



24th Conference of the European Society for
Cognitive Psychology

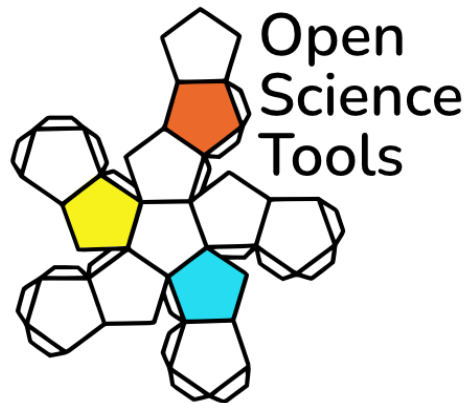
ABSTRACT BOOKLET



The University of Sheffield
1st - 6th September

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Committees

Organising Committee

Dr Vanessa Loaiza



Professor Claudia von Bastian



Scientific Committee

- Dr Emma Blakey
- Professor Claudine Bowyer-Crane
- Dr Sabrina Burr
- Dr Daniel Carroll
- Dr Amber Copeland
- Dr Ruth Corps
- Dr Rebecca Denniss
- Professor Megan Freeth
- Dr Alicia Forsberg
- Dr Alejandro Jimenez-Rodriguez
- Dr Myles Jones
- Dr Jennifer MacRitchie
- Dr Alekhya Mandali
- Professor Danielle Matthews
- Dr Tomás McDowell
- Professor Elizabeth Milne
- Dr Emma Morgan
- Dr Daniel Poole
- Professor Tony Prescott
- Dr Tim Riley
- Dr Hannes Saal
- Dr Marina Sarda Gou
- Professor Renee Timmers
- Dr Hazem Toutounji
- Dr Nemanja Vaci
- Dr Meesha Warmington
- Dr Anna Weighall
- Dr Alon Zivony

PhD Student Committee

- William Garvey
- Eleanor Hyde
- Elisabeth Knight
- James Myers
- Rosemary Wareham

Welcome Address from the President of ESCoP

Dear Delegates,

Welcome to the 24th Conference of the European Society for Cognitive Psychology (ESCoP) here in Sheffield, UK!



As an avid outdoors sports aficionado, I am particularly excited about the location of our society's conference this year in the [greenest city in the UK](#). Our conference organizers, Claudia von Bastian and Vanessa Loaiza, have put together a brilliant programme that showcases all of the best aspects of Sheffield as a vibrant and diverse European city nestled against the gorgeous [Peak District National Park](#). Indeed, the mix of events in the social programme will allow you to encounter all the charm and excitement of Sheffield that make it so unique in the UK and Europe more broadly: Code and music will come alive the Opening Reception's [Algorave](#) (a form of electronic music born in Sheffield); a cost-effective conference dinner will bring together colleagues from across fields and career stages at the [Cambridge Street Collective](#) (the largest purpose-built food hall in Europe); and a Farewell Reception at the [Kelham Island Museum](#) will creatively show off the city's industrial past. Claudia and Vanessa have further provided [several more optional activities on Saturday](#) following the conference that are sure to entice city people and nature lovers alike! If you have not already registered for one or more of these events, be sure to [get in touch](#) to avoid missing out!

While there is a chance that you may be a bit surprised by the wide array of amenities for you to enjoy in this best-kept-secret in Yorkshire, it is absolutely predictable that a fantastic scientific programme is in store for you. First, the pre-conference satellite events have been extended to include two-day workshops as well as part-day events that are intended to support our colleagues' professional development and networking opportunities. The Opening Ceremony and each morning main conference programme will include keynotes from four renowned scientists: Ruth Byrne (Broadbent Award recipient), Sylvie Belleville, Gaia Scerif, and Ven Popov (Bertelson Award recipient). Thereafter, we have a mix of parallel presentations: 175 symposium and regular talks, 268 posters, and 97 blitz talks from speakers coming from 36 different countries, representing all the best of cognitive psychology and allied disciplines.

In short, it is no wonder that I am greatly looking forward to this meeting! I wish all of you the best for a productive and stimulating conference.

Michał Wierzchoń

President of ESCoP

Welcome Address from the Organisers

Dear Delegates,

We are thrilled to welcome you to Sheffield for ESCoP 2025! It has been over 20 years since the biennial conference has taken place in the UK, and we are deeply honoured to host our colleagues in this vibrant, creative, and beautiful city.

Sheffield is known as the “Outdoor City”, offering the unique combination of a thriving urban centre surrounded by stunning natural landscapes. A third of the city lies within the Peak District National Park, making it one of the greenest cities in Europe. With a proud industrial heritage rooted in steelmaking, Sheffield has reinvented itself as a hub for innovation, culture, and the arts. While you are here, we encourage you to explore our museums, galleries, live music venues, and diverse food scene - ranging from award-winning street food to fine dining - and perhaps take a stroll through one of our many parks and gardens.



The University of Sheffield has been shaping the future through research and education since its founding in 1905, built on the support of the people of the city. Within the Faculty of Science, the School of Psychology conducts world-leading research in computational and cognitive psychology and neuroscience, ranging from fundamental studies to applied work tackling real-world challenges in collaboration with partners across the region, the UK, and beyond. The University’s welcoming, collaborative ethos extends far beyond the campus, and we are delighted to share our facilities and the spirit of our academic community with you during the conference.

We, the Scientific Committee, and the PhD Student Committee have worked hard to put together a scientific and social programme that blends the very best of our discipline with the unique character of Sheffield. We look forward to the exchange of ideas, the forging of new collaborations, and the celebration of our shared passion for researching cognition.

On behalf of all of us, we wish you an inspiring, enjoyable, and successful conference.

Claudia von Bastian and Vanessa Loaiza

ESCoP 2025 Organisers

Satellite Events

Creating Experiments Using PsychoPy and Pavlovia

Organizers: Rebecca Hirst and Kimberley Dundas from Open Science Tools

Taking place: Monday 1st and Tuesday 2nd of September, 9:00-17:00

Location: ICOSS B06

PsychoPy is a free, open-source, tool for creating and running experiments in the lab and pavlovia.org is a low-cost server for hosting and sharing experiments online, as well as a place to create surveys (a low-cost Qualtrics alternative). This workshop will introduce you to these tools, together we will create an experiment in PsychoPy builder, learn how to add flexibility to that experiment with python code snippets and launch that experiment online. We aim to make materials useful for beginners but also include useful tips and tricks for those already familiar with PsychoPy and Pavlovia. You do not need to have experience in python coding to attend this workshop (but we hope you learn some python skills as part of the sessions!). If you plan on attending the workshop and have any questions in advance (or questions on specific topics you might like covering) please contact workshops@opensciencetools.org

What you will need to do to prepare: Before the workshop, please make sure that you have a recent version of PsychoPy installed (a 2025 release) and that you have registered for a free pavlovia.org account using your institution's email address. Please check in advance of the session that your PsychoPy installation works (try running one of the example demo experiments in the app), if you encounter any difficulty please let us know and we will do what we can to assist in advance.

Analysing Data on the Level of Cognitive Processes

Organizers: Gidon T. Frischkorn, Ruhi Bhanap, and Isabel Courage

Taking place: Monday 1st and Tuesday 2nd of September, 9:00-17:00

Location: Diamond Workrooms 1 and 2

Traditional data analyses focus on behavioral performance indicators such as accuracy rates, response times or response selection. Typically, however, researchers are not interested in behavior per se, but in what it can tell us about the underlying cognitive processes. This workshop will introduce the use of cognitive measurement models to analyze data on the level of latent cognitive processes. A cognitive measurement model is a mathematical formalization of a theory that assumes processes that interact and generate the observed behavior in cognitive tasks. Such models are the Diffusion Decision Model (for choice reaction time tasks), the Memory Measurement model (for categorical memory tasks), or the Signal Discrimination model (for continuous reproduction memory tasks). Measurement models decompose one or more behavioral metrics into theoretically meaningful parameters and allow us to express and test scientific hypotheses about what influences these parameters.

In the workshop, we will provide an introduction into the Bayesian Measurement Model (bmm) R package that we developed to provide easy and accessible implementations of cognitive measurement models. We will cover some basic theoretical concepts and then investigate different cognitive measurement models that are implemented in the package. In an advanced track we also show how to add new models to the package for people that are developing their own cognitive measurement models.

What background knowledge is required for the workshop? Ideally you have worked with linear mixed effects models either using Frequentist or Bayesian estimation techniques as implemented in R packages such as: lme4, glmer, brms, or rstanarm. Preferably, you also have some experience with Bayesian statistics (we will not be able to provide an in-depth introduction but will cover basic concepts).

What should you prepare before the workshop? Please bring your own laptop with a current version of R (> 4.0.0) and RStudio installed. In addition, please install the 'bmm' package with all its dependencies. More information on the required packages can be found on the bmm GitHub repository: <https://github.com/venpopov/bmm>

Knowledge Exchange and Public Outreach

Organizers: PhD Student Committee

Speakers: Dr Annie Brookman-Byrne, Dr Alon Zivony, Prof Anna-Lena Schubert, and Dr Katie Pruszyński

Taking place: Tuesday 2nd September, 9:00-11:00

Location: Diamond Lecture Theatre 7

How can we effectively share cognitive psychology research with the world? This event features opportunities for discussion with presenters who will share valuable expertise in engaging with stakeholders and participant groups, crafting blog posts, writing opinion pieces, speaking on podcasts, and collaborating with news outlets. Attendees will be given practical guidance about tailoring communication with specific groups including educators, parents, older adults, and previous study participants. Join us to explore strategies for making your research, whatever your career stage, accessible, impactful and engaging for a broader audience.

Introduction to Functional Near-Infrared Spectroscopy (fNIRS) in Cognitive Psychology

Organizers: Sabrina Burr and Sheharyar Baig

Taking place: Tuesday 2nd September, 9:00-11:00

Location: ICOSS A16

This event will introduce functional near-infrared spectroscopy (fNIRS) and its uses in cognitive psychology research. fNIRS is a non-invasive, relatively inexpensive neuroimaging methodology that measures concentration changes of oxygenated and deoxygenated haemoglobin to assess brain activity. Thanks to its portability and tolerance to movement, fNIRS can be used for the study of numerous aspects of cognitive function in ecologically valid settings. It can also be used in combination with other physiological and neuroimaging methodologies, such as eye-tracking, EEG, and TMS. In this event, we will provide an overview of fNIRS followed by a demonstration of how to collect fNIRS data and conduct image reconstruction. No prior knowledge of fNIRS is necessary to attend this event. Reconstruction will be conducted in MATLAB, but participants will not need to have access to MATLAB to attend.

AI and Cognition: Rethinking Teaching and Assessment in the Age of Generative AI

Organizers: Tim Riley, Tomás McDowell and Emma Morgan

Taking place: Tuesday 2nd September, 9:00-12:30

Location: Diamond Lecture Theatre 2

Generative AI is rapidly reshaping higher education, with profound implications for teaching, learning, and assessment in cognitive psychology. This workshop is designed for university lecturers and researchers in cognitive psychology who want to better understand AI's evolving role in education, explore its potential as a teaching tool, and discuss strategies for addressing its impact on student assessment. The workshop will entail a series of engaging short talks from experts exploring current trends and challenges in integrating generative AI into cognitive psychology teaching. In addition, there will be an interactive session to facilitate discussion to share experiences and best practices as well as practical approaches to integrating AI to support learning while ensuring academic integrity. Whether you are already incorporating AI tools into your teaching or are looking to develop your awareness of its impact, this event offers a valuable opportunity to connect with colleagues, exchange ideas, and shape the future of cognitive psychology education. We invite cognitive psychology educators, researchers, and education specialists to join us in exploring this rapidly evolving landscape. Come and be part of the conversation on how we can best navigate AI's influence in cognitive psychology teaching and assessment.

Creating Inclusive and Safe Academic Spaces: Celebrating 25 Years of Women in Cognitive Science and Looking Ahead

Organizers: WiCS+ Europe

Chairs: María J. Maraver, University of Granada (Spain), and Marta Rivera Zurita, University of Balearic Islands (Spain)

Speakers: Judith F. Kroll, University of California, Irvine (USA), Co-Founder of Women in Cognitive Science, and Nura Sidarus, Royal Holloway University of London, UK, from the WiCS+ Europe Leadership Team

Taking place: Tuesday 2nd September, 13:30-16:30

Location: Diamond Lecture Theatre 7

PANEL DISCUSSION (13:30-15:00)

Women in Cognitive Science (WiCS) was founded in 2001, envisioned to support the professional development of young scholars in cognitive science. The need for WiCS arose from the historical underrepresentation of women in scientific environments, the necessity to reduce gender stereotypes and biases, and the goal to improve the visibility of both junior and senior women scientists. Significant advances have been made towards reducing gender inequalities over the last 25 years. Yet, many challenges remain, with recent global events reminding us that social change may not follow a linear path and cannot be taken for granted. This panel will look back at the foundation of WiCS and its trajectory, reflecting on what we have learned to inform how we can go forward in Widening Inclusivity in Cognitive Science (WiCS+), fostering a movement towards greater inclusivity, visibility, and professional growth for everyone in academia. Come join us in this conversation and share your own reflections, lessons learned from the past, suggestions for the future, and help us think together how best to navigate these changing times.

All gender identities are welcome, and we look forward to your participation in this discussion.

SPEED MENTORING & RECEPTION (15:00-16:30)

As part of this event, we invite you to participate in the WiCS+E speed mentoring session, which includes a coffee reception and offers junior researchers the opportunity to connect with senior faculty to discuss various aspects of research and academic careers. Based on sign-ups, participants will be matched with one or two mentors for brief, focused conversations designed to be both meaningful and productive. The goal is to foster in-depth discussions while also encouraging connections with individuals from diverse roles and backgrounds.

Illuminating the Mind's Eye: Advances and Applications of Eye Tracking in Cognitive Psychology

Organizer: Emma Morgan

Taking place: Tuesday 2nd September, 13:30-15:30

Location: ICOSS A16

This workshop will provide a comprehensive overview of cutting-edge eye tracking applications in psychology. Speakers will present their latest research, showcasing innovative uses of eye tracking techniques. Talks will explore how eye movement data offers unique insights into mental operations inaccessible through traditional data collection methods. A key highlight will be demonstrations of the newest eye tracking hardware and software from Tobii, a global leader in the field. Participants will experience firsthand the capabilities of these systems, including their accuracy, precision, and ease of use. Demonstrations will cover various eye tracking paradigms, from screen-based to mobile and wearable solutions, highlighting their potential for both laboratory and real-world research. The workshop will also foster interactive discussions, providing a platform for sharing best practices in eye tracking methodology. Attendees are encouraged to bring their own research questions and challenges for collaborative problem-solving. This workshop is designed for researchers at all levels, from students to experienced investigators, interested in leveraging eye tracking to advance our understanding of human cognition.

Keynote Speakers

Broadbent Lecture

Professor Ruth Byrne

Professor of Cognitive Science, Psychology

Professor of Cognitive Science, Trinity Inst. of Neurosciences (TCIN)

Ruth Byrne is the Professor of Cognitive Science in the School of Psychology and Institute of Neuroscience at Trinity College Dublin, Ireland. Her research expertise is in the cognitive science of human thinking, and her experimental work on reasoning and imaginative thought has advanced theoretical understanding of the common cognitive processes underlying rationality and creativity. Her books include, “The rational imagination: how people create alternatives to reality” (2005, MIT press), “Deduction”, co-authored with Phil Johnson-Laird (1991, Erlbaum Associates), and “Thinking, reasoning, and decision-making in autism”, co-edited with Kinga Morsanyi (2019, Routledge). In her keynote talk, she will discuss the nature of mental simulation in counterfactual thought, and its wide-ranging implications, for causal explanations, moral cognition, and understanding Artificial Intelligence.



Imaginative Thought – Abstract

I discuss the central role of imaginative thought in cognition. I highlight experimental evidence on causal reasoning that illustrates the role of imaginative thought in how we construct explanations and consider the cognitive processes that underlie the simulation of possibilities. I also outline experimental evidence on moral decision making that demonstrates the role of imaginative thought in understanding others' intentions and discuss its implications for engagement with artificial intelligence.

Wednesday Keynote: 09:00 – 10:00**Professor Sylvie Belleville**

Professor in Psychology

Université de Montreal and the research director of the Institut

Universitaire de Gériatrie de Montréal (IUGM)

Sylvie Belleville is a Professor at the University of Montreal's Psychology Department and researcher at the Research Center of the Institut Universitaire de Gériatrie de Montréal. She holds a Tier 1 Canada Research Chair on the Cognitive Neuroscience of Aging and Brain Plasticity. Recognized for her work in cognitive training and preventing age-related cognitive decline, she has received numerous prestigious awards including the Prix Armand-Frappier, Brenda Milner Award, Women of Distinction YWCA award, Prix du Québec Armand Frappier and an honoris causa doctorate from Mons University. In her keynote, she will discuss cognitive training interventions in older adults, particularly those at risk for dementia. She will also present studies examining brain activation changes related to cognitive training and how this relates to cognitive reserve models.

**Cognitive Training in Aging: Evidence, Mechanisms, and Pathways to Implementation – Abstract**

With populations aging worldwide, the need for effective strategies to maintain cognitive health has never been more urgent. In this presentation, I will explore the evolving science of cognitive training interventions for older adults, including those at risk of cognitive decline. Drawing on work from my laboratory, I will present evidence supporting the efficacy of cognitive training and its effect on brain activation. I will discuss how these findings inform our understanding of the underlying mechanisms and active ingredients, and their relationship to cognitive reserve models. Finally, I will illustrate how principles from implementation science can facilitate the translation of evidence-based interventions into real-world clinical and community settings, thereby maximising their reach and impact. Together, these perspectives point to a future in which cognitive training is not only scientifically robust but also accessible, and transformative for aging populations.

Thursday Keynote: 09:00 – 10:00**Professor Gaia Scerif**

*Professor of Developmental Cognitive Neuroscience
Department of Experimental Psychology, University of Oxford*

Gaia Scerif is a Professor of Developmental Cognitive Neuroscience at the University of Oxford. Her research focuses on the development of attentional control and those underlying attentional difficulties, from their neural correlates to their outcomes on emerging cognitive abilities. Given the importance of attention to how we learn and behave in everyday situations, particularly the classroom, it is imperative to understand attention differences and difficulties. Professor Scerif has collaborated with individuals and families with specific genetic conditions (e.g., fragile X syndrome, Down syndrome) and neurodivergent communities (e.g., autism, ADHD). Ultimately, this work is of interest both to basic neuroscience and, most importantly, to the families and individuals with whom we work.

**Attention, Memory, and Learning Dynamics: Insights from Development and Diversity - Abstract**

Attentional processes play a crucial role in biasing incoming information in favour of what is relevant to further processing. A key focus of the current seminar will be a new framework for attentional processes: attentional influences are not unidirectional, but highly dynamic in their interplay with memory and learning. This is because attention both shapes mnemonic and learning processes, and is shaped by them. I will illustrate evidence for this dynamic interplay via two complementary lines of work: age-related differences on the one hand and diversity on the other, each targeted using cognitive and neuroscience methods.

The first line of evidence will focus on what we can learn about the temporal dynamics of attention, memory and learning, if we study them in observers of different ages. First, eye-tracking data were collected while children and adults deployed attention to optimize maintenance of information in memory, and later used it to guide attention. For both adults and children attentional processes interplay dynamically with memory, and memory guides attention during later processing, but does so differently across age groups. Second, electroencephalographic (EEG) methods were also used to investigate the dynamics of the attention and learning interplay in the context of new learning, by directing adults' and children's attention to key dimensions of to-be-learned stimuli. Children were less efficient than adults at learning new information, and this process recruited attentional networks differently compared to adults, pointing to age-related changes in attention dynamics from the child to the adult state.

The second line of evidence will explore what we can learn about attention dynamics by studying two dimensions of diversity: neurodiversity and socio-economic diversity. First, using similar paradigms to the ones employed in the first part of the talk, I will illustrate how attention dynamics can differ when neurodivergent children pay attention in function of memory. Second, longitudinal and intervention data point to influence of socio-economic diversity on the interplay between complex

attentional processes and learning. I close by describing our recent steps to understand how dimensions of diversity influence the interplay between attention, memory, and learning.

In conclusion, evidence from development and diversity point to the dynamic interplay between attention, learning, and attentive observers, across ages, as well as across dimensions of neuro and socio-economic diversity. In turn, these findings highlight the importance of studying attention in its integration with other cognitive processes, rather than in isolation.

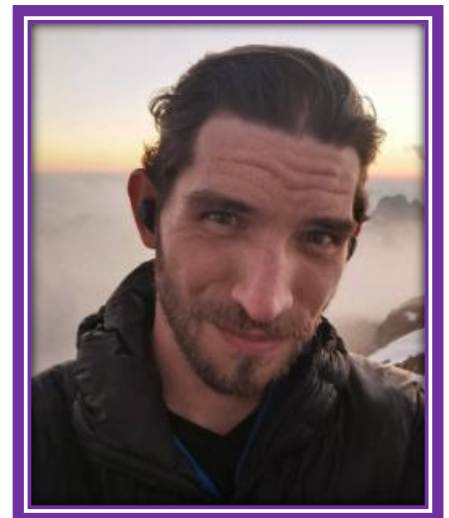
Friday Keynote: 09:00-10:00

Dr Ven Popov

Senior Scientist

Department of Psychology, Universität Zürich

Ven Popov is a tenured Senior Scientist at the Department of Psychology, University of Zürich, where he leads the Computational Modeling of Behavior group. He earned his PhD in Cognitive Psychology from Carnegie Mellon University in 2020 and subsequently worked as a postdoctoral researcher at the University of Zürich before transitioning to his current role at the beginning of 2024. His research focuses on developing integrative computational models of human memory, investigating cognitive resource allocation, and advancing theory-building in psychological science through formal modelling. His contributions have been recognized with the 2021 Glushko Dissertation Prize from the Cognitive Science Society and the 2025 Bertelson Early Career Award from the European Society for Cognitive Psychology.



Conference Venue

The University of Sheffield



Overview

The conference will be taking place across four of the University of Sheffield buildings. For detailed accessibility information, please visit our website: <https://www.escop2025.com/accessibility>

The Octagon Centre

The Octagon Centre is a versatile event venue located at the University of Sheffield. Built in 1983, it is a multi-purpose conference centre and music venue which comprises an eight-sided auditorium. This is where the Opening Ceremony and Broadbent Lecture will be taking place on Tuesday, 2nd September.

The Diamond

The Diamond was completed in September 2015 and was built to replace the Grade II listed Edwardian wing of the Jessop Hospital. It is now the home of the Faculty of Engineering, which houses 19 laboratories and over 30 class rooms linked by a central atrium with a large study space and cafe. Keynotes and many of the symposia, regular talk, and blitz talk sessions will run in parallel in seven lecture theatres and two work rooms.

The ICOSS

The ICOSS (Interdisciplinary Centre of the Social Sciences) is the home of the School of Psychology at the University of Sheffield. The 2-day PsychoPy workshop will take place in B06 on the first floor, and one of the parallel regular talk sessions will take place in room A16 on the ground floor.

Student's Union/Uni Central

The central building is a major hub for students and staff at the University of Sheffield which offers various support services and resources. The Opening Reception will take place here, where you can network and enjoy an Algorave before the main conference begins.

How to get here

By Train

Sheffield is just 2 hours from London and 3 hours 30 minutes from Edinburgh. The mainline station in Sheffield offers an impressive entry to the city, with fast direct links from London St Pancras International departing every 30 minutes from early morning to late at night.

If you are travelling from London, or on routes operated by East Midlands Railway, you'll find all the timetable and fare information you need on the [East Midlands Railway](#) website.

There are also hourly fast trains from Manchester City Centre which connect to/from Manchester International airport.

You can find more detailed information on arriving into Sheffield from our closest airports [here](#).

By Tram

You can get around Sheffield efficiently by making use of the frequent trams. The University of Sheffield stop is the nearest tram stop to the Diamond venue. From Meadowhall this is the 'yellow line' and from Halfway this is the 'blue line'.

By Car

Sheffield is fantastically well connected for delegates travelling by car. Exit the M1 at Junction 33 and take the "Sheffield A630" exit and follow signs to Sheffield City Centre.

Parking: Sheffield City Council operates several surface-level car parks; on-street parking charges and maximum parking times vary – details can be found [here](#). Privately operated multi-storey and surface-level car parking are also available across the city centre to give motorists lots of choice. Details (including up-to-date availability) can be found at en.parkopedia.co.uk/parking/Sheffield/. If you are driving into Sheffield, please check with your hotel or venue for any special offers.

By Air

With 3 international airports within less than an hour's drive, Sheffield is easy to reach from overseas destinations.

Manchester Airport is one of the UK's busiest airports. There is no longer a direct rail service from Manchester Airport, and you will need to change at Manchester Piccadilly to travel to Sheffield by train. Taxi and Uber services are available at the airport.

Leeds Bradford Airport is also well served by European and long-haul destinations. Sheffield can be reached by using a taxi service or bus to Leeds and then train to Sheffield.

Nottingham East Midlands receives routes from European and long-haul destinations. Sheffield can be reached by road using a taxi service or take the airport shuttle to East Midlands Parkway and take the train (operated by East Midlands Trains) to the centre of Sheffield.

General Information

Speaker Preview Room

All speakers must send their presentation slides to the organisers no later than 48 hours before your presentation is due to take place using the link provided previously. All speakers can use the speaker preview room (**Computer Room 5**) to speak to the Audio-Visual Team to run through their presentation ahead of their time slot to ensure that everything is working correctly. All presentations should be prepared in PowerPoint or PDF.

Internet Access

The venue has free public Wi-Fi. Please use “WIFI Guest” and fill out your details to connect.

Conference App

Immerse yourself in the conference by downloading the EVENT APP. The optional conference app will serve as a convenient resource for delegates to be quickly linked to the PDF programme and abstract booklet, along with helpful information about travel and social events. Details on how to log into your personal account of the event app were provided in the final delegate information email.

Coffee Breaks and Lunch

Refreshments and lunch will be served in the Basement and Moonscape of the Diamond throughout the conference.

Cloakroom

If you need to leave your luggage on the last day of the conference before you leave Sheffield, there will be space available in **Computer Room 5**.

Session Locations

Wednesday

Time	Diamond LT1	Diamond LT2	Diamond LT3	Diamond LT4	Diamond LT5	Diamond LT6	Diamond LT7	Diamond WR1	Diamond WR2	ICOSS A16
09:00 – 10:00	Keynote: Sylvie Belleville		Keynote streaming	Keynote streaming						
10:00 – 10:30	Coffee Break									
10:30 – 12:10	KSYM-01 Maintaining cognitive health in late adulthood: Individual differences and interventions	SYM-01 Eye movements in reading acquisition	SYM-02 Working memory beyond the item	SYM-03 The role of inhibition in language selection in bilinguals: The current state of evidence	SYM-04 Cross-disciplinary perspectives on real-time speech processing: When top-down prediction meets bottom-up input	SYM-05 Déjà vu and beyond: Investigating spontaneous cognitive experiences	SYM-06 Sense of Agency (SoA): Towards empirically driven measures and beyond	European Research Council: Introduction to the ERC funding opportunities	SYM-07 Interplays between creativity and emotion in music listening and performance	
12:10 – 14:00	Lunch Break									
12:30 – 14:00	Poster Session (P-01)									
14:00 – 15:40	T-01 Learning & Memory I	T-02 Memory & Metacognition	T-03 Cognitive Enhancement & Plasticity	T-04 Attention & Cognitive Control I	T-05 Cognitive Control & Neuroscience	T-06 Social Cognition	T-07 Language & Learning	T-08 Motor Cognition	T-09 Statistical & Computational Modelling	T-10 Individual Differences
15:40 – 16:10	Coffee Break									
16:10 – 17:50	KSYM-02 The role of mental simulation in thinking	SYM-08 Cognitive Mastery in play: From board to digital games as models of expertise	SYM-09 How does long-term memory knowledge support working memory? The effects of meaningfulness, levels of processing and elaboration	SYM-10 Individual differences in visual attention	SYM-11 On the functional relation between cognitive and motor processes: Current perspectives for an integrated view	SYM-12 Exploring cognitive and linguistic mechanisms in word processing across diverse languages and contexts	SYM-13 Current perspectives on mentalizing: Social cognition across contexts		SYM-37 Perception of artificial agents as social or self-aware others	
18:00 – 19:00	B-01 Learning & Memory I	B-02 Metacognition	B-03 Attention & Cognitive Control I	B-04 Language & Bilingualism I	B-05 Cognitive Ageing	B-06 Sensation & Perception	B-07 Numerical & Mathematical Cognition	B-08 Neurodiversity	B-09 Social Cognition	
19:30 – late	PhD Event University Arms									

Thursday

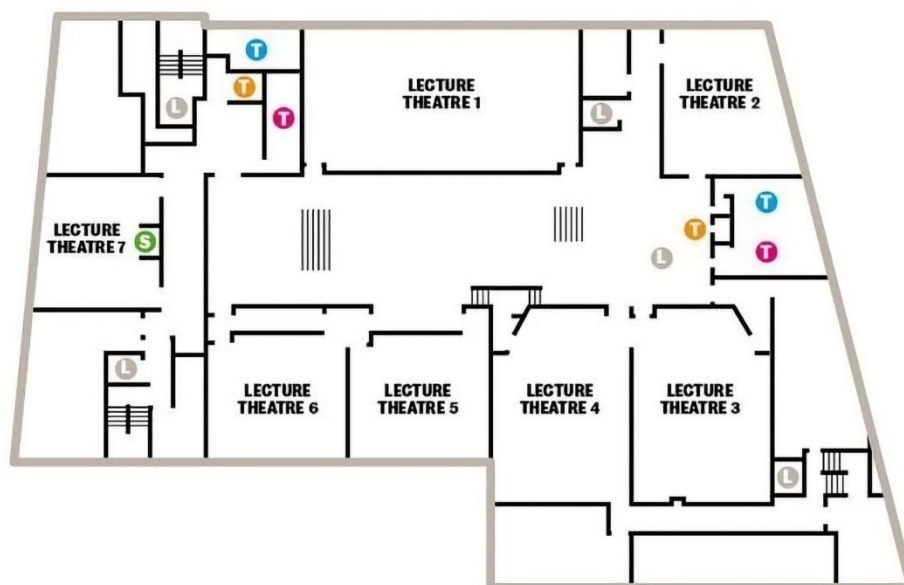
Time	Diamond LT1	Diamond LT2	Diamond LT3	Diamond LT4	Diamond LT5	Diamond LT6	Diamond LT7	Diamond WR1	Diamond WR2	ICOSS A16
09:00 – 10:00	Keynote: Gaia Scerif		Keynote <i>streaming</i>	Keynote <i>streaming</i>						
10:00 – 10:30	Coffee Break									
10:30 – 12:10	KSYM-03 The cognitive and neural underpinnings of executive functions in development: Insights from diverse populations and methodologies	SYM-14 Engagement and cognitive health in older adults	SYM-15 The focus of attention: Insights, progress, and what lies ahead	SYM-16 Moving Beyond standard memory and language: Insights from evolutionary psychology (Take 1)	SYM-17 Drift-diffusion modelling: A method for exploring group differences in psychology	SYM-18 The effects of expectations on cognition and beyond	SYM-19 Towards a more diverse science of reading and language processing, inside and outside the laboratory	SYM-34 Innovative approaches to assessing and understanding dyslexia and related language disorders	SYM-20 The sound of thought – Exploring the frontiers of inner speech	
12:10 – 14:00	Lunch Break									
12:30 – 14:00	Poster Session (P-02)									
14:00 – 15:40	T-11 Learning & Memory II	T-12 Attention & Cognitive Control II	T-13 Attention & Cognitive Control III	T-14 Language & Bilingualism I	T-15 Music & Perception	T-16 Decision Making I	T-17 Numerical & Mathematical Cognition	T-18 Emotion	T-19 Social Cognition & Consciousness	T-20 Learning & Memory III
15:40 – 16:10	Coffee Break									
16:10 – 17:50	PS-SYM We speak many languages! Bridging barriers to bring the diversity of language experience into cognitive psychology	SYM-21 Learning in the lab: insights on oral and written language from artificial orthographies experiments	SYM-22 The next step in memory research: Recent theoretical developments and future directions	SYM-23 Moving Beyond standard memory and language: Insights from evolutionary psychology (Take 2)	SYM-24 Gaze-based rehearsal during retrieval from working memory	SYM-25 The role of the body in cognition and emotion	SYM-26 Cognitive interventions across the lifespan: From design to implementation in clinical and healthy populations		PGR Committee: Career Transitions	
18:00 – 19:00	Business Meeting		Business Meeting <i>streaming</i>	Business Meeting <i>streaming</i>						
19:30 – late	Conference Dinner <i>Cambridge Street Collective</i>									

Friday

Time	Diamond LTI	Diamond LT2	Diamond LT3	Diamond LT4	Diamond LT5	Diamond LT6	Diamond LT7	Diamond WR1	Diamond WR2	ICOSS A16
09:00 – 10:00	Bertelson Award: Ven Popov		Keynote <i>streaming</i>	Keynote <i>streaming</i>						
10:00 – 10:30	Coffee Break									
10:30 – 12:10	KSYM-04 Theory building in cognitive psychology: The role of computational models	SYM-27 Understanding the cognitive mechanisms supporting conversation across typical and atypical populations	SYM-28 Binding and retrieval in action control: Part I: Modulations of binding and retrieval processes	SYM-29 Seeing the world through rose-colored glasses or feeling blue: The impact of emotions on working memory	SYM-30 Closed-loop systems in behavioral training for impact: designing adaptive performance-based challenges for players of all abilities	SYM-31 Advancing mentalizing research: From core mechanisms to cultural influences	SYM-32 Are eyes special in shaping attention? Emerging perspectives from social and non-social cues		SYM-33 (Electro) physiological constraints on language	
12:10 – 14:00	Lunch Break									
12:30 – 14:00	Poster Session (P-03)									
14:00 – 15:40	T-21 Learning & Memory IV	T-22 Memory & Attention	T-23 Attention & Cognitive Control IV	T-24 Attention & Cognitive Control V	T-25 Language & Bilingualism II	T-26 Language & Bilingualism III	T-27 Reading & Writing	T-28 Embodied Cognition	T-29 Sensation & Perception	T-30 Decision Making II
15:40 – 16:10	Coffee Break									
16:10 – 18:00	EDI Panel: Disrupting the Norm: Centring Diversity and Inclusion in Cognitive Psychology		SYM-35 Binding and retrieval in action control: Part II: Dissociating binding and retrieval from inhibition and learning	SYM-36 From sensory presentation to working memory representations: New insights on how working memory operates in our sensorily rich world	SYM-40 Can we retrieve information based on relational similarity?	SYM-38 New trends in measuring attentional control	SYM-39 The interplay of orthography and phonology in language production and learning			
18:00 – 19:00	B-10 Learning & Memory II	B-11 Learning & Memory III	B-12 Attention & Cognitive Control II	B-13 Reasoning & Language	B-14 Reading & Writing	B-15 Language & Bilingualism II	B-16 Embodied Cognition	B-17 Statistical & Computational Modelling	B-18 Individual Differences	
19:30 – late	Farewell Cocktails Kelham Island Museum									

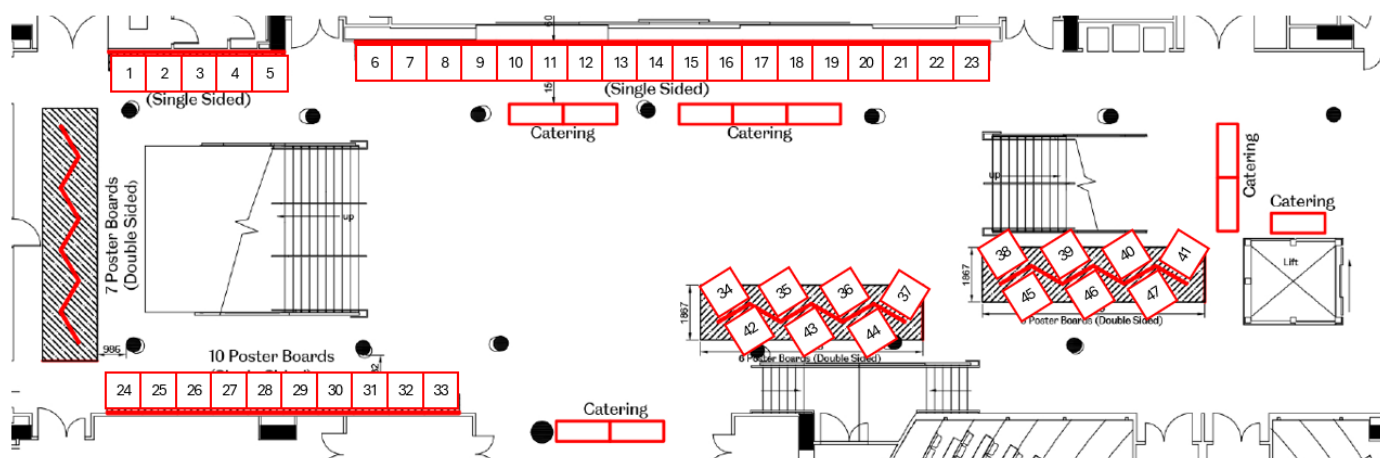
Floor Plan

Lecture Theatres

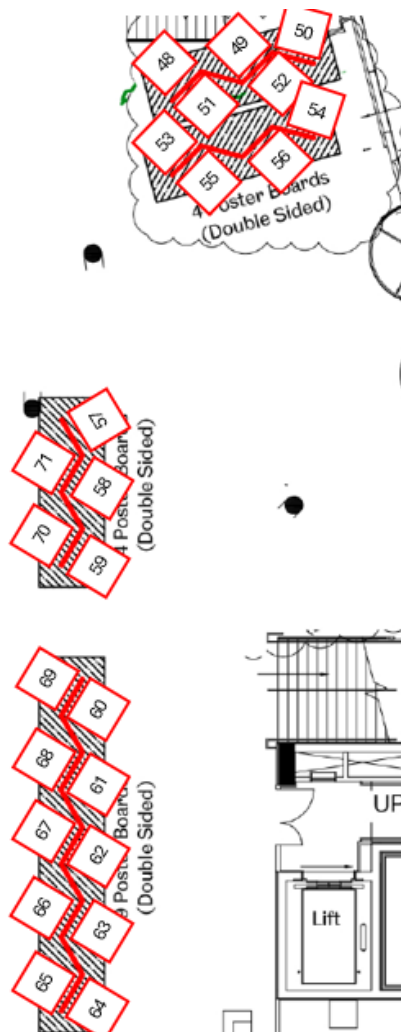


Poster Boards

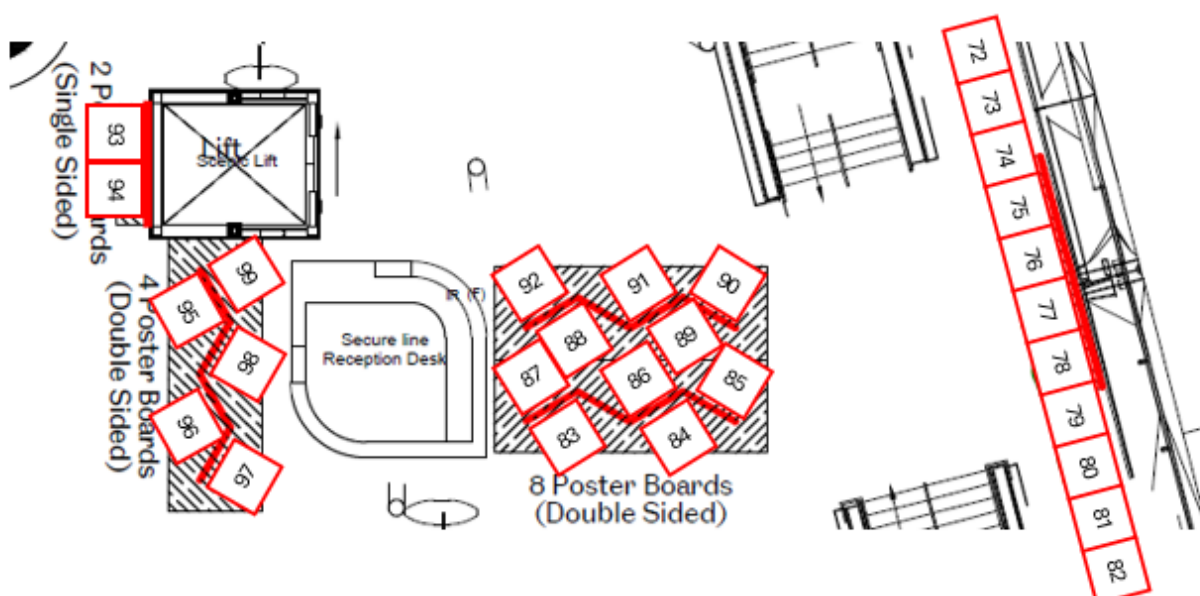
Basement



Ground Floor



Moonscape



Information for Talks and Posters

The official language of the meeting is English.

Symposia and Talk Sessions

Symposium and session chairs are asked to strictly keep to the schedule of the sessions to allow attendees to switch between sessions. Symposium and regular talks are allocated a 20-min time slot (15-min presentation followed by a 5-min Q&A). Blitz-talks are allocated a 10-min time slot (5-min presentation followed by a 5-min Q&A).

Symposium and session chairs will be provided with signs to inform presenters about their remaining time (5 min, 1 min, STOP).

Chairs are asked to follow the briefing document sent by email and the Quick Guide posted in the rooms.

Poster Presentations

Poster presenters are asked to prepare their poster in portrait format (DIN A0 size, equivalent to a maximum of 84 cm width x 119 cm height). **There will be three poster sessions, one on each day of 3rd to 5th September, from 12:30 to 14:00.** There is a number assigned to each poster (see poster session schedule). The number of your poster indicates the board where you should hang it. Please hang your poster at your given poster board number in the morning to allow interested colleagues the chance to view it throughout the day. During the scheduled poster session, the presenting author is expected to be available for questions and discussions. We also recommend the preparation of handouts or QR codes for making the poster available to the attendees.

Finally, we kindly ask the presenters to remove their posters at the end of your poster session to allow presenters of the next session to hang their posters.

Social Events

Opening Reception

To welcome you all to Sheffield, we would like to offer you a complimentary ticket to our Opening Reception to enjoy a drink and a snack with peers before a full week of learning and networking. This will take place at The Foundry and will begin at 7 pm after the Broadbent lecture. Please bring your free drink token with you that you will have been given with your name badge, to exchange for a drink upon arrival.



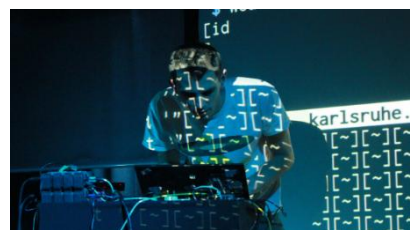
What's Included?

- Entry to Foundry and Fusion
- 1 free drink upon arrival
- Finger food pizza buffet
- Algorave entertainment (until late)

Algorave

Algorave uses live coding techniques to generate music from algorithms. Experience an audio-visual show from the following artists:

- hellocatfood
- TYPE
- Yaxu
- Eye Measure
- Rumblesan
- Wispeh



PhD and ECR Social Event

We welcome all PhD student and Early-Career delegates to our social event at the University Arms on 3rd September from 7.30 pm. Join us in this traditional-style British pub for a fun quiz.

This is a ticketed event which will have been purchased during registration. Please note that this is now full – however, please feel free to join us at the University Arms for networking after the event has finished.

What's included?

- Entry to the University Arms
- Food buffet
- Networking opportunity
- Ice breaker bingo
- Quiz

Conference Dinner

Cambridge Street Collective

To celebrate a successful conference, we will be hosting our Conference Dinner at Europe's largest purpose-built food hall, Cambridge Street Collective! Tickets cost £25 which includes a voucher for £40 to spend on food and drink of your choice (valid for 12 months). Visit the website to see over 20 different food and drink stalls (subject to change) that are available at Cambridge Street Collective.

Take a virtual tour [here!](#)

What's Included?

- Entry to Cambridge Street Collective
- DJ & dancefloor
- £40 voucher per person to spend on food & drinks
- Networking opportunity



Farewell Reception

Kelham Island Museum

We would like to invite our delegates to a farewell reception on the final day of the conference. It takes place on the last day of the conference and is £20 to attend and enjoy a drink with peers. Please join us to say 'farewell' to ESCOP 2025!

What's Included?

- Entry to Kelham Island Museum
- 1 free drink upon arrival
- Light nibbles
- Limited free parking (based on a first come first served basis)



Scientific Programme

Session Details

Tuesday

17:00 – 18:00: Opening Ceremony

Location: The Octagon

18:00 – 19:00: Keynote - Professor Ruth Byrne

Location: The Octagon

19:30 – late: Opening Reception

Location: Student Union, Foundry/Fusion

Wednesday

09:00 – 10:00: Keynote - Professor Sylvie Belleville

Location: The Diamond, LT1, with overflow streaming to LT3 and LT4

10:30 – 12:10: Symposia

KSYM-01: Maintaining Cognitive Health in Late Adulthood: Individual Differences and Interventions

Chair(s): Claudia von Bastian, Tilo Strobach

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Correlates of Daily Memory Lapses in Older Adults: Results From an Intensive-Longitudinal Study	Gizem Hülür	Gizem Hülür, Johanna Hartung, Jacqueline Mogle, Allison A. M. Bielak
2	No Transfer After Processing Speed Training Across the Adult Lifespan: Insights From Drift-Diffusion Modelling	Claudia von Bastian	Claudia von Bastian, Alice Reinhartz, Eleanor R. A. Hyde, Shuangke Jiang, Sylvie Belleville, Tilo Strobach
3	Promoting Well-Being and Cognitive Functioning in Healthy Older Adults – A Randomized Controlled Trial on the Effects on a Combined Cognitive and Stress-Management Training	Melanie Mack	Melanie Mack, Chiara Scarampi, Emilie Joly-Burra, Sascha Zuber, Matthias Kliegel

No.	Title	Presenter	Authors
4	Cognitive Interventions to Support Cognitive Functioning Among Older Adults: Does Metacognition Matter?	Elena Carbone	Elena Carbone, Erika Borella
5	Cognitive Ageing Interventions in Community Settings: Opportunities for Increasing Activity Engagement in the Real World	Alan Gow	Alan Gow

SYM-01: Eye Movements in Reading Acquisition

Chair(s): Anastasiya Lopukhina

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Changes in Length, Frequency, and Predictability Effects During Reading Development in German: Results From a Longitudinal Eye-Tracking Study	Sascha Schroeder	Sascha Schroeder, Simon Tiffin-Richards
2	Spatial Parameters of Eye-Movement Control During Reading in Russian-Speaking Children	Olga Parshina	Olga Parshina, Tatiana Eremicheva, Anastasiya Lopukhina
3	Characterising Children's Refixation Behaviour During Reading in English: A Corpus Study	Sara Milledge	Sara Milledge, Chuanli Zang, Hazel I. Blythe, Simon P. Liversedge
4	Development of the Perceptual Span in Russian-Speaking Children	Vladislava Staroverova	Vladislava Staroverova, Anastasiya Lopukhina
5	Where Do Children Look When Watching Videos With Same-Language Subtitles?	Anastasiya Lopukhina	Anastasiya Lopukhina, Walter van Heuven, Rebecca Crowley, Kathleen Rastle

SYM-02: Working Memory Beyond the Item

Chair(s): Johanna Hein

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Rapid Source Forgetting Across Modalities: Verbal and Visual Information Is Lost	Molly Delooze	Molly Delooze, Dominic Guitard, Nelson Cowan, Candice Morey
2	The Role of Prior Associative Knowledge in Visual Working Memory for Real-World Objects	Xinchi Yu	Xinchi Yu, Weizhen Xie
3	Declarative and Procedural Working Memory: Common Processes Underlying Maintenance, Interference, and Learning	Isabel Courage	Isabel Courage, Gidon Frischkorn
4	Exploring Processing and Maintenance of Uni-Modal and Multi-Modal Binding in Working Memory	Hatice Cinar	Hatice Cinar, Amy Atkinson, Amanda Waterman, Richard Allen
5	The Effect of Attentional Load on Item and Order Memory in Visual and Spatial Working Memory	Johanna Hein	Johanna Hein, Robin Remouchamps, Steve Majerus, Evie Vergauwe

SYM-03: The Role of Inhibition in Language Selection in Bilinguals: The Current State of Evidence

Chair(s): Aureliu Lavric, Srimoyee Chaterjie

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Language Inhibition or Activation? A Discussion of Data Patterns Often Interpreted as Reflecting Inhibition During Language Selection	Angela De Bruin	Angela De Bruin
2	Switching Between Listeners During Bilingual Language Production	David Peeters	David Peeters
3	The Role of Inhibition in Bilingual Control: Clear Inhibition but Unclear Effects of Language Dominance	Iring Koch	Iring Koch, Vuslat Karaaslan, Tanja C. Roembke, Andrea M. Philipp, Mathieu Declerck
4	No Indication of 'Global' Language Inhibition Persisting From One Trial to the Next: Evidence From Two Manipulations of Picture Naming	Srimoyee Chaterjie	Srimoyee Chaterjie, Stephen Monsell, Aureliu Lavric
5	Symposium Discussion	David Green	David Green

SYM-04: Cross-Disciplinary Perspectives on Real-Time Speech Processing: When Top-Down Prediction Meets Bottom-Up Input

Chair(s): Xin Xie

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	The Role of Phonological Prediction in Comprehension: A Meta-Analysis	Aine Ito	Aine Ito
2	Neural Signatures of Speech Prediction Error Are a Biological Marker for Spoken Word Recognition	Matt Davis	Matt Davis, Ediz Sohoglu
3	Sensory Processing and Prediction During Speech Comprehension: Neural Implementation in Single Cells and Region-Wide Structures	Laura Gwilliams	Laura Gwilliams
4	The Consistency of Speech Perception Is More Important Than the Nature of Speech Categories: The Role of Top-Down Factors	Bob McMurray	Bob McMurray, Hyojun Kim, Ethan Kutlu, Sita Carraturo, John Muegge
5	Symposium Discussion	Xin Xie	Xin Xie

SYM-05: Déjà Vu and Beyond: Investigating Spontaneous Cognitive Experiences

Chair(s): Krystian Barzykowski

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	What Is Familiarity? The Complex Nature of an Apparently Simple Form of Memory	Jérémy Gardette	Jérémy Gardette, Christine Bastin, Emma Delhay
2	A Comparison of Déjà Vu, Involuntary Autobiographical Memories, and Unexpected Thoughts Across the Lifespan	Anne M. Cleary	Anne M. Cleary, Caitlin Mills
3	Understanding the Development of Déjà Vu and Other Spontaneous Cognitions in Children	Akira O'Connor	Akira O'Connor, Erin Robbins
4	Relationship Between Metacognitive Accuracy and Déjà Vu Incidence: Evidence From Children Aged 10–16	Taisiia Polianskaia	Taisiia Polianskaia, Krystian Barzykowski, Chris J.A. Moulin
5	Bridging Perspectives on Spontaneous Cognition: Towards a Comprehensive Understanding	Lia Kvavilashvili	Lia Kvavilashvili

SYM-06: Sense of Agency (SoA): Towards Empirically Driven Measures and Beyond

Chair(s): Robrecht van der Wel, Pernille Hemmer, Agnieszka Wykowska

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	The Association of Trait Sense of Agency and Action Decisions	Katharina Schwarz	Katharina Schwarz
2	How to Measure Sense of Control Using Explicit Reports	Mateusz Woźniak	Mateusz Woźniak, Agnieszka Wykowska
3	Unpredictable Outcomes Negatively Impact the Sense of Agency More Than Unpredictable Actions	Laura Saad	Laura Saad
4	Sense of Agency: Improving Our Understanding of Its Measurements	Robrecht van der Wel	Robrecht van der Wel, Pernille Hemmer
5	Understanding Joint Agency: What Is It and How Can We Measure It?	Janeen Loehr	Janeen Loehr

SYM-07: Interplays Between Creativity and Emotion in Music Listening and Performance

Chair(s): Renee Timmers

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Creativity Facilitates the Flow Experience in Improvising Flamenco Duos	Atilla Vrasdonk	Atilla Vrasdonk, Peter E. Keller, Tor Endestd, Jonna K. Vuoskoski
2	Creativity and Emotion in Group Music-Making for People Living With Dementia	Jennifer MacRitchie	Jennifer MacRitchie, Justin Christensen
3	A Scoping Review of Literature on Creativity and Emotion in Music Cognition	Renee Timmers	Renee Timmers, James Vaidya
4	Creativity and Emotion in Expressive Performance of Western Classical Music	Yuko Arthurs	Yuko Arthurs, You Yue, Renee Timmers
5	Construction of Emotion in Music Listening: The Role of Self-Construal Across Cultures	Jonathan Tang	Jonathan Tang

10:30 – 12:10: Introduction to the ERC funding opportunities

Pilar Lacruz, European Research Council

Pilar Lacruz has a master's degree in Clinical Psychology from the University of Deusto (Spain) and postgraduate studies in Artificial Intelligence (Cognitive Science) from University of Leuven (Belgium). She has also a master's degree in Law from the University of Deusto (Spain). She has worked at regulatory affairs manager in a Belgian Foundation that runs clinical trials in cancer and as Policy Officer at Directorate General for Health and Consumers of the European Commission in different areas: Substances of human origin,

Tobacco control and Food contact materials. In 2012 Pilar joined the European Research Council Executive Agency and since 2016 she is the Panel coordinator for the SH4 panel 'The Human Mind and its Complexity' that covers Cognitive Science, Psychology, parts of Philosophy and Linguistics. Pilar will present the ERC Work programme for 2025, which incorporates several changes.

12:30 – 14:00: Poster Session 1 (P-01)

Sensation & Perception I

Location: The Diamond, Basement

No.	Title	Presenter	Authors
3	The Speed and Automaticity of Action Categorisation	Filip Durovic	Filip Durovic, Angelika Lingnau, Marieke Mur, Paul Downing
4	Implicit Bias in Associating Educational Roles: Gender, Age, and Appearance	Olga Daneyko	Olga Daneyko, Daniele Zavagno
5	The Influence of Second-Order Facial Features on Gaze-Following Behaviour and Attentional Biases	Federico Paulesu	Federico Paulesu, Daniele Zavagno, Matteo De Tommaso, Rossana Actis-Grosso

Numerical & Mathematical Cognition I

Location: The Diamond, Basement

No.	Title	Presenter	Authors
6	Which of the Familiar Fractions 1/4, 1/3, 1/2, 2/3, and 3/4 Are Represented More Precisely Than Unfamiliar Fractions on the Number Line?	Yuki Tanida	Yuki Tanida, Masahiko Okamoto
7	Evidence for Early Automatic Detection of Symbolic Numbers as a Category: A Visual Mismatch Negativity (vMMN) Study	Petia Kojouharova	Petia Kojouharova, Zahra Biabani
8	From Numbers to Attention: Exploring the Interaction Between Numerical Cognition and the Orienting Network Through the SNARC Effect	Sema Yıldırım	Sema Yıldırım, Gülten Ünal

No.	Title	Presenter	Authors
9	Evidence for Varying Levels of Task Conflict in the Gestalt Stroop Task	Ronen Hershman	Ronen Hershman, Eldad Keha, Lisa Beckmann, Avishai Henik, Ayelet Sapir
10	Three-Minute Number Line Estimation Tasks	Hanit Galili	Hanit Galili, Avishai Henik
11	Task-Dependent Nature of the SNARC Effect: A High-Powered Investigation in Turkish Participants	Hakan Çetinkaya	Hakan Çetinkaya, Seda Dural, Merve Bulut, Ayşenur Cendemir, Melike Şefikoğlu, Beria Haugen
12	Do Mathematicians Process Numbers Uniquely? A Multilab Preregistered Study on Automatic Number Processing in Experts and Controls	Mateusz Hohol	Mateusz Hohol, Martyna Sroka, Michał Obidziński, Roland H. Grabner, Michaela Meier, Mariagrazia Ranzini, Krzysztof Cipora
13	Magnitude Discrimination and Its Stability in House Cricket (<i>Acheta Domesticus</i>)	Julia Klimecka	Bartosz Baran, Julia Klimecka, Krzysztof Cipora, Mateusz Hohol
14	Math and Verbal Fluency Across Adulthood: Insights Into Aging and Individual Differences	Yarden Glikzman, Sharon Naparstek	Yarden Glikzman, Sharon Naparstek
15	Mid-Sagittal Expression of the SPoARC Effect: Sustainability of the Cultural Assumption?	Lucie Attout	Lucie Attout, Suzanne Lefevre, Pom Charras

Learning & Memory I

Location: The Diamond, Basement

No.	Title	Presenter	Authors
17	Numbers in the Brain: How Linguistic Experience Shapes the Neural Representation of Numbers	Silvia Angela Mansi	Silvia Angela Mansi, Valentina Bianco, Paola Previtali, Laura Ciaccio, Chiara Catalano, Tommaso Vecchi, Marco Marelli, Luca Rinaldi
19	Is It Space, Time, or Something Else? Exploring Event Segmentation in Long-Term Recall	Jamie P. Cockcroft	Jamie P. Cockcroft, Akshata Sheth, Matthew R. Logie, Aidan J. Horner

No.	Title	Presenter	Authors
20	The Influence of Negative Emotion on the Temporal Compression of Events in Episodic Memory	Charline Colson	Charline Colson, Gaëlle Panneels, Arnaud D'Argembeau
21	Cognitive Load and Procedural Learning in a Virtual Environment: Exploring the Impact of Secondary Tasks on Learning Phases	Anaïs Raison	Anaïs Raison, Nathalie Le Bigot, Olivier Augereau, Franck Ganier
22	Survival Shapes Memory: Resistance of High-Value Stimuli to Intentional Forgetting	Andres E. Zerpa	Andres E. Zerpa, Veronica Benitez, Shivani Daryanani, Maria A. Alonso
23	Self-Reported Strategies of Time Monitoring in Time-Based Prospective Memory	Gianvito Laera	Gianvito Laera, Adriana Rostekova, Chiara Scarampi, Charikleia Lampraki, Nora Turoman, Emilie Joly-Burra, Melanie Mack, Andreas Ihle, Matthias Kliegel, Sascha Zuber
34	Sequential Changes in Reward Prospect Modulate Cognitive Control Even With Implicit Learning of Reward Cues	Kerstin Fröber	Kerstin Fröber, Sarah Wilts
35	Investigating the Impact of Task-Switching on Simultaneous Auditory-Verbal Memory Encoding in a Free-Recall Memory Task	Sandra Hensen	Sandra Hensen, Iring Koch, Patricia Hirsch
36	Evaluating the Impact of Explicit Encoding Instructions on Verbal Learning	Helena Leach	Helena Leach, Jean Saint-Aubin, Dominic Guitard
37	The Role of Proactive Interference in the Phonological Similarity Effect	Winston Goh	Xuan Ng, Winston Goh
38	Towards a Mega-Study of Statistical Learning: Regularity Extraction in Diverse Inputs	Natan Ilani Shames	Natan Ilani Shames, Nadav Weisler, Noam Siegelman
39	A Computational Companion to Human Ratings Is Available	Vittoria Dentella	Vittoria Dentella, Marco Marelli, Luca Rinaldi
40	Does It Take One to Know One? Statistical Learning Affects Attention in a Target Detection Task	Yoel Sheinenson	Yoel Sheinenson, Tali Kleiman, Noam Siegelman

Social Cognition I

Location: The Diamond, Basement

No.	Title	Presenter	Authors
25	Socio-Cognitive Benefits of Exposure to Visual Illusions in Patients With Psychotic Disorders	Joy El Khoury	Joy El Khoury, Yves Rossetti, Amélie Pavard, François Quesque, Frédéric Haesebaert
26	Comparing Hindsight Bias and Cognitive Dissonance as Explanations for Choice-Induced Preference Change	Patrycja Didyk	Patrycja Didyk, Marek Nieznański
27	Preliminary Findings of Adaptive Decision-Making Performance in Stadium Simulation: Comparison Between Neutral and In-Group Disadvantageous Conditions	Ayşe Nurbeyza Kose	Ayşe Nurbeyza Kose, Hilal Karapinar, Berkan Kilic, Ozgun Ozgonul, Gaye Eskicioglu, Hande Tasa, Cigdem Ulasoglu-Yildiz
28	An Adapted Privileged Knowledge Task to Discriminate Perspective Taking Abilities Among Neurotypical Adults	Arthur Seye	Arthur Seye, François Quesque, François Osiurak, Yves Rossetti
29	Brain-To-Brain Coupling Forecasts Future Joint Action Outcomes	Roksana Markiewicz	Roksana Markiewicz, Katrien Segaert, Ali Mazaheri
30	The Perception of Eye Contact Is Associated With Men's Need to Belong, Self-Esteem, and Loneliness	Manman Zhai	Manman Zhai, Heini Saarimäki, Jari Hietanen
31	Racialised Gaze-Cueing Among Black and White British People	Makayla Ward	Makayla Ward, Wieske van Zoest, Ayoub Bouguettaya
32	Cognitive, Affective, and Spatial Perspective-Taking in Children and Adults With Cerebral Visual Impairments	Perside Ngani	Perside Ngani, Sylvie Chokron, Malika Auvray

Cognitive Ageing

Location: The Diamond, Basement

No.	Title	Presenter	Authors
41	How Memory Links Objects by Actions: Neural Dynamic of Encoding-Retrieval Similarity in Younger and Older Adults	Roni Tibon	Véronique Huffer, Axel Mecklinger, Roni Tibon
42	Pupillary Responses in Healthy Aging: Investigating the Role of Automatic and Controlled Processing	Eszter Kiss	Eszter Kiss, Gábor Gesztes, Péter Pajkossy
43	What Semantic Clues Distinguish Early Alzheimer's Disease From Depression in Aging?	Isabelle Simoes Loureiro	Isabelle Simoes Loureiro, Sandra Invernizzi, Laurent Lefebvre
44	Menopause Symptoms Linked to Poorer Processing Speed and Self-Reported Executive Function in Mid-Life Women	Karen Barnor	Karen Barnor, Chhanda Karmaker, Prerita Chawla, Lucy Cragg, Harriet Allen
45	Does More Mean Faster? The Influence of the Number of Semantic Features on Word Recognition in Young and Older Adults	Widad Rachdi	Widad Rachdi, Christelle Robert, Stéphanie Mathey
46	Language Control With Ageing in Heritage Language Speakers: Cued and Voluntary Language Switching Contexts	Zlatomira Ilchovska	Zlatomira Ilchovska, Farah Nazir, Angela de Bruin
47	Age-Related Differences in Information Control, but Not in Task Control in the Color Word Stroop Task	Eldad Keha	Eldad Keha, Daniella Aisenberg, Shachar Hochman, Eyal Kalanthroff

Emotion I

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
48	Categorized Affective Pictures Database Designed for a Wide Age Range	Ilona Glebov-Russinov	Ilona Glebov-Russinov, Avishai Henik
49	Effects of Emotional Context on the Choice and Execution of Memory Strategy, and Memory Performance	Hanna Chainay	Hanna Chainay, Jessica Demirjian

No.	Title	Presenter	Authors
	of Neutral Word Pairs as a Function of Age		
50	Imageability and Emotionality Effects in Word Identification and Free Recall: Distinct or Similar Processes?	Christelle Robert	Christelle Robert, Stéphanie Mathey

Motor Cognition I

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
52	Decisional Processes in Motor Response Execution: Assessing Decision Bias and Response Confidence	Saman Kamari Songhorabadi	Saman Kamari Songhorabadi, Simone Sulpizio, Michele Scaltritti
53	To Know or Not to Know? Different Decisional Dynamics in Motor-Response Execution	Elisa Fiora	Elisa Fiora, Michele Scaltritti, Simone Sulpizio
54	An Extension of Sequential Sampling Models to Delayed Decision Reports	Johan A. Achard	Johan A. Achard, Thibault Gajdos, Mathieu Servant
55	Neural Mechanisms of Motor and Auditory Predictive Signals to Visual Cortex	Batel Buaron	Batel Buaron , Roy Mukamel
56	Saccade Metrics During Perceptual Decision-Making Are Modulated by the Quality of Sensory Evidence	Vanessa C. Morita	Vanessa C. Morita, Thibault Gajdos, Jeffrey D. Schall, Anna Montagnini, Mathieu Servant

Attention & Cognitive Control I

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
57	Cognitive and Affective Outcomes of a 4-Week Controlled Breathing Intervention: A Pilot Study	Serge Onyper, Mark Oakes	Serge Onyper, Joseph Mocerine, Mark Oakes

No.	Title	Presenter	Authors
58	Balancing Menopause and Multiple Roles: Exploring Their Impact on Cognitive Flexibility	Chhanda Karmaker	Chhanda Karmaker, Karen Barnor, Prerita Chawla, Lucy Cragg, Harriet Allen
59	Obstructive Sleep Apnea Syndrom: Preliminary Insight on Social Cognition Recovery With Continuous Positive Airway Pressure	Apolline Durtette	Apolline Durtette, Audrey Henry, Claire Launois, Fabien Gierski
60	Congruent Sound Occurrences Influence the Visual Boundary Extension Effect in Dynamic Scenes	Guillaume Costille	Guillaume Costille, Cyril Thomas, André Didierjean
61	The Impact of Dynamic Range Compression on the Intelligibility and Short-Term Memory of Speech	William Campbell	William Campbell, Stephen Oxnard, Ian vander Linde
62	Feature Binding and Error Commission	Anna Foerster	Anna Foerster, Birte Moeller, Maria Nemeth, Christian Frings, Roland Pfister
63	Can We Try Harder to Become More Accurate? Evidence From Dart Performance	Lynn Huestegge	Lynn Huestegge, Isabel Stein
64	Error Cancellation	Roland Pfister	Roland Pfister, Anna Foerster, Jan Derrfuss, Claudia Danielmeier, Denis Cousineau, Katharina Schwarz
65	Effect of Mental Fatigue on Visuomotor Adaptation in a Visually-Guided Pointing Task	Ákos Arató	Ákos Arató, András Matuz, Árpád Csathó
66	The Influence of Temporal Expectancy During Cognitive Dual Tasking on Balance Control	Anton Koger	Anton Koger, Leif Johannsen, Andrea Kiesel, Hermann Müller, Denise N. Stephan, Elisa R. Straub, Iring Koch
67	The Impact of If-Then Plans on the Cognitive Representation of Food Stimuli	Rabia Dilawar	Rabia Dilawar, caterina gowrilow, Jona Massinger, Ulrike Schwarz
68	Learning Behaviors Through Verbal Versus Nonverbal Instructions – The	Francois Foerster	Francois Foerster, Salvatore Lo Bue, Nicolas Bourguignon

No.	Title	Presenter	Authors
	Power of Language in Overcoming Conflict		
69	Hierarchical Instantiation of Inhibitory Control	Irem Giray	Irem Giray, Yakup Catalkaya, Elif Unluerler, Tamer Gezici, Ausaf Farooqui
70	Unraveling Partisan Misinformation: EEG Insights Into Cognitive Bias and Flexibility	Daniela Lizarazo Villarreal	Daniela Lizarazo Villarreal, Angela Marti Marca, Salvador Soto-Faraco, Clara Pretus, Mireia Torralba
71	Effect of Eco-Anxiety on Behavioral Adaptation in the Context of the Climate Crisis	Marie Mathé	Marie Mathé, Fanny Grisetto, Adrien Lorant, Lisa Sturm, Clémence Roger

Language & Bilingualism I

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
72	Using Fixated-Related Potentials to Investigate Prediction Error During Natural Reading	Rupali Limachya	Rupali Limachya, Steven Frisson, Federica Degno, Simon P. Liversedge, Kevin B. Paterson, Ascensión Pagán
73	Linguistic Synchrony and Collaboration: Exploring the Role of Games in Educational Contexts	Ayano Tsuda	Ayano Tsuda
74	Are Meanings of the Same Word Competing With Each Other In-The-Moment During Statistical Word Learning?	Matilde Simonetti	Matilde Simonetti, Iring Koch, Tanja Roembke
75	Language Proficiency Effects on Word Recognition Memory in Spanish-English Bilinguals	Elena Markantonakis	Elena Markantonakis, Kristin Lemhöfer, Rachel Lemaître
76	Does Prosody Enable Children to Improve Their Emotional Inference Skills When It Comes to Understanding Oral Narratives?	Lisa Sanchez	Lisa Sanchez, Mehdi Moktaa, Maria Vazeux

No.	Title	Presenter	Authors
77	Systematic Linguistic Regularities Shape Geographical Knowledge	Daniele Gatti	Daniele Gatti, Arne Ekstrom, Giorgia Anceresi, Francesca Rodio, Tomaso Vecchi, Marco Marelli, Luca Rinaldi
78	Structure Dependent Differences in the Persistence of Syntactic Priming	Salma Gilani	Salma Gilani, Evelien Heyselaar, Linda Wheeldon, Katrien Segaert
79	Neural Responses to Voice Predict Second Language Word Reading Ability	Fangzhe Kang, Yanhao Jia	Fangzhe Kang, Yanhao Jia, Yu Li
80	The Role of Proficiency in False Recognition With Ad Hoc Categorical, Associative, and Taxonomic Lists of Words	Verónica Benítez	Verónica Benítez, Pedro B. Albuquerque, Shivani Daryanani, Andres E. Zerpa, María A. Alonso
81	The Lifetime of Sequential Memory Traces in the Absence of Language	Leonardo Pinto Arata	Leonardo Pinto Arata, Laura Ordonez Magro, Joël Fagot, Jonathan Grainger, Arnaud Rey
82	What Predicts Adult Word Learning During Face-To-Face Interaction?	Christopher Edwards	Christopher Edwards, Francesco Cabiddu, Harriet Hill-Payne, Ed Donnellan, Yan Gu, Gabriella Vigliocco

Reading & Writing

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
83	Stability of Reading and Spelling Difficulties	Claudia Laskay-Horváth	Claudia Laskay-Horváth, Ferenc Kemény
84	Exploring Decoding Skills in Samantha Ruvoletto Children With Developmental Language Disorder (DLD) Using a Single-Case Experimental Design (SCED)	Samantha Ruvoletto	Samantha Ruvoletto, Manon Heim, Maria Vazeux, Teng Guo, Hélène Maire, Nadège Doignon-Camus, Lucie Macchi, Daniel Zagar

No.	Title	Presenter	Authors
85	Does Learning to Write Allographs on a Touchscreen Tablet Stimulate the Development of the Abstract Identity of Letters in 5-Year-Old Pre-Readers?	Hélène Labat	Hélène Labat, Frédérique Laforest, Stéphane Frénot, Carine Royer
86	The Impact of Handwriting and Typing on the Reading Acquisition Process: A Study Using an Unfamiliar Orthography	Gorka Ibaibarriaga	Gorka Ibaibarriaga, Joana Acha, Manuel Perea
88	Letter Position Processing Effect in Children Aged 7-11 Years' Reading of French Words Aged: Cross-Sectional Study	Carine Royer	Céline Billot, Carine Royer, Mélanie Eban, Hélène Labat
89	Stability of Deficits in Reading Fluency and/or Spelling	Heike Mehlhase	Heike Mehlhase, Jan Luis Sigmund, Gerd Schulte-Körne, Kristina Moll
90	Automatic Activation and Selection of Words in Early Readers: Frequency and Word Neighbourhood Effects Revisited	Gorka Vergara	Gorka Vergara, Gorka Ibaibarriaga, Joana Acha
91	Influence of Rhythmic Background on Graphomotor Skills in Children With and Without Dysgraphia	Margaux Lê	Margaux Lê, Aline Frey, Jérémy Danna, Jean-François Connan, Fanny Gardette, Marianne Jover
92	Development of Inferential Processes in Children: The Role of Information Accessibility in Reading Comprehension Situation	Hélène Guinet	Hélène Guinet, Carine Royer, Hélène Labat, Sabine Guéraud
93	Revisiting the Word Superiority Effect in Adults and in Children During Learning to Read	Bernard Lété	Bernard Lété, Jonathan Grainger, Hugo Fabrizi, Joana Acha, Marta Vergara-Martinez, Stéphanie Massol
94	Individual Differences in Predictability Effects During Reading:	Erez Milsthen	Erez Milsthen, Kobi Raz, Noam Siegelman

No.	Title	Presenter	Authors
	Measurement Reliability and Reading Proficiency		
95	Enhancing Reading Skills via Individualized Psycholinguistic Models	Tal Koren	Tal Koren, Noam Siegelman, Nadav Weisler
96	Reconceptualizing the Grapheme: How Does Alphabetic Writing Work?	Daniel Zagar, Teng Guo	Daniel Zagar, Teng Guo
97	Does Emotional Valence Modulate Orthographic Processing?	Ana Baciero	Ana Baciero, Celia Martínez-Tomás, Manuel Perea, José Antonio Hinojosa
98	Direct vs. Indirect Assessment of Print Exposure and Its Relationship With Reading Skills in French Elementary School Children	Brice Brossette	Brice Brossette, Mee-Jin Chalbos, Chloé Prugnières, Stéphanie Ducrot

14:00 – 15:40: Regular Talks

T-01: Learning & Memory I

Chair: Tomás McDowell

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Supporting Consolidation of Recent Event Memory in Healthy Older Adults and People With MCI	Ali Mair	Ali Mair, George Georgiou, Mike Page
2	Does Working Memory in Childhood Predict Long-Term Academic and Employment Outcomes?	Amy Atkinson	Amy Atkinson, Katie Allen, Brian Francis, John Towse
3	The Role of Adulthood Working Memory in Real World Outcomes: Evidence From the Avon Longitudinal	Katie Allen	Katie Allen, Brian Francis, John Towse, Amy Atkinson

No.	Title	Presenter	Authors
	Study of Parents and Children Cohort		
4	Reducing False Memories in Older Adults: Behavioral and Neural Mechanisms of Corrective Feedback	María J. Maraver	María J. Maraver, Raquel Lezama, María García de Viedma, Nuria Montoro-Membila, Teresa Bajo, Alejandra Marful
5	Cognitive Changes During Menopause Transition: Investigating Verbal Working Memory	Prerita Chawla	Prerita Chawla, Chhanda Karmaker, Karen Barnor, Harriet Allen, Lucy Cragg

T-02: Memory & Metacognition

Chair: W. Fred Garvey

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	How Does Semantic Elaboration Affect Retrieval From Episodic Memory?	Joscha Dutli	Joscha Dutli, Klaus Oberauer, Lea M. Bartsch
2	Metacognition of Varied Retrieval	Katarzyna Zawadzka	Katarzyna Zawadzka, Ewa Butowska-Buczyńska, Maciej Hanczakowski
3	Assessing Response Confidence Reduces the Benefits of Response Revisions in Perceptual and Memory Tasks	Marta Siedlecka	Marta Siedlecka, Piotr Litwin, Borysław Paulewicz
4	The Role of the Working Memory Storage Component in a Random-Like Series Generation	Mikołaj Biesaga	Mikołaj Biesaga, Andrzej Nowak
5	Do Prospective Memory and Working Memory Share Common Processes? Evidence From a Color Matching Task	Tobias Kühlwein	Tobias Kühlwein, Chhavi Sachdeva, Jan Rummel, Nicolas Rothen

T-03: Cognitive Enhancement & Plasticity

Chair: Rebecca Denniss

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	No Far Transfer From Relation Processing Training to Fluid Reasoning: A Latent Growth Model	Patrycja Kałamała	Patrycja Kałamała, Paweł Basoń, Jan Jastrzębski, Bartłomiej KroczeK, Hanna Kucwaj, Michał Ociepka, Claudia von Bastian, Adam Chuderski
2	Does Music Training Improve Emotion Recognition and Cognitive Abilities? Longitudinal and Correlational Evidence From Children	Cesar Lima	Cesar Lima, Leonor Neves, Marta Martins, Ana Isabel Correia, São Luís Castro, E. Glenn Schellenberg
3	If Music Training Improves Cognitive Abilities, Are Professional Musicians Smarter Than Amateurs?	Francesca Talamini	Francesca Talamini, Massimo Grassi, E. Glenn Schellenberg, César F. Lima
4	Does Studying Latin Make You Smarter? Three Large-Scale Studies Into the Cognitive and Linguistic Benefits of Latin Instruction	Cathy Hauspie	Cathy Hauspie, Wouter Duyck, Stijn Schelfhout, Alexandra Vereeck, Mark Janse, Arnaud Szmalec
5	The Role of Sports Experience in Audiovisual Integration: A Comparison Between Rackets Players and Swimmers	Simona Perrone	Simona Perrone, Daniele Romano, Luisa Girelli

T-04: Attention & Cognitive Control I

Chair: Alon Zivony

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Partially Masking Task-Irrelevant Speech Induces Particularly Pronounced Metacognitive Illusions in Judgments of Distraction	Gesa Fee Komar	Gesa Fee Komar, Axel Buchner, Laura Mieth, Raoul Bell
2	Speaking a Second Language Is Not a Conflict Task: Implications for Hypotheses of Bilingual Advantages and Other Language-Control Associations	Giacomo Spinelli	Giacomo Spinelli, Simone Sulpizio
3	Attentional Capture vs. Attentional Bias: New Evidence for the Priority Accumulation Framework	Mor Sasi	Mor Sasi, Daniel Toledano, Shlomit Yuval-Greenberg, Dominique Lamy

No.	Title	Presenter	Authors
4	Assessing Hazard Prediction and Risk Calibration Skills in Experienced and Novice E-Scooter Riders	Petya Ventsislavova	Petya Ventsislavova, Lydia Harrison, Thom Baguley
5	What Modulates the Alertness-Executive Control Interaction?	Yafit Oscar	Yafit Oscar, Noam Weinbach, Avishay Henik

T-05: Cognitive Control & Neuroscience

Chair: Elizabeth Milne

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	Modulating Medial Prefrontal Cortex Activity and Inhibitory Control Using Transcranial Random Stimulation	Alekhyia Mandali	Alekhyia Mandali
2	The Word-Color Interference Effect: John Ridley Stroop's Big Misstep	Céline Lemerrier	Céline Lemerrier
3	Exploring Individual Differences in Cognitive Flexibility: A Data-Driven Time-Frequency Analysis Combined With Latent Change Modeling	Mareike Hülsemann	Mareike Hülsemann, Christoph Löffler, Anna-Lena Schubert
4	Studying Individual Patterns in Attentional Shifts Using Steady-State Evoked Potentials and Their Relations to Mental Health	Omer Reuveni	Omer Reuveni, Moran Eidelman-Rothman, Lior Krtizman, Andreas Keil, Hadas Okon-Singer, Nava Levit-Binnun
5	Enhancing Inhibitory Control Through Regular Physical Exercise: Behavioral and Neuroelectric Evidence	Tomasz S. Ligeza	Tomasz S. Ligeza, Michal Remiszewski, Gabriela Rajtar, Marcin Maciejczyk

T-06: Social Cognition

Chair: Emma Morgan

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	From Private to Communal Imagination: The Dalit Milshtein Influence of Joint Imagination on Emotional Experiences	Dalit Milshtein	Dalit Milshtein, Simon Shamai-Zoory

No.	Title	Presenter	Authors
2	Neural Signatures of Gender Stereotype Asymmetry in Word-Face and Face-Word Priming: An ERP Study	Luana Serafini	Luana Serafini, Francesca Pesciarelli
3	Affective Types and Functions of Digital Game Interlocutors	Małgorzata Puchalska-Wasyl	Małgorzata Puchalska-Wasyl, Paweł Fortuna, Łukasz Kaczmarczyk, Andrzej Cudo
4	Cognitive Processes of Implicit Weight Bias: Katja Pollak A Diffusion Model Analysis		Katja Pollak, Hanna Wachten, Julius Fenn, Raphael Hartmann, Constantin Meyer-Grant, Jana Strahler, Andrea Kiesel
5	Leveraging Self-Prioritization to Enhance Performance in Dynamic Working Memory Tasks	Irfan Ahmad, Ark Verma	Irfan Ahmad, Ark Verma

T-07: Language & Learning

Chair: Claudine Bowyer-Crane

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	A Consonantal Bias in the Process of Learning Artificial Words by Hebrew Speakers: Evidence From the Visual World Paradigm	Avital Deutsch	Avital Deutsch, Yaara Lador-Weizman
2	Who Will Speak? Speaker Identity Shapes Phonological Predictions	Marco Sala	Marco Sala, Francesco Vespignani, Simone Gastaldon, Laura Casalino, Francesca Peressotti
3	The Impact of Context on Incidental Word Learning via Reading in Adults and Children	Meyrem Tompson	Meyrem Tompson, Sarah J. White, Ascensión Pagán
4	Discovering Affixes Through Statistical Learning: Does Explicit Instruction Matter?	Teng Guo	Teng Guo, Davide Crepaldi, Kathy Rastle
5	Lexical Feedback in Perceptual Closure: How Word Frequency Shapes the Recognition of Incomplete Words; an ERP Study	Teresa Civera	Teresa Civera, Manuel Perea, Montserrat Comesana, Marta Vergara-Martínez

T-08: Motor Cognition

Chair: Alejandro Jimenez-Rodriguez

Location: The Diamond, WR1

No.	Title	Presenter	Authors
1	Event-Related Analysis of Balance Control While Performing a Flanker Task	Andrea Kiesel	Andrea Kiesel, Anton Koger, Leif Johannsen, Hermann Müller, Denise N. Stephan, Iring Koch, Elisa R. Straub
2	Do Self-Generated Movement Sounds Influence Hurdle Sprint Performance? The Role of Auditory Reafferences in Motor Learning	Dennis Redlich	Dennis Redlich, Alexandra Pizzera, Sophie Siestrup, Mustafa Acar, Ricarda I. Schubotz, Markus Raab
3	Dissociating Explicit and Implicit Memory Contributions to the Learning of Action-Effect Relations	Marcel R. Schreiner	Marcel R. Schreiner, Wilfried Kunde
4	How Does Flow Relate to Performance: Using Mobile EEG and Eye-Tracking in Basketball Free-Throw Shooting	Paul Bejjani	Paul Bejjani, Guido Orgs, Karina Linnell
5	Prevention Actions and What They Teach Us About Ideomotor Action-Effect Linkages	Solveig Tonn	Solveig Tonn

T-09: Statistical & Computational Modelling

Chair: Hazem Toutounji

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	All the Same? Comparing Sequential Effects on Response Time Distributions Across Paradigms Using a Within-Subject Design	Anne Voormann	Anne Voormann, Andrea Kiesel, Jeff Miller
2	When You Should and Should Not Use Mixed Models	Henrik Singmann	Henrik Singmann
3	A Multilayer Model of Automatization: Core Processes Driving the Emergence of Automatic Action Control	Hermann Müller	Hermann Müller, Rouwen Canal-Bruland, Stefan Kuenzell, Torsten Schubert
4	Intra-Individual Variability in Cognitive Control: Insights From Dynamic Structural Equation Modeling	Jean-Paul Snijder	Jean-Paul Snijder

No.	Title	Presenter	Authors
5	As Short as Possible? Experimentally Comparing Verbal and Pictorial Single-Item Scales of Perceived Usability and Their 10-Item Counterparts	Elisa Gräve	Elisa Gräve, Raoul Bell, Axel Buchner

T-10: Individual Differences

Chair: Sabrina Burr

Location: ICOS, A16

No.	Title	Presenter	Authors
1	Domain-General Processing Speed and Linguistic Experience Differentially Affect Lexical Retrieval and Structural Assembly During Language Production	Florian Hintz	Florian Hintz, Mohammad Momenian
2	Does Plain Language Result in Clear Communication? Findings From a Systematic Scoping Review and From a Series of Observational Studies	Rob Davies	Rob Davies, Mathew Gillings, Sarah Chadwick, Michael Ratajczak
3	The Individual Differences in German Language Skills (IDLaS-DE) Test Battery	Sandra Bethke	Sandra Bethke, Antje S. Meyer, Florian Hintz
4	How Sensitivity to Cognitive Rewards Changes Throughout Development	Tal Nahari	Tal Nahari, India Pinhorn, Tali Sharot
5	From One Emotion to Another: Why ADHD Makes It Difficult?	Tehila Nadav	Tehila Nadav, Avishai Henik

16:10 – 17:50: Symposia

KSYM-02: The Role of Mental Simulation in Thinking

Chair(s): Isabel Orenes

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Facts, Possibilities, and How Humans Verify Them	Isabel Orenes	Isabel Orenes, Yurena Morera, David Beltrán, Manuel de Vega
2	The Effect of Counterfactual Thinking and Age on Victim Blaming	Stefania Pighin	Stefania Pighin, Alessandro Bogani, Benjamin Timberlake, Katya Tentori

No.	Title	Presenter	Authors
3	The Role of Kinematic Mental Simulation in False Memories of Actions	Monica Bucciarelli	Monica Bucciarelli, Francesco Iani, Teresa Limata, Ivan Nabil Ras
4	The Role of Mental Simulations in Naive Programming	Robert Mackiewicz	Robert Mackiewicz
5	Symposium Discussion	Isabel Orenes	Isabel Orenes

SYM-08: Cognitive Mastery in Play: From Board to Digital Games as Models of Expertise

Chair(s): Nemanja Vaci

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Causal Modelling of Interplay Between Abilities and Practice in Expertise	Nemanja Vaci	Nemanja Vaci, Merim Bilalić, Roland Grabner
2	Understanding Fun: Using Video Games to Study Intrinsic Motivation	Franziska Brändle	Franziska Brändle
3	The Role of AI in Transforming Elite Human Performance	Merim Bilalić	Merim Bilalić, Mario Graf, Nemanja Vaci
4	Cognitive Correlates of Expertise in Video Game Players	Eleanor Hyde	Eleanor R. A. Hyde, Robert Schmidt, Daniel J. Carroll, Claudia C. von Bastian
5	Modelling the Acquisition of Expertise in Board Games	Fernand Gobet	Fernand Gobet

SYM-09: How Does Long-Term Memory Knowledge Support Working Memory? The Effects of Meaningfulness, Levels of Processing and Elaboration

Chair(s): Alessandra S. Souza, Nuno D. Sobrinho

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Meaningful and Familiar Stimuli Support Visual Working Memory for Simple Features	Yong Hoon Chung	Yong Hoon Chung, Viola Störmer

No.	Title	Presenter	Authors
2	Levels of Processing Effects on Visual Associative Memory for Basic Perceptual Features	Nicolas Rothen	Nicolas Rothen, Mirela Dubravac, Chhavi Sachdeva, Rebecca Ovalle-Fresa
3	How Does Prior Knowledge Buffer Against Age Deficits in Working Memory?	Vanessa M. Loaiza	Vanessa M. Loaiza
4	Elaboration Effects in Verbal and Visual Working Memory: Same or Different Processes?	Nuno D. Sobrinho	Nuno D. Sobrinho, São Luís Castro, Alessandra S. Souza
5	Symposium Discussion	Alessandra S. Souza	Alessandra S. Souza

SYM-10: Individual Differences in Visual Attention

Chair(s): Alon Zivony

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	A New Method for Studying Individual Differences in the Speed of Attention	Alon Zivony	Alon Zivony, Claudia C. von Bastian, Rachel Pye
2	Individual Capacity Differences in Memory-Guided Visual Search	Anna Grubert	Anna Grubert, Ziyi Wang, Courtney Turner
3	Visual Distraction and Experience-Based Suppression in ADHD	Dominique Lamy	Dominique Lamy, Mor Sasi, Tair Vizel, Nitzan Shahrar
4	Individual Differences in Visual Attention as Drivers of Autistic and Psychotic Tendencies	Carmel Mevorach	Carmel Mevorach
5	Symposium Discussion	Alon Zivony	Alon Zivony

SYM-11: On the Functional Relation Between Cognitive and Motor Processes: Current Perspectives for an Integrated View.

Chair(s): Michele Scaltritti, Simone Sulpizio

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	An Integrated Theory of Decision-Making, Motor Preparation and Motor Execution	Mathieu Servant	Mathieu Servant, Edouard Dendauw, Gordon D. Logan, Jeffrey D. Schall, Thibault Gajdos

No.	Title	Presenter	Authors
2	Perceptual Decision Correlates in the Peripheral Motor System	Luc Selen	Luc Selen, Pieter Medendorp, Yvonne Visser
3	Independent Decisional Components in Motor-Response Execution	Michele Scaltritti	Michele Scaltritti, Saman Kamari Songhorabadi, Elisa Fiora, Simone Sulpizio
4	The Missing Link Between Response Selection and Execution in Language Production	Svetlana Pinet	Svetlana Pinet
5	A Kinematic Analysis of Interoceptive Grounding of Conceptual Knowledge	Laura Barca	Laura Barca

SYM-12: Exploring Cognitive and Linguistic Mechanisms in Word Processing Across Diverse Languages and Contexts

Chair(s): Anna Yi Leung

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	What Language Is This? How Expectations Shape Pronunciations	S��verine Casalis	Ding Yan, Paolo Mairano, S��verine Casalis
2	Reading Cognates in Urdu, Hindi, and Persian	Xenia Schmalz	Xenia Schmalz, Sara Chilson, Elmira Esmaeelpour, Azizuddin Khan
3	Revisiting the Influence of Phonological Similarity on Cognate Processing: Evidence From Cantonese-Japanese Bilinguals	Brian W. L. Wong	Brian W. L. Wong, Shawn Hemelstrand, Tomohiro Inoue
4	Can Phonology Help CFL Novice Learners Learn Chinese Characters' Meanings?	Anna Yi Leung	Anna Yi Leung, Kristina Moll, Xenia Schmalz
5	Interference From Adjacent Words: Is It Symmetric? Is It Lexical?	Athanassios Protopapas	Athanassios Protopapas, Laoura Ziaka, Dzan Zelihic, Bob McMurray

SYM-13: Current Perspectives on Mentalizing: Social Cognition Across Contexts

Chair(s): Elisabeth Bradford

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	A Longitudinal Investigation of the Link Between Developmental Trajectories of Theory of Mind and Psychopathology From Early Childhood to Preadolescence	Tobias Schuwerk	Tobias Schuwerk, Nora Fenske, Nathalie Christner, Beate Sodian, Markus Paulus
2	Reading the Minds of Others: What's in a Look?	Jelena Ristic	Jelena Ristic, Florence Mayrand, Jessica Savoie
3	The Impact of Mood on Children's Mentalizing	Andrew Surtees	Andrew Surtees
4	Identifying Mechanisms for Social-Cognitive Decline in Older Age	Heather Ferguson	Heather Ferguson
5	Biases in Mentalizing Across the Lifespan: More Efficient Perspective-Taking for Same-Age Versus Other-Age Others	Elisabeth Bradford	Elisabeth Bradford, Sofia Villoria

SYM-37: Perception of Artificial Agents as Social or Self-Aware Others

Chair(s): Agnieszka Wykowska, Tony Prescott

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Adopting the Intentional Stance Towards Humanoid Robots – Conditions and Implications	Agnieszka Wykowska	Agnieszka Wykowska, Serena Marchesi
2	Perception of Artificial Agents as Self-Aware	Marina Sarda Gou	Marina Sarda Gou, Tony Prescott
3	Collaboration in Human-Robot Interaction Depends on the Perceived Social Nature of Robots	Eva Wiese	Eva Wiese, Jairo Perez-Osorio, Patrick P. Weis
4	A Cognitive Robotics Approach to Theory of Mind	Angelo Cangelosi	Angelo Cangelosi
5	Investigating Interactions With Humanoids From a Social Cognitive Neuroscience Perspective	Thierry Chaminade	Thierry Chaminade

18:00 – 19:00: Blitz Talks

B-01: Learning & Memory I

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Both Semantically and Episodically Elicited False Memories Enhance Prospective Memory Performance	Damla Dayan	Damla Dayan, Alex Kafkas, Jason Taylor
2	The Impact of Representation (In-)Consistency on Memory for True and False Information: Examining Modality Changes Between Encoding and Retrieval for Event Description	Nicole Antes	Nicole Antes, Markus Huff, Stephan Schwan
3	Mice Utilize Previously Learned Spatiotemporal Mappings for Extrapolating Temporal Information	Ezgi Gür	Ezgi Gür, Yalçın Akın Duyan, Pınar Toptaş, Fuat Balcı
4	Reconciling the Beneficial Effects of Physically Inactive Wakeful Rest and Physically Active Exercise on the Early Consolidation of New Memories	Michael Craig	Michael Craig, Roger Makepeace, Phil Hayes
5	Assessing Glutamate Changes in Medial Frontal Cortex During an Associative Visuospatial Working Memory Task Using FMRS	Ryan Elson	Ryan Elson, Daniel Cocking, Adam Berrington, Katherine Dyke, Mohammad Zia Ul Haq Katshu, Claudia Danielmeier
6	Effects of Maths Anxiety and Working Memory on Calculation and Arithmetic Word Problem Performance	Masahiko Okamoto	Yun Wei Ong, Masahiko Okamoto, Kanetaka Mori

B-02: Metacognition

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Does Secondary Motor Integration During Decision-Making Inform Confidence?	Axel Garnier-Allain	Axel Garnier-Allain, Vincent De Gardelle, Thibault Gajdos, Mathieu Servant
2	The Effect of Anxiety on Metacognitive Judgements	Karolina Moutsopoulou	Karolina Moutsopoulou, Andrea Desantis
3	Illusory Transparency of Intention Applied: Insights From Human-Computer-Interaction	Lea Marie Weber	Lea Marie Weber, Regina Jucks
4	Unskilled and Unaware: Confidence in the Accuracy of Self-Estimates Increases With Miscalibration	Mariana Coutinho	Mariana Coutinho, Justin Couchman, Justin Thomas, Imani Fredricks-Lowman

No.	Title	Presenter	Authors
5	People Learn About Others to Dynamically Prioritize Superior Advice	Rumandeep Hayre	Rumandeep Hayre, Arkady Konovalov, Romy Froemer
6	From Perception to Decision: Emergence and Variation of Trust During Decision Making	Léa Mathieu	Léa Mathieu, Bertille Somon, Patrick Mazoyer, Florence De Grancey, Nicolas Drougard, Jean-Christophe Sarrazin

B-03: Attention & Cognitive Control I

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	The Impact of Multimodal Threat Distractors on Visual Search Performance	Bahtiyar Yildiz	Bahtiyar Yildiz, Botond Laszlo Kiss, Andras Norbert Zsido
2	Did You See This Coming? How Age Modulates the Mechanisms for Goal-Directed Response Selection	Daniela Czernochowski	Daniela Czernochowski
3	The Influence of Fine Motor Skills and Executive Functions on Automatized Handwriting	Gaëlle Alhaddad	Gaëlle Alhaddad, Jérémy Danna, Mariama DIONE, Marieke Longcamp
4	Force Adaptation Patterns Suggest Similarity of Action Representations in Sensorimotor Synchronization and Tone Self-Generation Tasks	János Horváth	János Horváth, Sámuel Varga, Erika György, Bence Neszmélyi
6	Proactive Suppression: Challenging the Limits	Pom Charras	Virginie Leclercq, Pom Charras

B-04: Language & Bilingualism I

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	A Unified Mechanism of Statistical Learning? Evidence From Cross-Modal Integration During Learning	Giulio Severijnen	Giulio Severijnen, Davide Crepaldi
2	The Relationship Between Statistical Learning and Different Facets of Language Ability: Evidence From Auditory and Visual Modalities	Krisztina Sára Lukics	Krisztina Sára Lukics, Ágnes Lukács

No.	Title	Presenter	Authors
3	Cross-Linguistic Semantic Integration in Bilingual Populations	Marta Almería-Morena	Marta Almería-Morena, Carlos Romero-Rivas
4	Learning Trajectories and Generalisation: Converging Markers for Rule- and Similarity-Based Processes in Grammar Learning?	Moulshree Rana	Moulshree Rana, Herbert Schriefers, Kristin Lemhöfer
5	Anchors to Language: Proximity to High Frequency Words Enhances Word Recognition	Tamar Matas	Tamar Matas, Noam Siegelman
6	Ship or Sheep? Mitigating Cross-Linguistic Orthographic Interference in L2 Perception and Pronunciation via Color Coding	Tiphaine Caudrelier	Tiphaine Caudrelier, Flore Albano, Camille Carliez, Julie Coquard-Molinari, Jessi Jacobsen, Svetlana Pinet

B-05: Cognitive Ageing

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	The 14-Item Everyday Problems Test (EPT-14): A Revised Test for Everyday Problem Solving and Its Relation to Biographical and Basic Cognitive Domains	Alice Reinhartz	Alice Reinhartz, Eleanor Hyde, Shuangke Jiang, Thomas Jacobsen, Sylvie Belleville, Tilo Strobach, Claudia von Bastian
2	Age and Physical Activity Modulate Processing of Past- and Future-Related Words	Anastasia Malyshevskaya	Anastasia Malyshevskaya, Martin H Fischer, Yury Shtyrov, Andriy Myachykov
3	Proactive Top-Down Processes and Modulation of Distractor Expectation in Healthy Ageing	Ilaria Baroni	Marco Petilli, Ilaria Baroni, Carlotta Lega, Roberta Daini
4	Mapping Cognitive Control in Older Age: Insights From a Longitudinal Study	Sarah De Pue	Sarah De Pue, Hans Stuyck, Céline R. Gillebert, Eva Dierckx, Eva Van den Bussche
5	A Systematic Review of the Effects of Sleep Duration and Daytime Alertness on Cognitive Function Across the Adult Lifespan	Séamas Farrell	Séamas Farrell, Catriona Ewart, Leanne Fleming, Louise Brown-Nicholls
6	Motor Imaginary and Cognitive-Motor Interference Throughout Ageing	Tian Zhou	Tian Zhou, Elisa Straub, Andrea Kiesel, Dominic Gehring, Urs Granacher, Aaron Haslbauer, Reto W. Kressig, Roland Rössler

B-06: Sensation & Perception

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	Where Do We Draw the Line? How Mental Perspectives Shape Our Body's Boundaries	Celia R Blaise	Celia R Blaise, Hannes P Saal
2	Inducing Longer Time Production by Modifying Attentional State	Joseph Glicksohn	Joseph Glicksohn, Tal Dotan Ben-Soussan
3	A Closer Look at the Agent Advantage Effect: The Impact of Biting Orientations	Wenjia Xu	Wenjia Xu, Markus Huff, Frank Papenmeier
4	Internalized Stereotypes Impair Speech Perception in Older Adults: Insights From Speech-In-Noise Tasks	Ornella Dakwar Kawar	Ornella Dakwar Kawar, Vered Shakuf
5	High-Level Expectations Drive Detection of Biological Motion in Noisy Point-Light Displays	Piotr Szymanek	Piotr Szymanek, Mateusz Hohol, Magdalena Senderecka
6	What You Hear Is Not What You See: Irony Comprehension in Monolingual and Multilingual Children	Kimberley Mulder	Kimberley Mulder, Elise van Wonderen, Josje Verhagen

B-07: Numerical & Mathematical Cognition

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	Understanding Position Coding in Alphanumeric Strings: Testing Character Spacing and the Triplet Hypothesis	Ana Calviño	Ana Calviño, Ismael Gutiérrez-Cordero, Javier García-Orza
2	Cognitive Profiles: Working Memory and Finger Counting in 5-8-Year-Olds	Fanny Ollivier	Fanny Ollivier
3	Impact of Perceptual Processing on Numerical Estimation: Priming Local Processing Amplifies Number/Size Conflicts	Léa Chrétien	Léa Chrétien, André Knops, Nicolas Poirel, Arnaud Viarouge
4	Eye Movement Signatures of High vs. Low Mathematical Creativity: Mapping Creative Cognition	Raisa Guberman	Raisa Guberman, Adi Eraky
5	Learning Patterns, Seeing Numerosity	Virginie Leclercq	Virginie Leclercq

No.	Title	Presenter	Authors
6	Free to Choose, Bound by Numbers: Does Response-Side Bias Account for SNARC Inconsistencies in the Turkish Population?	İlayda Korkut	İlayda Korkut, Samet Kahraman, Seda Dural, Hakan Çetinkaya, Ezgi Gür

B-08: Neurodiversity

Location: The Diamond, LT8

No.	Title	Presenter	Authors
1	Testing Contextual Modulation of Social Prediction in Typical and Atypical Development	Valentina Bianco	Valentina Bianco, Sara Boscarol, Gaia Garghetti, Viola Oldrati, Andrea Ciricugno, Alessandra Finisguerra, Renato Borgatti, Romina Romaniello, Laura Farinotti, Cosimo Urgesi
2	Development and Validation of the Mandarin Version of the Theory of Mind Inventory-2 and Theory of Mind Task Battery in Children With Autism Spectrum Disorder in Mainland China	Wenyu Xia	Wenyu Xia, Shiyue Cao, Mi Tian, Xuezheng Xiao
3	Oddball Fast Periodic Visual Stimulation to Explore Facial Emotion Recognition in Children With Autism Spectrum Disorder: An fNIRS Study	Wenyu Zhao	Wenyu Zhao, Chuchu Ren, Mi Tian, Xuezheng Xiao, Gaoding Jia
4	Exploring Prosodic Perception and Musical Perception in Musicians and Non-Musicians With and Without Dyslexia	Bairavi Selvarajah	Bairavi Selvarajah, Richard Allen, Christina Sotiropoulou Drosopoulou
5	Theory of Mind Intervention Enhances Facial Emotion Recognition in Children With Autism Spectrum Disorder: A Functional Near-Infrared Pilot Study	Chuchu Ren, Wenyu Zhao	Chuchu Ren, Wenyu Zhao, Mi Tian, Xuezheng Xiao, Gaoding Jia

B-09: Social Cognition

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	How Do We View Faces on Zoom Calls? Live Video Slows Perceptual Search of Faces	Chloe Sainsbury	Chloe Sainsbury, Gregory Davis

No.	Title	Presenter	Authors
2	Cognitive Evolution and Stone Tool Recognition: An Eye-Tracking Study	Chloé Bryche	Chloé Bryche, Giovanni Federico, Arthur Seye, Arnaud Fournel
3	Empathy in a Glance: Evaluations of Listener Gaze Depend on Emotional Context	Eva Landmann	Eva Landmann, Anne Böckler
4	Beyond Intrinsic Cues: Gaze-Cueing and Social Evaluation of Ingroup and Outgroup Faces	Irene Razpurker-Apfeld	Irene Razpurker-Apfeld, Lipaz Shamo-Nir
5	A Competitive Edge: How Social Cues and Spatial Congruence Influence Joint Attention in Addressed or Witnessed Interactions	Mahmoud Elsherif	Isabel Blackie, Anisah Islam, Andrew Surtees, Mahmoud Elsherif
6	My New Habit Is Special: Prioritised Cognitive Processing Within Four Weeks of Habit Formation	Michella Feldborg	Michella Feldborg, Jie Sui

19:30 – late: PhD Event

Location: University Arms

Thursday

09:00 – 10:00: Keynote - Professor Gaia Scerif

Location: The Diamond, LT1, with overflow streaming to LT3 and LT4

10:30 – 12:10: Symposia

KSYM-03: The Cognitive and Neural Underpinnings of Executive Functions in Development: Insights From Diverse Populations and Methodologies

Chair(s): Emma Blakey

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Executive Functions During the Toddler and Preschool Years: Relations With Language and the Home Environment	Emma Blakey	Emma Blakey, Molly Jackson, Molly Willis, Emma Smith, Chris Stride, Danielle Matthews
2	Attention, Working Memory and Mathematics Skills in Children Born Preterm	Lucy Cragg	Lucy Cragg, Jenny Retzler, Madeleine Groom, Samantha Johnson
3	Developmental Dynamics Between Cognitive Control and Statistical Learning in Childhood	Nicolas Chevalier	Nicolas Chevalier, Matthew Johnston, Jessica Dolan
4	Neural Mechanisms of Attentional Selection and Suppression: Insights From ERPs on Developmental Changes	Andria Shimi	Andria Shimi
5	Reverse Engineering the Developing Brain: How Do the Higher-Order Principles of Our Brains Emerge?	Duncan Astle	Duncan Astle

SYM-14: Engagement and Cognitive Health in Older Adults

Chair(s): Lixia Yang

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Preliminary Efficacy of a Community Centre-Based Personalized, Multidomain Lifestyle Dementia Risk Reduction Intervention: The Kimel Family Centre for Brain Health and Wellness	Nicole Anderson	Nicole Anderson

No.	Title	Presenter	Authors
2	Improving Access to Memory and Brain Health Intervention for Older Adults With an Online Program	Renée Biss	Renée Biss
3	How Does Popular Music Help Younger and Older Adults Remember Their Past?	Myra Fernandes	Myra Fernandes, Khalil Husein
4	Help or Hinder? Response to Walking to a Beat Depends on Task Complexity and Individual Differences in Age, Beat Perception, and Auditory Selective Attention	Karen Li	Karen Li, Averil Parker
5	Thriving to Age Actively: Cognitive Benefits of Active Aging Activity Engagement	Lixia Yang	Lixia Yang, Cassandra Skrotzki

SYM-15: The Focus of Attention: Insights, Progress, and What Lies Ahead

Chair(s): Caro Hautekiet

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Working Memory Prioritization Produces Asymmetrical Interactions With Perception	Joseph Saito	Joseph Saito, Frida A.B. Printzlau, Yvanna Yeo, Keisuke Fukuda
2	Revisiting the Retro-Cue Effect: Protection Against Decay and Test-Display Interference	Caro Hautekiet	Caro Hautekiet, Klaus Oberauer
3	A Domain-General Focus of Attention, or Are There Domain-Based Boundary Conditions to the Retro-Cue Effect?	Evie Vergauwe	Evie Vergauwe, Johanna Hein, Caro Hautekiet
4	Running After Two Hares in Visual Working Memory: Exploring Retrospective Attention to Multiple Items Using Simulation, Behavioural Outcomes, and Eye-Tracking	Richard Allen	Richard Allen, Taiji Ueno
5	Value-Based Interference: How Working Memory Representations Influence Interruption Processing	Marlene Rosner	Marlene Rosner, Thaleia Mouratidou, Damiano Grignolio, Clayton Hickey

SYM-16: Moving Beyond Standard Memory and Language: Insights From Evolutionary Psychology (Take 1)

Chair(s): Jeanette Altarriba, Josefa Pandeirada, Sara Félix

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Testing the Effects of Survival-Focused Retrieval on Word Recognition and Source Memory	Raoul Bell	Raoul Bell, Meike Kroneisen, Laura Mieth
2	Ageless Memory? The Animacy Effect in Prospective Memory in Older Adults	Sara Félix	Sara Félix, Josefa N. S. Pandeirada
3	Who Is the Nice Guy? Can We Genuinely Remember Relevant Interaction Partners Better, or Has Previous Research Only Demonstrated Improved Visual Memory?	Meike Kroneisen	Meike Kroneisen
4	Symposium Discussion	Josefa N. S. Pandeirada	Josefa N. S. Pandeirada
5	Extended Symposium Discussion	Josefa N. S. Pandeirada	Josefa N. S. Pandeirada

SYM-17: Drift-Diffusion Modelling: A Method for Exploring Group Differences in Psychology

Chair(s): Amber Copeland

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	Inhibition, Impulsivity and Processing Speed: What Have Evidence Accumulation Models Taught Us About Individual Differences	Craig Hedge	Craig Hedge
2	The Influence of Positive Alcohol Memories and Alcohol Cues on Value-Based Decision-Making and Ad Libitum Drinking: A Drift-Diffusion Model Approach	Amber Copeland	Amber Copeland, Cameron Crook, Michelle Pun, Tom Stafford, Matt Field
3	Making Use of Drift Diffusion Models When Measuring Selective Attention in Autism	Daniel Poole	Daniel Poole
4	Applying the Diffusion Model to Understand Perceptual Decision-Making in Autistic and Dyslexic Children	Cathy Manning	Cathy Manning
5	Symposium Discussion	Alekhyia Mandali	Alekhyia Mandali

SYM-18: The Effects of Expectations on Cognition and Beyond

Chair(s): Avi Mendelsohn

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	Linguistic and Visual Priors Reveal the Structure of Semantic Memory	Luca Rinaldi	Luca Rinaldi
2	The Tunnel Effect: Evolutionary Roots and Subcortical Contributions in Humans and Archerfish	Shai Gabay	Shai Gabay
3	The Importance of Individual Beliefs in Assessing Treatment Efficacy	Roi Cohen Kadosh	Roi Cohen Kadosh
4	Exploring the Interplay of Spatial and Temporal Attention	Pom Charras	Pom Charras
5	The Effects of Musical Expectations on Long-Term Memory Formation	Avi Mendelsohn	Avi Mendelsohn

SYM-19: Towards a More Diverse Science of Reading and Language Processing, Inside and Outside the Laboratory

Chair(s): Pablo Gomez

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	The Eye-Tracking Gap in Reading and Language Research and How It Can Be Closed	Bernhard Angele	Bernhard Angele
2	The Impact of Bilingualism on L1 and L2 Lexical Access and Vocabulary Development	Montserrat Comesaña	Montserrat Comesaña
3	Visual Disruptions and Word Processing in Native and Foreign Languages: Insights From Virtual Reality Studies	Jon Andoni Duñabeitia	Jon Andoni Duñabeitia
4	Living Meta-Analyses Can Make Research More Diverse	Pablo Gomez	Pablo Gomez
5	Investigating Word Presentation Effects on Sentence Processing During Self-Paced Reading	Maki Kubota	Maki Kubota

SYM-34: Innovative Approaches to Assessing and Understanding Dyslexia and Related Language Disorders

Chair(s): Esther Adi-Japha

Location: The Diamond, WR1

No.	Title	Presenter	Authors
1	The 'Inner Eye' Begets the 'Inner Voice': Sight Reading Scaffolds Speech Internalisation	Rod Nicolson	Rod Nicolson
2	The Brain Efficiency Screening Test: Re-Uniting the Developmental Disorders!?	Angela Fawcett	Angela Fawcett, Rod Nicolson
3	Auditory Category Learning in Developmental Dyslexia	Yafit Gabay	Yafit Gabay
4	Predicting Written-Language Disorders Among Second and Third Graders	Esther Adi-Japha	Esther Adi-Japhe, Chagit Hollander
5	Phonological Ability and Neural Congruency: Phonological Loop or More?	Timothy Papadopoulos	Timothy Papadopoulos

SYM-20: The Sound of Thought - Exploring the Frontiers of Inner Speech

Chair(s): Hamutal Kreiner

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Inner Speech as a Cognitive Tool: Recall of Actions and Processing of Abstract Concepts	Anna M. Borghi	Anna M. Borghi, Chiara De Livio, Mattia Gervasi, Charles Fernyhough
2	The little voice in bilinguals' head: what language does it speak? Varieties of inner speech among multilingual speakers	Reem Dallasheh Khatib	Reem Dallasheh Khatib, Zohar Eviatar
3	Inner Speech: Connecting Body and Mind	Johanne Sofie Krog Nedergård	Johanne Sofie Krog Nedergård, Mikkel Wallentin
4	Rethinking Inner Speech Through Linguistic Active Inference	Bo Yao	Bo Yao
5	The Sound of Thought: Form Matters – the Prosody of Inner Speech	Hamutal Kreiner	Hamutal Kreiner, Zohar Eviatar

12:30 – 14:00: Poster Session 2 (P-02)

Robotics & AI

Location: The Diamond, Basement

No.	Title	Presenter	Authors
1	Age Related Differences in Cognitive Bias by Rui Cheng Zhou Developing a Scenario-Based Questionnaire Using Deep Learning		Rui Cheng Zhou, Fai Hong Lui, Yi Huang
2	Enhancing Inclusive University Teaching With Immersive Virtual Reality: A Work in Progress	Antonella Ferrara	Antonella Ferrara, Clément Desoche, Valentin Clement, Anna Clavel, Yuliya Kostyleva- Leborgne, Stéphanie Mazza, Amandine E. Rey, Alice Gomez
3	Trust in Generative AI: The Influence of Verbosity and Accuracy	Nicolo Ciarrocchi	Nicolo Ciarrocchi, Pierpaolo Zivi, Stefano Sdoia, Fabio Ferlazzo
4	Nested Resampling in Machine Learning: The Effects of Number of Iterations, Sample Size and Classification Complexity	András Matuz	András Matuz, László Péczely
5	A Literature Review of Implicit Bias in Language Models: What Can Language Models Teach Us About the Psychological Attitudes We Hold?	Kevin Kiy	Kevin Kiy, Dermot Lynott, Diarmuid O'Donoghue

Numerical & Mathematical Cognition II

Location: The Diamond, Basement

No.	Title	Presenter	Authors
6	Finding Their Way: Examining Changes in Fraction Misconceptions Over Two Years Among Emergent Fraction Learners	Sabrina Di Lonardo Burr	Sabrina Di Lonardo Burr, Chang Xu, Jiwei Si, Hongxia Li
7	Predictors of Reading and Arithmetic: A Longitudinal Study From Grade 1 to Grade 3	Karin Landerl	Karin Landerl, Chiara Banfi, Silke M. Göbel
8	Sharpening the Number Sense: Developmental Trends in Numerosity Perception	Irene Oeo Morín	Irene Oeo Morín, Fien Depaepe, Bert Reynvoet
9	Investigating the Operational Momentum Effect in Arithmetic Problems in Children and Adults	Tabea-Maria Haase	Tabea-Maria Haase, Martin H. Fischer, Tom Hartley, Silke M. Göbel

No.	Title	Presenter	Authors
10	Linguistic Processing in Multi-Digit Number Magnitude Comparison – The Base-20 Effect in French-Speakers	Elise Klein	Elise Klein, André Knops, Arnaud Viarouge, Silke M. Wortha, Roman J. Janssen

Language & Bilingualism II

Location: The Diamond, Basement

No.	Title	Presenter	Authors
11	The Role of Proactive Control During Adjective Online Processing in L2 Spanish	Marta Rivera	Marta Rivera, Pedro Guijarro-Fuentes
12	Enabling Multilingual Eye-Tracking Data Collection for Human and Machine Language Processing Research: Presenting the Cost Action Multipleye	Ana Matić Škorić	Ana Matić Škorić, Eva Pavlinušić Vilus, Maja Stegenwallner Schütz, Deborah Noemie Jakobi, Cui Ding, Marie-Luise Müller, Ramunė Kasperė, Nora Hollenstein, Lena Ann Jäger, The MultipleYE Team
13	Surprisal and Locality in Sentence Processing – The Role of Working Memory and Cognitive Flexibility	Kristina Cergol	Eva Pavlinušić Vilus, Ana Matić Škorić, Kristina Cergol, Marijan Palmović
14	Can Grammatical Gender Override Gender Stereotypes? The Impact of Cognitive Flexibility and Stereotypical Thinking	Aristeidis Tsitouras	Aristeidis Tsitouras, Efthymia Lamprou, Evangelia Daskalaki, Nikoleta Galeraki, Eleni orfanidou
15	Cross-Linguistic Communication via Pseudowords	Fritz Günther	Fritz Günther, Aliona Petrenco, Daniele Gatti
16	Gestural and Vocal Communication in Deaf and Non-Deaf Infants During Play With Their Parent	Rosemary Wareham	Rosemary Wareham, Danielle Matthews, Sabrina Burr, Colin Bannard, Evelynne Mercure
17	Tracking the Trajectory of Crossmodal Integration of Novel Words	Nini Chrispeels	Nini Chrispeels, Arthur Samuel, Efthymia Kapnoula
18	The Effect of Lexical Co-Activation During Learning on Integration of New Words	Daphne Weiss	Daphne Weiss, Arthur Samuel, Efthymia Kapnoula
19	Centroid Analysis: Inferring Mental Representations From Open-Ended Word Responses	Aliona Petrenco	Aliona Petrenco, Fritz Günther

No.	Title	Presenter	Authors
20	Does "Dinsy" Refer to Something Small? Sound Symbolism of Pseudowords From the Perspective of Computational Models and Human Intuition	Iva Šaban	Iva Šaban, Luca Rinaldi, Marco Marelli
21	Creating Novel Words With a Desired Meaning: Human Evaluation of a Semantic Pseudoword Creator	Rolando Bonandrini	Rolando Bonandrini, Marco Marelli
22	Exploring the Multimodal Neural Representations of Words	Laura Anna Ciaccio	Laura Anna Ciaccio, Silvia Angela Mansi, Marco Petilli, Marco Marelli, Luca Rinaldi

Sensation & Perception II

Location: The Diamond, Basement

No.	Title	Presenter	Authors
24	Temporal Differences in Non-Linguistic Stimuli Are Better Discriminated in the Audiovisual Modality, but Show No Association With Reading Ability	Stephanie Armstrong	Stephanie Armstrong
25	Characterising Time-On-Task Effects on Oscillatory and Aperiodic EEG Components and Their Co-Variation With Visual Task Performance	Martina Kopčanová	Martina Kopčanová, Gregor Thut, Christopher Benwell, Christian Keitel
26	The Role of Interoceptive Sensitivity in Music Tempo Preference: Influence of Pseudo-Heartbeats	Kyoko Hine	Kyoko Hine, Keita Tsuchiya, Shigeki Nakauchi
27	Assessing Chronic Opioid Risk Using Neurobiology (Acorn): The Predictive Value of Peak Alpha Frequency for Post-Surgical Pain and Opioid Use	Amélie Grandjean	Amélie Grandjean, Roksana Markiewicz, Samuel Hannon, Fang Gao Smith, Babu Naidu, Ali Mazaheri
28	A Steady-State Visual Evoked Potential Approach in Low-Level Adaptation Control: A Visual Mismatch Negativity Study	Lili Kővári	Lili Kővári, Béla Petro, Domonkos File, Petia Kojouharova, Zsófia Anna Gaál, István Czigler

Social Cognition II

Location: The Diamond, Basement

No.	Title	Presenter	Authors
29	Executive Function Mediates the Impact of Trauma on Emotion Recognition	Yu-Lien Huang	Yi-Ying Lu, Yi-Hsuan Lin, Yu-Lien Huang
30	Neural Correlates of Mechanisms Involved in Observation of Performance of Others	Giulia Siri	Giulia Siri, Jia Liu, Roksana Markiewicz, Agnieszka Wykowska
31	EEG Evidence of Early Partner-Specific Lexical Entrainment in Lexical Access During Speech Production	Anna K. Kuhlen	Isabella Boux, Anna K. Kuhlen
32	Long-Term Effects of Childhood Trauma on Facial Emotion Recognition in Healthy Young Adults: An ERP Study	Veronica Debora Toro	Veronica Debora Toro, Madia Marika Biasi, Gianluigi Serio, Diletta Decarolis, Paola Palladino, Tiziana Quarto
33	Late Event Related Potentials as Prediction Error Signals That Determine the Updating of Prior Information With Sensory Evidence	Michail Ntikas	Michail Ntikas, Patric Bach, Eleonora Parrotta, Giorgio Ganis

Individual Differences I

Location: The Diamond, Basement

No.	Title	Presenter	Authors
38	Non-Visual Working Memory Strategies in Aphantasia: An Objective Assessment	Maël Delem	Maël Delem, Charline Favier, Gaën Plancher
39	The Impact of Mental Images on Reasoning: A Study on Aphantasia	Gaën Plancher	Maël Delem, Damien Le Clézio, Gaën Plancher
40	Searching for Remote Associations: A Process-Oriented Analysis of Errors in the Remote Associates Test in Schizophrenia Patients and Healthy Controls	Hanna Kucwaj	Hanna Kucwaj, Bartłomiej Krocze
41	Spontaneous Thought Dynamics: Identifying the Characteristics and Correlates of Thought Transitions Using the Think-Aloud Method	Arya Gilles	Arya Gilles, Arnaud D'Argembeau, David Stawarczyk

Metacognition

Location: The Diamond, Basement

No.	Title	Presenter	Authors
42	Metacognition in the Face of Distraction	Sandra Nowak	Sandra Nowak, Maciej Hanczakowski, Katarzyna Zawadzka
43	Confidence in Source Memory: When External Cues Fail to Sway Judgment	Paulina Pietrak	Paulina Pietrak, Katarzyna Zawadzka, Maciej Hanczakowski
44	The Role of Location in Visual Short-Term Memory Comparison Processes	Lauren Hebburn	Lauren Hebburn, Olivia Afonso, Michael Pilling
45	Monitoring One's Own Performance: The Case of Math-Anxious Individuals	Àngels Colomé	M. Isabel Núñez-Peña, Àngels Colomé
46	Is There Relative Accuracy in Participants' Metamemory Judgments for Context?	Désirée N. Schönung	Désirée N. Schönung, Rica Zühlke, Vivienne N. Haag, Beatrice G. Kuhlmann
47	The Impact of External Cues on Metamemory Monitoring During Learning	Aleksandra Krogulska	Aleksandra Krogulska, Maciej Hanczakowski, Katarzyna Zawadzka

Learning & Memory II

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
48	Profiling Everyday Memory Functioning Across the Autism and ADHD Spectrums	Joanna Kubiak	Joanna Kubiak, Michael Craig, Kristofor McCarty, Joanna Greer
50	Argumentative Writing Development in 3rd & 5th Graders in Dutch Primary Education	Marco van de Ven	Marco van de Ven, Aurora Troncoso Ruiz, Lara Dilger, Eliane Segers
51	How Do Spontaneous Thoughts Come to Mind, and How to Change Them: Testing the Interaction Between Type of Cues and Priming Mechanisms	Magda Jordao	Magda Jordao, Kata Pauly-Takacs, Chris Moulin, Krystian Barzykowski
52	Memory in Your Hands: Note-Taking Enhances Card Memory in a Concentration Game	Anna-Lena Finkler	Anna-Lena Finkler, Hannes Thomas, Hauke S. Meyerhoff
53	Subtle Effects of Synchronous Learning on Memory and Skin Conductance	Michèle Muhmenthaler	Michèle Muhmenthaler, Beat Meier

No.	Title	Presenter	Authors
54	Exploring Cognitive Aging in Autism: A Lifespan Perspective	Marine Bessé	Marine Bessé, Shasha Morel-Kohlmeyer, Emmanuelle Houy-Durand, Julia Capdeville, Laurie Tuller, Philippe Prevost, Laurence Taconnat, Badiâa Bouazzaoui, Marie Gomot, Lucie Angel
55	Nature and Reliability of Task-Evoked Pupil Responses With Respect to Performance in N-Back Tasks	Gábor László Bényei	Gábor László Bényei, Péter Pajkossy
57	All the Same, Less to Maintain: Electrophysiological Evidence for Late-Stage Optimization in Visual Working Memory	Qianru Xu	Qianru Xu, Lijing Guo, Dan Nie, Chaoxiong Ye
58	Long-Term Memory Contributions to Working Memory: Insights From the Contralateral Delay Activity	Ana Rodriguez	Ana Rodriguez, Peter Shepherdson, Lea Bartsch
59	Image Memorability Facilitates Visual Working Memory Formation: An ERP Study	Chaoxiong Ye	Chaoxiong Ye, Lijing Guo, Edward Awh, Edward Vogel, Qiang Liu, Weizhen Xie
60	Extending the Theta Cycle Enhances Visual Working Memory in Individuated- but Not Fixed-Frequency Transcranial Alternating Current Stimulation	Michał Ociepka	Michał Ociepka, Paweł Basoń, Suvarna Rekha Chinta, Adam Chuderski
61	Different Patterns of Activation for the Recognition of Visual Vs Auditory Verbal Information in the SPoARC Effect	Maëliiss Vivion	Maëliiss Vivion, Fabien Mathy, Alessandro Guida, Lydiane Mondot, Stephen Ramanoël
62	The Impact of Label Specificity on Visual Memory	Krzysztof Piątkowski	Krzysztof Piątkowski, Cihan Altunkaynak, Mariana Carrito, Katarzyna Zawadzka, Maciej Hanczakowski, Alessandra Souza
63	Benefits and Costs of Encoding Variability for Item and Relational Features	Mikołaj Wieczór	Mikołaj Wieczór, Maciej Hanczakowski, Katarzyna Zawadzka
65	The Unity and Diversity of Binding and Its Relation to Fluid Intelligence	W. Fred Garvey	W. Fred Garvey, Alon Zivony, Alicia Forsberg, Claudia C. von Bastian

No.	Title	Presenter	Authors
66	Item-Specific Processing for Real-World Objects in Visual Working Memory: Effects of Presentation Time	Makoto Tanji	Makoto Tanji, Satoru Saito
67	Is Working Memory Updating Costly or Obligatory? The Role of Task Relevance and Response Selection	Noga Rotshtein	Noga Rotshtein, Yoav Kessler
68	The Role of Attention in Verbal Working Memory for Serial Order	Robin Remouchamps	Robin Remouchamps, Johanna Hein, Evie Vergauwe, Steve Majerus
69	The Effect of Word Length on Chronometric Measures in Handwritten and Typed Spelling Productions	Yasmin Arnould	Yasmin Arnould, Anna L. Barnett, Michael Pilling, Olivia Afonso
70	Investigating the Impact of Cognitive Offloading on Serial Position Effects in Working Memory	Millie Smith	Millie Smith, Amanda Waterman, Luísa Superbia Guimarães, Jonathan Redshaw, Richard Allen
71	Switching Without Memory and Control: Testing the Impact of Working Memory and Proactive Control in Task Switching	Aharon Oppenheim	Aharon Oppenheim

Decision Making & Reasoning

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
72	Beyond Cognitive Sophistication: Why Conspiratorial Thinking Endures	Ivana Hromatko	Ivana Hromatko, Mirjana Tonković, Andrea Vranić, Nebojša Blanuša, Bartul Vuksan-Ćusa
73	The Impact of Aerobic Exercise on Rational Decision-Making	Michał Remiszewski	Michał Remiszewski, Gabriela Rajtar, Marcin Maciejczyk, Tomasz Ligeza
74	Interoceptive Awareness and Veracity Assessment Accuracy: Heartbeat Evoked Brain Potentials (HEP) Study	Joanna Ulatowska	Joanna Ulatowska, Wiktoria Gucińska
75	What Do People Expect From Expected Value?	Bartłomiej Krocze	Tomasz Smoleń, Paweł Basoń, Bartłomiej Krocze, Hanna Kucwaj, Konrad Sak

No.	Title	Presenter	Authors
76	Deontic Reasoning and Wason's Selection Task: State of the Art	Montserrat Martín	Montserrat Martín, María Dolores Valiña
77	Developing and Validating an Experimental Task for Crisis Negotiation	Geoffrey Duran	Geoffrey Duran, Aya Chahboun, Maurane Berteau, Célie Marino-Marienneau, Melis Yildirim

Motor Cognition II

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
78	How the Cognitive System Deals With Error Commission: Binding of Correct Responses in Cases of Errors in Complex Response Sequences	Maria Nemeth	Maria Nemeth, Anna Foerster, Christian Frings, Roland Pfister, Birte Moeller
79	A Systematic Review on Body Schema and Arm Size Plasticity	Anna Zigrino	Anna Zigrino, Pierpaolo Zivi, Fabio Ferlazzo, Stefano Sdoia
80	Where Do We Draw the Line Between Our Physical Bodies and the External World? A Psychophysical Analysis	Hannes Saal	Celia Blaise, Holly Clark, Hannes Saal
81	Towards an Intentional Approach to the Spatial Coding of Actions	Elsa Pezet	Elsa Pezet, Nicolas Morgado, Loïc Heurley
82	Stimulus-Driven and Response-Driven Cross-Modal Action Co-Activation	Jens Kürten	Jens Kürten, Lynn Huestegge

Attention & Cognitive Control II

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
83	Preliminary Evidence for the Resting-State Theta/Beta Ratio as a Predictor of Working Memory and Emotional Regulation	Madia Marika Biasi	Madia Marika Biasi, Veronica Debora Toro, Gianluigi Serio, Diletta Decarolis, Paola Palladino, Tiziana Quarto
84	Impact of Unliking and Unwanting Threats on Working Memory	Hippolyte Fournier	Hippolyte Fournier, Gaën Plancher

No.	Title	Presenter	Authors
85	Neurophysiological Evidence for Emotional Attention Modulation Depending on Goal Relevance	Xiaojuan Xue	Xiaojuan Xue, Gilles Pourtois
86	Reward-Driven Cognitive Control Dysfunction in Adolescents With Major Depressive Disorder: Behavioral and Neural Insights	Yiwen Qiu, Haoran Dou, Yi Lei	Yiwen Qiu, Haoran Dou, Yi Lei
87	Inner and Outer Balance: The Relationship Between Equanimity and Postural Stability in the Mindful Body	Petra Prof. Dr. Jansen	Petra Prof. Dr. Jansen, Philipp Prof. Dr. Hofmann, Franziska Prof. Dr. Schroter
90	Motivation in Interference Resolution – Investigating the Impact of Motivational Statements on the Congruency Effect	Miriam Gade	Miriam Gade
90	Multi Negations in Information Processing	Robert Wirth	Robert Wirth, Yanick Kloß
91	Proactive Control Strategy as a Function of Reactive Inhibition Capacities and Impulsiveness: Challenging the Dual Mechanisms of Control	Adrien Lorant	Adrien Lorant, Marie Mathé, Fanny Grisetto, Clémence Roger
92	Control Under Pressure - the Influence of Aversive Motivation on Adaptive Control	Peter Czingraber, Natalija Dokic, Julianna Harangozo, Alexia Kraft	Peter Czingraber, Natalija Dokic, Julianna Harangozo, Alexia Kraft, Andras Fazekas, Miklos Bognar, Balazs Aczel
95	Flexibility and Stability in Cognitive Control: The Role of Reward Contingency	Larissa Walter	Larissa Walter, Anne Voormann, Irina Monno, Andrea Kiesel
96	The Cognitive Underpinnings of Language Mixing Behavior in Bilingual Aphasia	Mathilde Iserentant	Mathilde Iserentant
97	Investigating Associative Processes of Task Set Reconfiguration by Relearning Cue-Task Mappings	Stefanie Kellner	Stefanie Kellner, Tilo Strobach, Mike Wendt
98	Lower Caution, Not Inhibitory Control, Predicts Gambling Severity – A Pre-Registered Cognitive Modelling Study	Michelle Oxtoby	Michelle Oxtoby, Charlotte Pennington, Richard Tunney, Craig Hedge
99	Individual Sensitivities to Reward and Punishment Outcomes Predict Mid Frontal Theta Activity in Approach Avoidance Conflict	Shubham Pandey	Shubham Pandey, Roman Osinsky

14:00 – 15:40: Regular Talks

T-11: Learning & Memory II

Chair: Emma Blakey

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Following Instructions in a Working Memory Task: Does Instructed Strategy Use Improve Performance?	Amanda Waterman	Amanda Waterman, Asiyah Alzahrani, Richard Allen
2	Intention Offloading Across the Adult Lifespan: An Investigation Across Laboratory and Naturalistic Settings	Chiara Scarampi	Chiara Scarampi, Sam J. Gilbert, Guido H.E. Gendolla, Matthias Kliegel
3	The Impact of Age and Spontaneous Strategy Use on Real-World Visual Memory Tasks	Gerard Campbell	Gerard Campbell, Rebecca Hart, Richard J. Allen, Claudia von Bastian, Melanie R. Burke, Mario Parra Rodriguez, Victor Shiramizu, Louise A. Brown Nicholls
4	Use of Everyday Memory Strategies Predicts Subjective Cognitive Difficulties Across the Adult Lifespan	Louise Brown Nicholls	Louise Brown Nicholls, Julia-Marie Lukas, Linzi Crawford, Lazaro Jackson
5	Memory Costs Following Cognitive Offloading in Young and Older Adults	Hagit Magen	Neta Shenhav, Hagit Magen

T-12: Attention & Cognitive Control II

Chair: Daniel Poole

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Sequential Effects in Visual Search, Task Switching and Action Control: Evidence for Different Episodic-Retrieval Mechanisms	Daniel Toledano	Daniel Toledano, Tamar Alkalai, Dominique Lamy
2	Evaluating the Reliability of Switch Costs in Two Different Task Switching Paradigms	Irina Monno	Irina Monno, Jovita Brüning, Andrea Kiesel
3	Examining Affective Flexibility Using the Voluntary Affective Task-Switching (Vats) Paradigm: Insights Into Self-Initiated Cognitive-Emotional Control	Sharon Naparstek	Lihi Cohen, Rotem Menachem, Noy Bass, Aharon Hauser, Sharon Naparstek

No.	Title	Presenter	Authors
4	Age-Related Inhibitory Deficits in Auditory Attention: Evidence From Task Switching and Negative Priming	Luigi Falanga	Luigi Falanga, Thomas Deutsch, Janina Fels, Denise Stephan, Iring Koch
5	Switching Between Cognitive Control States? No, Thank You	Merve Ileri-Tayar	Merve Ileri-Tayar, Julie Bugg, Wouter Kool

T-13: Attention & Cognitive Control III

Chair: James Myers

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Screen or Paper? A Pilot Study on Cognitive Load, Attention and Reading Comprehension Using Eye-Tracking, EEG, and GSR	Amanda Saksida	Amanda Saksida, Laura Blaznik, Igor Žagar
2	From Screens to Creativity: The Impact of Media Multitasking on Attentional Scope and Creative Potential	Ioanna Darviri	Eleni Orfanidou, Ioanna Spentza, Ioanna Darviri, Panagiotis Kourtesis, Chrisanthi Nega
3	Shifts in Attention During Listening to a Novel – Evidence From Eye-Tracking	Johanna Kaakinen	Johanna Kaakinen, Diane Mézière, Jarkko Lehtola, Karin Kukkonen, Jonathan Smallwood, Jaana Simola
4	Influence of Curiosity on Cognitive Control	Seema Prasad	Seema Prasad, Christian Beste, Bernhard Hommel
5	Effects of Interruption Frequency on Performance in a Serial Multistep Task in Younger and Older Adults	Tara Radovic	Tara Radovic, Torsten Schubert

T-14: Language & Bilingualism I

Chair: Danielle Matthews

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Individual Differences in the Tendency to Rely on Multiword Information in Natural and Artificial Languages	Dan Steinhof	Dan Steinhof, Noam Siegelman, Inbal Arnon

No.	Title	Presenter	Authors
2	Examining the Relationship of Phonological Neighborhood Density and Off-Line Consolidation Effects on Word Learning	Efthymia Kapnoula	Efthymia Kapnoula, Arthur Samuel
3	The Power of Delay: Asynchronous Presentation Benefits Spoken-Written Word Form Acquisition	Johanna Funk	Johanna Funk, Florian Hintz
4	Morpheme Knowledge Is Shaped by Information Available Through Orthography	Maria Korochkina	Maria Korochkina, Holly Cooper, Marc Brysbaert, Kathleen Rastle
5	From Letters to Words: How Readers Adapt to Print-Speech Uncertainty	Naama Schwartz	Naama Schwartz, Ram Frost, Noam Siegelman

T-15: Music & Perception

Chair: Jennifer MacRitchie

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	How Perceptual Ability Shapes Memory	Chhavi Sachdeva	Chhavi Sachdeva, Emily Whelan, Rebecca Ovalle-Fresa, Alodie Rey-Mermet, Jamie Ward, Nicolas Rothen
2	Expertise Shapes Low-Level Sensory Working Memory in Artists and Musicians	Damla Çifçi	Damla Çifçi, Joana Pereira Seabra, Vivien Chopurian, Thomas B. Christophel
3	How Perceived and Felt Emotions Shape the Accuracy of Musical Tempo Memory	Julia Vigl	Julia Vigl, Francesca Talamini, Marcel Zentner
4	The Effect of Preferred Background Music on Attentional State and Performance and the Role of Mood and Arousal	Luca Kiss	Luca Kiss, Karina J Linnell
5	Do Musicians Have Better Short-Term Memory Than Nonmusicians? A Multi-Lab Study	Massimo Grassi	Massimo Grassi, Francesca Talamini

T-16: Decision Making I

Chair: Nemanja Vaci

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	The Robustness of Cognitive Illusions of Truth in Naturalistic Settings	Annika Stump	Annika Stump, Christoph Klauer
2	Let Me Tell You That I Don't Know: A New Perspective on the Continued Influence Effect	Devora Newman	Devora Newman, Ruth Mayo
3	Biased Misinformation Distorts Beliefs	Rani Moran	Juan Vidal-Perez, Raymond Dolan, Rani Moran
4	Incorporating Response Times Into Multinomial Processing Tree Models of the Illusory Truth Effect: A Comparison of RT-MPT Models	Raphael Hartmann	Raphael Hartmann, Lars Kulbe, Constantin Meyer-Grant, Semih Aktepe, Daniel Heck
5	The Role of Intuition and Reflection in Realistic Moral Judgment and Decision-Making	Simon Jauffreau	Simon Jauffreau, Rui Manuel Da SilvaNeves, Julie Lemarié

T-17: Numerical & Mathematical Cognition

Chair: Sabrina Burr

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	Semantics at the Wheel, Metaphors in the Backseat: What Drives the Perception of Ordinality in Numerical Cognition?	Ann Mary John	Ann Mary John, Mônica Macedo-Rouet, Hippolyte Gros
2	Testing the Role of Perceptual Length in the Comparison of Multi-Digit Numbers With Different Length	Ismael Gutiérrez-Cordero	Ismael Gutiérrez-Cordero, Ana Calviño, Javier García-Orza
3	Does Format Matter? Investigating the Development of Arithmetic Fluency in Standard and Nonstandard Formats Over Two Years of Primary School	Lisa Jane Rodgers	Lisa Jane Rodgers, Sabrina Di Lonardo Burr, Judith Wylie, Chang Xu
4	Exploring the Mechanisms Underlying a Momentum Effect in the Time Domain	Marie Jacquél	Marie Jacquél, Arnaud Viarouge, André Knops
5	Daily Living Computational Skills: The Exact Answer Is Not Always the Right One	Sara Zonca	Sara Zonca, Marzia Bizzaro, Tomaso Vecchi, Giulio Costantini, Luisa Girelli

T-18: Emotion

Chair: Alekhya Mandal

Location: The Diamond, WR1

No.	Title	Presenter	Authors
1	Prosody Meets Semantics: Insights From 15 Years of Exploring Emotional Speech Processing Across Human Populations... and AI Models!	Boaz Ben-David	Boaz Ben-David
2	The Role of Empathy in Children's Processing and Comprehension of Written Irony	Henri Olkonemi	Henri Olkonemi, Tuomo Häikiö, Matti Laine, Penny Pexman
3	Learning to Suppress That What I Fear	Jan Theeuwes	Jan Theeuwes
4	Insights Into the Influence of Emotional and Semantic Value of Unexpected Visual Information on Inattention Blindness	Katarina Pavic	Katarina Pavic, Ludovic Ferrand, Marie Izaute, Laetitia Silvert
5	Reducing Attentional Bias to Threat Through Reward Learning	Manon Mulckhuyse	Manon Mulckhuyse, Mario Severo

T-19: Social Cognition & Consciousness

Chair: Megan Freeth

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Moral Cognition: Normal Functioning and Disturbances After Traumatic Brain Injury	Caroline Bourdon	Caroline Bourdon, Hakim Djeriouat, George Michael
3	The Development of the Awareness Attribution Scale	Marina Sarda Gou	Marina Sarda Gou, Kinga Ciupinska, Agnieszka Wykowska, Tony Prescott
4	Beyond the Ear: How Self-Perceptions and Stereotypes Shape Auditory Performance	Vered Shakuf	Vered Shakuf, Ornella Dakwar Kavar

T-20: Learning & Memory III

Chair: Tim Riley

Location: ICOS, A16

No.	Title	Presenter	Authors
1	Eye Tracking for Autobiographical Memory Detection	Andrea Zangrossi	Andrea Zangrossi, Liisa Camilla Gatto, Margherita Pucci, Miriam Celli, Virginia Lanfranchi, Giuseppe Sartori
2	Typicality, Encoding, and Neurodivergence in Recognition Memory: Cognitive Strategies in Autism vs. Neurotypical Adults	Ann-Kathrin Beck	Ann-Kathrin Beck, Cristiane Souza, Margarida V. Garrido, J. Bernardo Barahona-Correa, Joana C. Carmo, Daniela Czernochowski, Thomas Lachmann
3	The Contributions of Online and Offline Processes to Memory Integration in Children Versus Adults	Emma James	Emma James, Layla Unger
4	Are Social Robots as Capable of Teaching as Humans? A Meta-Analysis	Juan C. Castro-Alonso	Juan C. Castro-Alonso, Rachel M. Wong, Hongyan Yang, Shelby Palmer, Ou Hao Chen
5	Spatial Abilities and Attitudes Toward STEM - Any Connection? Cross-Cultural Study	Marija Živković	Marija Živković, Gavin Duffy, Antonija Vrdoljak, Luka Juras, Ena Kantor, Helena Tomšek, Dóra Hegyesi

16:10 – 17:50: Symposia

PS-SYM: We Speak Many Languages! Bridging Barriers to Bring the Diversity of Language Experience Into Cognitive Psychology

Chair(s): Megan Zirnstein, Ingrid Finger, Judith Kroll, Janaina Weissheimer

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	The Bilingual Experience Through the Lens of Graph Analysis	Janaina Weissheimer	Janaina Weissheimer, Ingrid Finger
2	Within-Participant Variability in Multilingual Language Processing	Tamar Degani	Tamar Degani
3	Factors Influencing Success in Foreign Language Learning: Insights From Genetic and Behavioral Evidence in Third Language Learners in Hong Kong	Xin Kang	Xin Kang, Patrick C.M. Wong

No.	Title	Presenter	Authors
4	Bilingualism Is a Dynamic Multifaceted Experience That Shapes Cognition and the Brain	Christos Pliatsikas	Christos Pliatsikas
5	What Variation in Language Experience Tells Us About Cognition and the Brain	Judith Kroll	Judith Kroll, Megan Zirnstein

SYM-21: Learning in the Lab: Insights on Oral and Written Language From Artificial Orthographies Experiments

Chair(s): Irene Altarelli

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Symbol-Sound Association Learning, a Relevant Predictor of Individual Differences in Reading?	Milene Bonte	Milene Bonte, Fiona Borska, Chiara Turri, Leandra Zinke, Jurgen Tijms, Marjolein Tool, Nienke van Attevelde, Rogier Kievit
2	The Neural Basis of Learning Letter-Speech Sound Associations: Insights From EEG and fMRI in Children With Typical and Poor Reading Skills	Silvia Brem	Silvia Brem, Nada Frei, Tugce Aras, David Willinger, Christina Lutz, Sarah Di Pietro, Ilana I. Karipidis
3	Audio-Visual Associative Learning, Even When Non-Linguistic, Is Impaired in Children With Developmental Dyslexia	Aaron Cochrane	Angela Pasqualotto, Aaron Cochrane, Daphne Bavelier, Irene Altarelli
4	Production and Perception of Novel Speech Sounds and Words After Artificial Sound-Letter Association Learning	Silvia Yang	Silvia Yang, Clara Martin, Rachel Hayes-Harb, Antje Stoehr
5	Symposium Discussion	Irene Altarelli	Irene Altarelli

SYM-22: The Next Step in Memory Research: Recent Theoretical Developments and Future Directions

Chair(s): Dominic Guitard

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Embedded Processes in the Mind and Brain	Nelson Cowan	Nelson Cowan

No.	Title	Presenter	Authors
2	Episodic and Semantic Memory: A Tale of Two Solitudes	Randall K. Jamieson	Randall K. Jamieson, J. Nick Reid, Dominic Guitard
3	The Revised Feature Model: Theory and Applications	Jean Saint-Aubin	Jean Saint-Aubin, James Yearsley, Dominic Guitard, Marie Poirier
4	Processing and Maintenance of Information in the Time-Based Resource Sharing Model	Valérie Camos	Valérie Camos, Maximilien Labaronne, Julie Pougeon, Clément Belletier, Pierre Barrouillet
5	Steps to a Computational Model of Working Memory	Klaus Oberauer	Klaus Oberauer

SYM-23: Moving Beyond Standard Memory and Language: Insights From Evolutionary Psychology (Take 2)

Chair(s): Sara B. Félix, Josefa N. S. Pandeirada

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Exploring the Influence of Dynamic and Multisensory Cues in the Contamination Effect	Sónia M. P. Santos	Sónia M. P. Santos, Natália Lisandra Fernandes, Josefa N. S. Pandeirada
2	The Impact of Disease Cues on Destination Memory: Effects of Illness-Related Signals on Memory for Information Recipients	Pedro B. Albuquerque	Pedro B. Albuquerque, A. Catarina Ribeiro, Raquel Pinto, Angela Bartolo
3	Survival Processing and the Influence of Carotenoid Coloration	Jênnyfer C. A. Freitas	Jênnyfer C. A. Freitas, Josefa N. S. Pandeirada, Gün Semin
4	Remain Positive! Survival Advantages Do Not Accrue for Negatively-Valenced Words	Dailyn Q. Clark	Dailyn Q. Clark, Jeanette Altarriba
5	The Role of Attention and Context: Investigating Underlying Mechanisms of the Animacy Effect	Vanessa Sophie Pallentin	Vanessa Sophie Pallentin, Meike Kroneisen

SYM-24: Gaze-Based Rehearsal During Retrieval From Working Memory

Chair(s): Agnes Rosner, Candice Morey

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	Exploring the Role of Saccades in Visual Working Memory Utilization	Shlomit Yuval-Greenberg	Shlomit Yuval-Greenberg, Rania Qais
2	Looking at Nothing Does Not Vary With Long-Term Memory Strength	João Vieira	João Vieira, Alessandra S. Souza, Ruhi Bhanap, Agnes Rosner
3	The Role of Eye Movements and Covert Shifts of Attention in Working Memory Retrieval	Ruhi Bhanap	Ruhi Bhanap, Klaus Oberauer, Agnes Rosner
4	Encoding Spatial Information for Backwards Recall: Evidence From Eye Movements in Adults and Children	Candice Morey	Candice Morey, Genevieve Lawson, Tanja Könen, Julia Karbach, Nicolas Chevalier
5	How Do Children Encode What and Where Information? Evidence From Eye Movements	Genevieve Lawson	Genevieve Lawson, Emily M. Elliot, Candice C. Morey

SYM-25: The Role of the Body in Cognition and Emotion

Chair(s): Eva Van den Bussche, Gethin Hughes

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	Electrically Induced Facial Feedback – Effects on Felt and Perceived Emotion	Sebastian Korb	Sebastian Korb
2	Interacting Hearts: The Role of Cardiac Interoception on Emotional Processing and Social Decision-Making	Mariana von Mohr	Mariana von Mohr
3	Movement and the Brain: Learning-Related Changes in Brain Structure	Marco Taubert	Marco Taubert
4	Mind Blanking Reports Are Mediated by Altered Arousal Levels	Athena Demertzi	Athena Demertzi
5	Bodily Arousal and Sense of Agency	Gethin Hughes	Gethin Hughes, Harry Ford, Peter Gooding, Eva Van den Bussche

SYM-26: Cognitive Interventions Across the Lifespan: From Design to Implementation in Clinical and Healthy Populations

Chair(s): Julia Föcker, Mor Nahum

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	Can We Personalize Cognitive Bias Modification? Shedding Light on Emotional and Cognitive Bias Factors That Predict Training Efficiency	Hadas Okon-Singer	Hadas Okon-Singer
2	Sense-Braille: Co-Creating a Multisensory Braille Device Together With Visually Impaired and Blind Children	Julia Föcker	Julia Föcker, Polly Atkins, Jonathan Waddington, Patrick Dickinson
3	Harnessing Non-Invasive Brain Stimulation and Cognitive Control Training for Pediatric ADHD: Advances in Pediatric Interventions	Mor Nahum	Mor Nahum, Ornella Dakwar-Kawar, Noam Mairon, Shachar Hochman, Roi Cohen Kadosh, Itai Berger
4	Home-Based Stereoptic VR Serious Games as a New Treatment for Amblyopia: Randomized Controlled Trial (RCT) Results	Pawel J. Matusz	Pawel J. Matusz
5	From Surviving to Thriving: Resilience-Training Interventions in the Context of Breast Cancer	Nazanin Derakhshan	Nazanin Derakhshan

16:10 – 18:00: Career Transitions

Organised and chaired by the PhD Committee

This session includes academics and industry professionals who will share their experiences and guidance on career transitions within Psychology. Designed for researchers at all levels, panellists will discuss key opportunities, challenges, successes, and strategies for navigating a range of career pathways.

Name	Affiliation
Nick Chater	Warwick Business School, UK
Alessandra Souza	University of Porto, Portugal
Jon Peirce	Open Science Tools and University of Nottingham, UK
Merim Bilalic	Northumbria University, UK

18:00 – 19:00: ESCAP Business Meeting

Location: The Diamond, LT1, with overflow streaming to LT3 and LT4

Friday

09:00 – 10:00: Keynote - Dr Ven Popov

Location: The Diamond, LT1, with overflow streaming to LT3 and LT4

10:30 – 12:10: Symposia

KSYP-04: Theory Building in Cognitive Psychology: The Role of Computational Models

Chair(s): Klaus Oberauer

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	G-Distance: On the Comparison of Model and Human Heterogeneity	Andy Wills	Andy Willis, Lenard Dome
2	Neural Mechanism of Compositional Generalisation	Zilu Liang	Zilu Liang
3	How Cause-Effect Reasoning Impedes Theory Development: Why We Should Focus on Mechanisms and Functions Instead	Noah van Dongen	Noah van Dongen
4	To Be Fair: Theory Specification Needs an Update	Caspar van Lissa	Caspar van Lissa
5	Symposium Discussion: What Can Computational Models Do for Us to Improve Theories of Cognition?	Klaus Oberauer	Klaus Oberauer

SYM-27: Understanding the Cognitive Mechanisms Supporting Conversation Across Typical and Atypical Populations

Chair(s): Ruth Corps, Katie Carpenter

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Studying Conversation Outside the Laboratory: A Corpus Analysis	Ruth Corps	Ruth Corps
2	Using Question-Answering to Understand the Flow of Conversation	Martin Pickering	Martin Pickering, HuanHuan Yin, Weijia Hu, Ruth Corps
3	Conversation in Adverse Listening Conditions: Is Hearing Loss Special?	Lauren Hadley	Lauren Hadley

No.	Title	Presenter	Authors
4	Manipulating the Impact of Interest Intensity on Autistic and Neurotypical Child Conversation	Katie Carpenter	Katie Carpenter, Amy Howard, Danielle Matthews, Sue Leekam, Colin Bannard, Michael Forrester, Kirsten Abbot-Smith
5	Does Manipulating Conversation Partner Speech Rate Impact Autistic and Neurotypical Child Response Content and Timing	Chantel Smith	Chantel Smith, Danielle Matthews, Colin Bannard, Michael Forrester, Sue Leekam, Heather Ferguson, Kirsten Abbot-Smith

SYM-28: Binding and Retrieval in Action Control, Part I: Modulations of Binding and Retrieval Processes

Chair(s): Carina Giesen, Andrea M. Philipp

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	From Tusk Till Horn: Modulating Feature Boundaries in Action Control	Nicolas D. Münster	Nicolas D. Münster, Christian Frings
2	Stimulus-Response Binding and Retrieval Is Impervious to Affective Consequences	Anna Martini	Anna Martini, Klaus Rothermund
3	Does Vicarious Feedback Influence Stimulus-Response Binding by Observation?	Kira Franke	Kira Franke, Carina G. Giesen
4	Response-Response Binding Effects Can Be Increased by Investing More Effort in Each Response	Birte Moeller	Birte Moeller, Lars Schöpper, Christian Frings, Roland Pfister
5	Episodic Retrieval in Task Switching: Repeating the Response Induces Retrieval of the Task	Elena Benini	Elena Benini, Luca Moretti, Malte Möller, Iring Koch, Andrea M. Philipp, Ruyi Qiu, James A. Grange, Susanne Mayr

SYM-29: Seeing the World Through Rose-Colored Glasses or Feeling Blue: The Impact of Emotions on Working Memory

Chair(s): Christina G. Lutz

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Emotional Prioritization in Visual Working Memory	Christina G. Lutz	Christina G. Lutz, Evie Vergauwe
2	Modulation of Maintenance and Processing in Working Memory by Negative Emotions	Gaën Plancher	Gaën Plancher, Pascale Colliot, Hanna Chainay
3	Further Evidence Against a Precision Boost Induced by Negative Emotion on Visual Working Memory	Alessandra S. Souza	Alessandra S. Souza, Daniel Skoda, Joana Pinto, Susana Vieira, Mariana F. C. Encarnação
4	Emotional Working Memory: Tests, Associations to Symptoms, and Target for Interventions?	Eivind H. Ronold	Elvind H. Ronold, Nanna K. G. Skram, Constance G. Storvestre, J. D. Allen, Sheri L. Johnson, Åsa Hammar
5	Modulating Prefrontal Cortex Activity to Alleviate Stress-Induced Working Memory Deficits: A Transcranial Direct Current (TDCS) Study	Sumit Roy	Sumit Roy, Michael A. Nitsche

SYM-30: Closed-Loop Systems in Behavioral Training for Impact: Designing Adaptive Performance-Based Challenges for Players of All Abilities

Chair(s): Angela Pasqualotto, Daphne Bavelier

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	The Importance of Design in Adaptive Algorithms for Cognitive Training	Aaron Seitz	Aaron Seitz, Susanne Jaeggi
2	Adaptive Cognitive Training: A Novel Multidimensional Dynamic Difficulty Adjustment (DDA) System	Angela Pasqualotto	Angela Pasqualotto, Marios Fanourakis, Zeno Menestrina, Mor Nahum, Daphne Bavelier
3	Building an Adaptive Learning Environment for Research: Using Response Times and Tracking Parameters With Elo	Abe Hofman	Abe Hofman
4	Closed-Loop Systems for Mindfulness and Behavior Change	Jyoti Mishra	Jyoti Mishra
5	Symposium Discussion	Daphne Bavelier	Daphne Bavelier

SYM-31: Advancing Mentalizing Research: From Core Mechanisms to Cultural Influences

Chair(s): François Quesque

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	Dissociating Visual Perspective Taking and Belief Reasoning in Autistic and Non-Autistic Participants	Klaus Kessler	Klaus Kessler, Green Rachel Lara, Carrington Sarah Joanne, Shaw Daniel Joel
2	The Impact of Sleep Deprivation on Mentalizing	Andrew Surtees	Andrew Surtees, Rui Pereira, Martina de Lillo, Andrew Bagshaw, Clare Anderson
3	Improving Mentalizing Abilities Through Low-Level Interventions: The Case of Visual Illusion Exposure	François Quesque	François Quesque
4	Anti-Social Learning: The Impact of Language on Mentalizing	Caroline Catmur	Caroline Catmur, Bryony Payne, Geoffrey Bird
5	Symposium Discussion	François Quesque	François Quesque

SYM-32: Are Eyes Special in Shaping Attention? Emerging Perspectives From Social and Non-Social Cues

Chair(s): Mario Dalmaso, Anna Lorenzoni

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	On the Nature of the Reversed Congruency Effect for Gaze Stimuli: Exploring the Joint Attention Hypothesis	Anna Lorenzoni	Anna Lorenzoni, Mario Dalmaso
2	Spatial Biases to Pointing- and Gaze-Cues	Wieske van Zoest	Wieske van Zoest
3	Are There Quantitative Differences in Spatial Interference Triggered by Social and Non-Social Targets?	Yoshihiko Tanaka	Yoshihiko Tanaka, Kenta Ishikawa, Takato Oyama, Matia Okubo
4	Exploring Spatial Interference Effects in Social and Non-Social Targets: A Conditional Accuracy Function Analysis	Renato Ponce	Renato Ponce, Juan Lupiáñez, Carlos González-García, Maria Casagrande, Andrea Marotta
5	Effects of Learning Regularities With Gaze and Arrow Cues on Attention	Anna Pecchinenda	Anna Pecchinenda, Claudia Salera, Ala Yankouskaya

SYM-33: (Electro)Physiological Constraints on Language

Chair(s): Lena Henke, Lars Meyer

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Respiratory Cycles as Intrinsic Temporal Frames Grounding Speech Production	Susanne Fuchs	Susanne Fuchs
2	Jerky Jaw Kinematics in the Creation of Syllables	Malin Svensson Lundmark	Malin Svensson Lundmark
3	Estimating Individual Linguistic Processing Bottleneck	Jérémy Giroud	Jérémy Giroud, Jacques Pesnot Lerousseau, François Pellegrino, Benjamin Morillon
4	Electrophysiological Constraints Shape Infant Language Acquisition	Katharina Menn	Katharina Menn, Claudia Männel, Lars Meyer
5	Electrophysiological Time Constraints on Multi-Word Chunking	Lena Henke	Lena Henke, Lars Meyer

12:30 – 14:00: Poster Session 3 (P-03)

Learning & Memory III

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Abstracted Category Representations Are More Familiar Than Specific Exemplars: Prototypes Resemble so We Remember?	Anett Rago	Anett Rago, Julia Baross, Hunor Kis, Szabo Eszter Dora
24	The Relative Self: An Investigation of Time and Distance in the Self-Reference Effect on Memory	Julia Englert	Julia Englert, Nexhmedin Morina
25	Speaking to a Partner in a Shared-Memory Task Reduces the Production Effect	Rachel M. Brown	Rachel M. Brown, Anna K. Kuhlen
26	Effects of Semantic Salience on Memory for Object Locations	Flurina L. Brodewolf	Flurina L. Brodewolf, Beat Meier
27	Associative and Item Effects of Errorful Learning	Maciej Hanczakowski	Maciej Hanczakowski, Ewa Butowska-Buczyńska, Katarzyna Zawadzka

No.	Title	Presenter	Authors
28	The Influence of Cost on Avoidance Recovery After Extinction With Response Prevention	Paula Balea Carbajo	Paula Balea Carbajo, Diego Alaminos Ortega, Francisco J. López Gutiérrez, Pedro Luis Cobos Cano
29	Recognition-Related Pupil Dilation as a Mnemonic Salience Signal	Ádám Albi	Ádám Albi, Péter Pajkossy
30	Complementary Roles of Semantics and Lab-Based Contextual Learning in Cued Recall: A Response Latency Analysis	Satoru Nishiyama	Satoru Nishiyama, Satoru Saito
31	Effects of Age-Related Stereotype Threat on Semantic and Subjective Organization in Older Adults	Lina Guerrero	Lina Guerrero
32	Remembering the Good and the Bad: Valence Effects on Memory for True and False Talk About Other People	Lena Nadarevic	Lena Nadarevic, Meike Kroneisen, Raoul Bell
33	False Recognition in Parkinson's Disease Patients: Impact of Mild Cognitive Impairment	Shivani Daryanani	Shivani Daryanani, Iván Galtier, Andres E. Zerpa, Verónica Benítez, María A. Alonso
34	Target Lure Interference Effect in Prospective Memory Task: Exploring the DRM Paradigm	Naveen Kashyap	Naveen Kashyap
35	Improving Memory in Participants With Intellectual Disabilities: The Role of Wakeful Rest After Learning	Markus Martini	Markus Martini, Valentin Wirth, Stefan Huber, Pierre Sachse
36	Effects of Delay and Task Importance on Children's Prospective Memory in Everyday Life	Milvia Cottini	Milvia Cottini, Paola Palladino, Demis Basso
37	Study of the Benefits of Natural Environments on Cognition in Primary School: The Role of Environmental Characteristics and Sensorimotor Interactions	Léna Kolodzienski	Léna Kolodzienski, Rémy Versace, Hanna Chainay, Gaëlle Plancher
38	Comparing Multi-Probe Designs With and Without Spatial Cues for Assessing the SPoARC Effect in Short-Term Memory for Serial Order	Samantha Hurtado Woenckhaus	Samantha Hurtado Woenckhaus, Morgane Ftaïta, Maëli Vivion, Alessandro Guida, Fabien Mathy

No.	Title	Presenter	Authors
39	A Left-To-Right Spatial Bias in Serial Order Processing Develops Linearly With Schooling From Early to Late Childhood	Morgane Ftaïta	Morgane Ftaïta, Maëli Vivion, Alessandro Guida, Fabien Mathy
40	Iconic Gestures, Novel Information, and Individual Differences: When Do Gestures Help Young Children Learn?	Elisabeth Knight	Elisabeth Knight, Gabriella Vigliocco, Luca Onnis, Claudia von Bastian, Alicia Forsberg
41	Working Memory Moderates Gesture Benefit Isobel Chick for Lexical Retrieval in Aphasia	Isobel Chick	Isobel Chick, Norina Hauser, Gabriella Vigliocco
42	What Influences the Automaticity of Feature Binding?	Lily Cheung	Lily Cheung
43	How Does Time Affect Working Memory Processing?	Lucas Rotolo	Lucas Rotolo, Valérie Camos
44	Dual-Set Maintenance and Interference in Working Memory	Noah Rischert	Noah Rischert, Klaus Oberauer
45	Individual Differences Study on Involuntary Thoughts About the Past and Future: The Role of Working Memory Capacity	Ewa Ilczuk	Ewa Ilczuk, Michał Wereszczyński, Paulina Chwiłka, Lia Kvavilashvili, Krystian Barzykowski
46	Exploring the Proactive Benefits of Free Time: A Preliminary Test of an Action-Offloading Account	Ruiheng Zhang	Ruiheng Zhang, Evie Vergauwe
47	A New Tool for Assessing Working Memory Capacity in French Children Aged 4 to 7: A Pilot Study	Catherine Monnier	Catherine Monnier, Béatrice Bourdin, Lucie Attout

Individual Differences

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Leisure Activity Engagement and Cognitive Functioning Across the Lifespan	Christ Billy Aryanto	Christ Billy Aryanto, Eleanor R.A. Hyde, Shuangke Jiang, Alice Reinhartz, Tilo Strobach, Sylvie Belleville, Claudia C. von Bastian

Computational Modelling

Location: The Diamond, Basement

No.	Title	Presenter	Authors
1	Causal Attribution of Valenced Outcomes and Its Association With Transdiagnostic Mental Health Symptoms	Nura Sidarus	Hayley Dorfman, Alexandra Hopkins, Jonathan Roiser, Nura Sidarus
2	Modeling Lexical Competition and Semantic Priming in Language Production: A Computational Approach to the Swinging Lexical Network	Louis Schiekiera, Vincent Gruber	Louis Schiekiera, Vincent Gruber, Allissa Mellinger, Rasha Abdel Rahman, Fritz Günther
3	Conveying and Understanding (Discrete) Emotions Through Out-Of-Vocabulary Stimuli	Celia Martínez Tomás	Celia Martínez Tomás, Fritz Günther, José Antonio Hinojosa, Daniele Gatti
4	Learning Map-Like Neural Representations of Abstract Concepts	Sophie Johnson	Sophie Johnson, Sam Berens
5	The Effect of Prior Knowledge and Representational Distinctiveness on Learning and Generalisation	Sam Berens	Sophie Johnson, Sam Berens

Attention & Cognitive Control III

Location: The Diamond, Basement

No.	Title	Presenter	Authors
6	Changing-State Sounds Influence Self-Monitoring but Not the Serial Recall of Environmental Sounds	Leyu Huang	Leyu Huang, Julia Föcker, Florian Kattner, Timothy Hodgson
7	Concurrent Validity of the Hazard Prediction-Orientation Test in Naturalistic Driving Environments: Correlations With UFOV, TMT, and Contrast Sensitivity Measures	Candida Castro	Candida Castro, Daniel Salazar-Frías, Sonia Ortiz, Jose Juan Castro, Franceso Martino
8	Exploring Systematic Spatial Association Effects Arising From Language Experience Alone	Oksana Tsaregorodtseva	Oksana Tsaregorodtseva, Luca Rinaldi, Marco Marelli
10	Exposure to Multilingual Contexts Enhances Controlled Auditory Attention in Demanding Speech Conditions: Evidence From Syllabic Forced Dichotic Listening	Hadeel Ershaid	Hadeel Ershaid, Amaia Carrión Castillo, Clara Martin, Almendra Villalta Ramirez, Marie Lallier
11	Mental Number Line Compatibility Modulates Size-Based Interference	Seda Dural	Seda Dural, Melike Şefikoğlu, Hakan Çetinkaya

No.	Title	Presenter	Authors
12	Do Spatial-Numerical Associations Depend on Distances Between Numbers? Evidence From a Unimanual Magnitude Comparison Task	Ayşenur Candemir	Ayşenur Candemir, Merve Bulut, Hakan Çetinkaya, Seda Dural
13	Cognitive and Temperamental Determinants of Susceptibility to Orientation Illusions on an Example of the Poggendorff and Zöllner Figures	Hanna Bednarek	Hanna Bednarek, Magdalena Przedniczek
14	Eye Blink Rate: Temporal and Frequency Patterns in a Simple Visual Task	Hussam Abu Jaber	Hussam Abu Jaber, Ronen Hershman, Avishai Henik
15	The Role of Irrelevant Numbers and Selective Attention in Numerical Processing: Evidence From Hierarchical Navon Stimuli	Valter Prpic	Valter Prpic, Arianna Felisatti, David Aagten-Murphy, Luisa Lugli, Martin H. Fischer
16	Inhibition, Cognitive Flexibility and Academic Performance in College Youth With Depressive Symptoms	Bryan Jauregui	Bryan Jauregui, María de los Angeles Rodríguez, Juancarlos Pingel, Purificación Galindo
17	Reading Vertically Scrolling Texts: Impact of Agentivity on Text Comprehension	Alexis Besseyrias	Alexis Besseyrias, Frédéric Danion, Jean Dumoncel, Christine Ros, Nicolas Vibert
18	Is Temporal Integration a Unitary Process?	Abigail Wyllie	Abigail Wyllie, Alon Zivony
19	New Insights Into Control Mechanisms in Dual Tasks Contexts: Assessing Task-Pair Mixing Costs	Alice Camisa	Alice Camisa, Iring Koch, Patricia Hirsch

Sensation & Perception III

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
48	Intact Susceptibility to Visual Illusions in Autistic Individuals	Yarden Mazuz	Yarden Mazuz, Bat-Sheva Hadad, Tzvi Ganel
49	Temporal Dynamics and Stimulus Similarity in Discrete Visual Perception	Mikhail Allakhverdov	Mikhail Allakhverdov
51	Context Matters: Intense Negative Context Reduces the Decision Criterion for Unpleasant Feelings	Kim Rubinstein	Kim Rubinstein, Nachshon Meiran

No.	Title	Presenter	Authors
52	Exploring the Effect of a VR-Based Social Interaction Task on Face Perception	Shengtong Liu	Shengtong Liu, Boris Otkhmezuri, Rebecca Elliott, Karen Lander
55	Metacognitive Efficiency of “Same”- “Different” Decisions in Two Visual Comparison Tasks	Michael Pilling	Michael Pilling
56	How Temporal Order Judgement Affects Early Attentional Processing in the Self-Prioritization Effect	Dipanjali Dipanjali	Dipanjali Dipanjali

Individual Differences II

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
58	Polish Adaptation of Cognitive Reserve Scale. Relationship of Cognitive Reserve With Personality and Subjective / Objective Cognitive Functioning	Jakub Stupczewski	Jakub Stupczewski, Bartłomiej Kiljanek, Maria Dolores Roldan-Tapia, Juan García-García
59	Deciphering White Matter Microstructure and Its Influence on Fluid Intelligence Through Structural Equation Modeling	Henrike Jungeblut	Henrike Jungeblut, Erhan Genç, Michael Burke, Patrick D. Gajewski, Stephan Getzmann, Edmund Wascher, Anna-Lena Schubert
60	Inside and Outside the Body Space: Exploring Spatial Processing in Healthy Young and Older Adults	Erica Dolce	Erica Dolce, Daniela Malangone, Irene Ruffo, Simona Raimo, Liana Palermo
61	Body Processing and Navigational Abilities: Insights From a Real-World Environment	Irene Ruffo	Irene Ruffo, Erica Dolce, Simona Raimo, Liana Palermo
62	Exploring the Impact of Digital and Print Media on Cognitive Processes and Conspiracy Theory Endorsement	Nefeli Kapsourachi	Nefeli Kapsourachi, Eleni Orfanidou
63	ENGAGE++: Psychometric Validation of a Questionnaire on Organizational Commitment	Ambre Di Fresco	Geoffrey Duran, Ambre Di Fresco

Cognitive Plasticity

Location: The Diamond, Ground Floor

No.	Title	Presenter	Authors
66	No Evidence That Watching Nature Videos Restores Working Memory Capacity	Andree Hartanto	Andree Hartanto, Verity Lua, Nicole Chen, Nadyanna Majeed
67	Cognitive Strategy Use in Backward Serial Recall	Nan Ni	Nan Ni, Hiroyuki Tsubomi, Satoru Saito
68	Training Cognitive Functions Using Episodic Specificity Induction in Healthy Older Adults: A Task-fMRI Study of Activation and Functional Connectivity	Gloria Leblond-Baccichet	Gloria Leblond-Baccichet, Samira Mellah, Rudy Purkart, Sylvie Belleville
69	Systematic Review on Difficulty Adjustment in Cognitive Training	Sylvie Denkinger	Sylvie Denkinger, Samantha Caldara, Angela Pasqualotto, Daphné Bavelier
70	Unlocking Multitasking Potential: How Instructions and Task Switching Training Shape Individual Differences in Processing Modes	Jovita Brüning	Jovita Brüning, Annemarie Scholz
71	Methods to Study Expectation Effects in Cognitive Training Interventions	Freya Joessel	Freya Joessel, Zechun Zhao, Susanne M. Jaeggi, Aaron R. Seitz, C. Shawn Green

Emotion II

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
72	How Fear and Happiness Disrupt the SNARC Effect: The Impact of Emotional Tasks on Spatial-Numerical Associations	Zeynep Tuncalı	Zeynep Tuncalı, Hakan Çetinkaya, Seda Dural
73	Sex Differences in Multimodal Emotional Processing of Moral Transgressions	Astrid Thébault Guiochon	Astrid Thébault Guiochon, Eva L. Vives, Valentin Revillard, Bastien Trémolière, Hakim Djeriouat
74	Exploring the Role of Emotion Intensity and Background on Face Emotion Recognition	Yuanyi Peng	Yuanyi Peng, Alex Kafkas, Karen Lander
75	Facial Expression Predictions and Their Impact on Social Cognition in Early-Stage Psychosis	Tijana Tomic	Tijana Tomic, Irene Ramos-Grille, Eva Cortés Velasco, Neus Barrantes-Vidal, Lorena Chanes

No.	Title	Presenter	Authors
76	Emotional Cues in Earnings Calls Influence Investors' Perception of Trust and Confidence	Maaha Ahmad, Chaona Chen	Maaha Ahmad, Junhong Yang, Chaona Chen
77	No Impact of Restricting Facial Movements on the Perception of Human Affect Vocalizations and Instrumental Sounds	Kinga Wotoszyn	Kinga Wotoszyn, Mateusz Hohol, Piotr Winkielman
78	The Interference of Auditory Negative Emotional Stimuli on Visual Semantic Vigilance Performance	Andras Zsido	Andras Zsido, Andras Matuz, Basler Julia, Gergely Darnai, Arpad Csatho
79	Recognising Basic Emotions in Art	Zoe Thurtle	Zoe Thurtle, Prof. Daniele Zavagno, Dr. Anna Maria DiBetta, Dr. Jane L Morgan, Dr. Olga Daneyko
80	Enhancing Attentional Disengagement From Threat: A Novel Online Paradigm for Attention Bias Modification Training	Mario Carlo Severo	Mario Carlo Severo, Manon Mulckhuysse
81	Affective Perspective Taking (APT) and Rumination	Liel Stelmach-Lask	Liel Stelmach-Lask, Hanit Galili, Henik Avishai

Neuroscience

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
83	Impaired Early Visual Processing During Visuospatial Neglect: An Event-Related Potential Study	Nóra Csikós	Nóra Csikós, Petia Kojouharova, Gábor Szabó, Gábor Fazekas, Zsófia Anna Gaál, István Czigler
84	Cognitive Demand That Deactivates Fronto-Parietal Regions	Ausaf Farooqui	Berhan Akgur, Tamer Gezici, Elif Oymagil, Ausaf Farooqui
85	Rule Encoding by Mental Simulation	Yanick Kloss	Yanick Kloss, Wilfried Kunde, Roland Pfister

Cognitive Development

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
88	The Development of Children's Fairness Cognition and Redistribution in Merit-Based Resource Inequality	Qingfeng Peng	Qingfeng Peng, Hong Li
89	Self-Prioritization, Power and Gender in Children Aged 7 to 9	Hélène Maire	Hélène Maire, Jean-Baptiste Van der Henst, Alexandre Foncelle, Rawan Charafeddine
91	Whispers of Attention in the Classroom: Piloting an ASMR Intervention in Kindergarten	Joanna Greer	Sandra McKay, Colin Hamilton, Michael Craig, Joanna Greer
92	How Does Experiencing Disadvantage Impact Toddler Language Skills? A Comparison of Socioeconomic Circumstances and Parent Stress	Molly Willis	Molly Willis, Emma Smith, Molly Jackson, Danielle Matthews, Emma Blakey

Numerical & Mathematical Cognition III

Location: The Diamond, Moonscape

No.	Title	Presenter	Authors
95	Do Different Modalities of Statistical Learning Predict Different Mathematical Skills?	Michelle Janssens	Michelle Janssens, Liv Smets, Arnaud Szmalec, Bert Reynvoet
96	Can We Predict Adolescents' Mathematical Abilities From Their Basic Statistical Learning Skills?	Liv Smets	Liv Smets, Cathy Hauspie, Michelle Janssens, Christophe Vanhouwe, Wouter Duyck, Bert Reynvoet, Arnaud Szmalec
97	Can the Efficient Coding Principle Explain How We Process the Number Zero?	Giulia Vigna	Giulia Vigna, Paola Previtali, Annamaria Porru, Luca Rinaldi, Silvia Benavides-Varela
98	Spatial Biases in Arithmetic: The Effect of Operation Order and Visual Spacing on Calculations	Michał Obidziński	Michał Obidziński, Martyna Sroka, Mateusz Hohol, Krzysztof Cipora
99	Does Body Posture Modulate the SNARC Effect? Embodied and Situated Constraints of Numerical Cognition	Kinga Szafron	Mateusz Hohol, Kinga Szafron, Hubert Balcerzak, Krzysztof Cipora

14:00 – 15:40: Regular Talks

T-21: Learning & Memory IV

Chair: Eleanor Hyde

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Rethinking the Free-Time Benefit: Evidence Against a Decay and Refreshing Account	Benjamin Kowialiewski	Benjamin Kowialiewski, Steve Majerus
2	How Does Free Time Benefit Working Memory in Complex Span Tasks?	Eda Mizrak	Eda Mizrak, Klaus Oberauer
3	Exploring the Dual Structure of Maintenance in Verbal Working Memory	Maximilien Labaronne	Maximilien Labaronne, Pierre Barrouillet, Valérie Camos
4	The Role of Episodic Memory for Repetition Learning	Philipp Musfeld	Philipp Musfeld, Joscha Dutli, Keisuke Fukuda, Klaus Oberauer
5	Contextual Cueing of Visual Search and Awareness: Evidence for a Single Memory System From Mousetracking and Computational Modelling	Yu Heng Daryl Lee	Yu Heng Daryl Lee, Christopher Berry, David Shanks

T-22: Memory & Attention

Chair: Alon Zivony

Location: The Diamond, LT2

No.	Title	Presenter	Authors
1	Prioritization of Verbal Items Based on Their Reward Value: The Role of Attentional Resources in Working Memory	Christophe Fitamen	Christophe Fitamen, Maximilien Labaronne, Chantal Martin Sölch, Valérie Camos
2	Mechanisms Underlying Strategic Prioritisation in Working Memory	David Peebles	David Peebles, Richard Allen, Graham Hitch
3	The Temporal Dynamics of Retro-Cue Benefits in Visual Working Memory: Feature Cue vs. Spatial Cue	Lijing Guo	Lijing Guo
5	Two Minds Don't Boost Together: Target Detection Enhances the Recognition of Self-Relevant, but Not Other-Relevant, Items	Pietro Spataro	Pietro Spataro, Neil Mulligan, Clelia Rossi-Arnaud

T-23: Attention & Cognitive Control IV

Chair: Elizabeth Milne

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Assessing Changes in Cognitive Control and Vigilance Components in a Dual Task Over Time	Amelie C. Jung	Amelie C. Jung, Fernando G. Luna, Rico Fischer
2	The Affective Consequences of Response Inhibition Determine No-Go-Based Crosstalk Effects in Dual Tasks	Devu Mahesan	Devu Mahesan, Rico Fischer
3	Can't Wait to Relax: Prospective Relaxation of Control as Revealed by a Future-Based Congruency Sequence Effect	Luca Moretti	Luca Moretti, Giacomo Spinelli
4	Investigating the Impact of Lower-Level Learning Processes on the Sequential Modulation of Task-Order Switch Costs in Dual Tasks	Tilo Strobach	Tilo Strobach, Nils Assink
5	On Prerequisites for the Activation of Task-Order Representations in Dual Tasks	Torsten Schubert	Torsten Schubert, Daniel Darnstaedt, Leif Langsdorf, Sebastian Kuebler

T-24: Attention & Cognitive Control V

Chair: Alejandro Jimenez-Rodriguez

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Instructions Specifying Context-Specific Strategic Control Can Modulate Voluntary Behaviour but Not the Automatic Effects of Instructions	Cai Longman	Cai Longman, Christina Pfeuffer, Andrea Kiesel
2	Age-Related Differences in Action Preparation: Evidence From Crossmodal Response Precuing	Denise Stephan	Denise Stephan, Ludivine Schils, Pi-Chun Huang, Shulan Hsieh, Jos Adam, Iring Koch
3	How Do We Avoid Doing or Saying the Wrong Thing at the Wrong Time: Exerting Cognitive Control During and After the Accumulation of Internal Evidence	Isaac Fradkin	Isaac Fradkin
4	Strategy-Driven Interference: Investigating the Role of Order Information Processing in the Changing-State Effect	Philipp Radloff	Philipp Radloff, Judith Schweppe

No.	Title	Presenter	Authors
5	Paradoxical Learning of Distractor Occurrence Across Space	Thiago Leiros Costa	Thiago Leiros Costa, Massimo Turatto, Leonardo Chelazzi

T-25: Language & Bilingualism II

Chair: Elisabeth Knight

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	Are Pupils With Developmental or Learning Disorders More at Risk in Immersion Education?	Chloé Parmentier	Chloé Parmentier, Arnaud Szmalec
2	Promoting Parental Support of Early Child Language Development: An RCT to Evaluate a Text Messaging Service With BBC Tiny Happy People Video Content	Danielle Matthews	Danielle Matthews, Colin Bannard, Silke Fricke, Penny Levickis, Gideon Salter, Kiera Solaiman, Emma Thornton, Julian Pine, Emily Hancock, Antonia Pavlou-Rodriguez, Emma Smith, Molly Willis
3	What Drives L2 Learning? A Longitudinal Study of Metacognition and Achievement Emotions in Primary School Children	Eugenio Trotta	Eugenio Trotta, Paola Palladino, Milvia Cottini
4	The Role of Caregivers' Multimodal Behaviours in Children's Word Learning	Gabriella Vigliocco	Gabriella Vigliocco, Antonia Jordan Monteiro De Barros, Ed Donnellan, Francesco Cabiddu
5	The Role of Social Interaction in Children's Learning of Abstract Concepts: An fNIRS Hyperscanning Study	Gal Rozic	Gal Rozic, Sara De Felice, Antonia Hamilton, Gabriella Vigliocco

T-26: Language & Bilingualism III

Chair: Ruth Corps

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	Implicit Association Test Gender & Career Bias Modelling With Linguistic Features	Alexander Porshnev	Alexander Porshnev, Kevin Dirk Kiy, Diarmuid O'Donoghue, Manokamna Singh, Cai Wingfield, Dermot Lynott

No.	Title	Presenter	Authors
2	Saying “No” Is Not Always Enough: The Effect of Focus on the Interpretation of Short Exchanges	Candice Frances	Candice Frances, Antje Meyer
3	How Readers Resolve Ambiguity in Unfamiliar Compound Words: Computational and Behavioural Studies in Chinese	Cheng-Yu Hsieh	Cheng-Yu Hsieh, Marco Marelli, Kathleen Rastle
4	Disentangling the Moral Foreign Language Effect: Evidence From the Cni Model and Real-World Dilemmas	Francesca Dumančić	Francesca Dumančić, Mirjana Tonković
5	The Importance of Being Specific: Unfamiliar Objects Elicit More Specific and Concrete Words in Semi-Naturalistic Conversation	Tommaso Lamarra	Tommaso Lamarra, Andrea Amelio Ravelli, Marianna Bolognesi, Gabriella Vigliocco

T-27: Reading & Writing

Chair: Anna Weighall

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	The Processing of the Definite Article in Brazilian Portuguese: When “The” Carries Gender and Number Marking	Denis Drieghe	Denis Drieghe, João Vieira, Hayward Godwin, Elisângela Teixeira
2	Semantic and Syntactic Prediction in Reading Aloud and Statistical Learning: An fMRI Study in University Students With Dyslexia	Elisa Gavard	Elisa Gavard, Valérie Chanoine, Franziska Geringswald, Jean-Luc Anton, Eddy Cavalli, Johannes Ziegler
3	Is It a Word or a Pseudoword? Error Dynamics During Lexical Decision in Children and Adults and Its Relationship With Reading Skills	Gwendoline Mahé	Gwendoline Mahé, Fanny Grisetto, Adrien Lorant, Clémence Roger
4	The Multilingual Eye-Movement Corpus (MECO): Updates After Six Years of Collecting Eye-Tracking Reading Data Worldwide	Noam Siegelman	Noam Siegelman, Sascha Schroeder, Victor Kuperman
5	Testing Two Accounts of Transposed-Letter Effects by Varying the Location of Transpositions Relative to Fixation	Stéphanie Massol	Stéphanie Massol, Manuel Perea, Jonathan Mirault, Jonathan Grainger

T-28: Embodied Cognition

Chair: Hannes Saal

Location: The Diamond, WR1

No.	Title	Presenter	Authors
1	Sun and Grief Trigger Automatic Attentional Shift: Evidence From Cross-Modal Correspondence Effect	Armina Janyan	Armina Janyan, Sashka Aleksandrova, Kassim Basha
2	Social Grounding of Abstract Words: Evidence From a Joint Semantic Categorization Task	Daria Goriachun	Daria Goriachun, Kristof Strijkers, Jonathan Mirault, Johannes Ziegler
3	Visuospatial Perspective Taking: The Roles of Language, Embodiment, and Mental Imagery	Steven Samuel	Steven Samuel, Geoff Cole
4	Memory and Imagination an Integrated Continuum: A Theoretical Perspective	Vijay Paul Punia	Vijay Paul Punia

T-29: Sensation & Perception

Chair: Rebecca Denniss

Location: The Diamond, WR2

No.	Title	Presenter	Authors
1	Seeing 'Me' First: The Cognitive Edge of Self-Prioritization	Neetu Singh	Neetu Singh, Irfan Ahmad, Dr Ark Verma
2	Imagery as Predicted Perception: Imagery Predictively Biases Judgments of Observed Action Kinematics	Patric Bach	Eleonora Parrotta, Katrina McDonough, Patric Bach
3	The Conceptual Structure of Ephemerality and Its Influence on Aesthetic Perception	Kanji Goda	Kanji Goda
4	Perceptual Completion in Pea Plants	Silvia Guerra	Silvia Guerra, Bianca Bonato, Gabriela Gjinaj, Marco Dadda, Umberto Castiello
5	Prediction, Step by Step: The Influence of Incidentally Generated Movement Sounds for a Neural Predictive Model of Hurdling	Sophie Siestrup	Sophie Siestrup, Viviana Villafañe Barraza, Dennis Redlich, Alexandra Pizzera, Markus Raab, Ricarda I. Schubotz

T-30: Decision Making II

Chair: Hazem Toutounji

Location: ICOSS, A16

No.	Title	Presenter	Authors
1	Curated Realities: The Influence of Ingroup Bias on Media Processing and Behavioral Discourse	Ark Verma	Abishek Baba, Ark Verma
2	How Do Crime-Lineup Delays Affect the Cognitive Processes Underlying Eyewitness Responses in Lineups?—A Multinomial Analysis	Amelie Therre	Amelie Therre, Raoul Bell, Nicola Marie Menne, Carolin Mayer, Ulla Lichtenhagen, Axel Buchner
3	Contradict Them Softly! Contradictions of the Subject Feel Less True Than Contradictions of the Object	Beatriz Gusmão	Beatriz Gusmão, Michael K. Zürn, Sascha Topolinski
4	When the Injured Brain Erases Boundaries: An Online Survey on the Impact of Head Injury on Moral Disengagement and Criminal Behavior	George Michael	Caroline Bourdon, Hakim Djeriouat, George Michael
5	Investigating Age-Related Differences in the Cognitive Processes Underlying Eyewitness Responses to Lineups Using a Multinomial Processing Tree Model	Carolin Mayer	Carolin Mayer, Raoul Bell, Nicola Marie Menne, Amelie Therre, Ulla Lichtenhagen, Axel Buchner

16:10 – 18:00: Disrupting the Norm: Centring Diversity and Inclusion in Cognitive Psychology

Chair(s): Asha Akram, Alicia Forsberg

This panel discussion addresses the critical need for greater equality, diversity, and inclusion within the field of cognitive psychology. We will explore how historical biases have shaped research paradigms, participant recruitment, and the interpretation of findings. Panellists will discuss strategies for promoting more representative research, fostering inclusive environments, and challenging existing power structures. We will explore ways in which cognitive psychology research could be made more accessible and benefit all individuals, regardless of background or identity. This discussion aims to ignite a conversation about how we can collectively build a more equitable and inclusive future for cognitive science.

Name	Affiliation
Meesha Warmington	University of Sheffield, UK

Name	Affiliation
Ramesh Mishra	University of Hyderabad, India
Eirini Mavritsaki	Birmingham City University, UK
Emma Blakey	University of Sheffield, UK

16:10 – 17:50: Symposia

SYM-35: Binding and Retrieval in Action Control: Part II: Dissociating Binding and Retrieval From Inhibition and Learning

Chair(s): Carina Giesen, Andrea M. Philipp

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	Binding and Retrieval in Response Inhibition – Overlaps With Action Control?	Astrid Prochnow	Astrid Prochnow
2	Adaptation by Binding: A Meta-Analysis on the Specificity of Adaptive Control	Daxun Zhu	Daxun Zhu, Hannah Kaiser, Karin Bausenhardt, David Dignath, Carolin Dudschig, Wim Notebaert, Donna Bryce, Senne Braem
3	Manipulating Instructions to Dissociate Influences of Episodic Retrieval and Propositional Knowledge in the Valence Contingency Learning Task	Carina Giesen	Carina Giesen
4	Binding of Context, Concept, and Language	Andrea M. Philipp	Andrea M. Philipp, Elena Benini, Iring Koch
5	The Integration and Disintegration of Newly Learned Meaningful Words	Rebecca Crowley	Rebecca Crowley, Amir-Homayoun Javadi, Jakke Tamminen

SYM-36: From Sensory Presentation to Working Memory Representations: New Insights on How Working Memory Operates in Our Sensorily Rich World

Chair(s): Laura Klatt

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	Decoding Tactile Working Memory Content Reveals Performance Relevance of Parietal fMRI Activity Patterns	Miro Grundei	Miro Grundei, Timo Torsten Schmidt, Paolo Barbieri, Felix Blankenburg
2	Binding Information Across Sensory Formats in Working Memory	Laura Klatt	Nora Turoman, Elodie Walter, Anaë Motz, Laura-Isabelle Klatt
3	Behavioral and Electrophysiological Indices of Audiovisual Working Memory	Ceren Arslan	Ceren Arslan, Stephan Getzmann, Daniel Schneider, Laura-Isabelle Klatt
4	Using Working Memory to Track Multisensory Moving Objects Under Occlusion	Yichen Yuan	Surya Gayet, Yichen Yuan, Nathan van der Stoep
5	Evidence Against a Single-Stream Account: Working Memory for Successive Versus Concurrent Presentation of Auditory and Visual Information	Dominic Guitard	Dominic Guitard, Luísa Superbia Guimarães, Nelson Cowan

SYM-40: Can We Retrieve Information Based on Relational Similarity?

Chair(s): Penka Hristova, Margarita Pavlova

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	Retrieval of Relationally Similar Events	Margarita Pavlova	Margarita Pavlova
2	Relational Categories Bridge the Retrieval Gap: An Empirical Study	Lucas Raynal	Lucas Raynal
3	The Adapter Model: As Deep as Possible Target Encoding and Retrieval	Emmanuel Sander	Emmanuel Sander
4	An Attempt to Study the Gap in Relational Retrieval Differently	Penka Hristova	Penka Hristova, Patric Pförtner
5	Symposium Discussion	Vencislav Popov	Vencislav Popov

SYM-38: New Trends In Measuring Attentional Control

Chair(s): Anna-Lena Schubert, Alodie Rey-Mermet

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	What Key Obstacles Are We Facing When Measuring Attentional Control?	Alodie Rey-Mermet	Alodie Rey-Mermet, Anna-Lena Schubert
2	Does Distinguishing Post-Congruent and Post-Incongruent Trials Improve Cognitive Control Measures?	Niels Kempkens	Niels Kempkens, Julia Haaf, Anna-Lena Schubert, Alodie Rey-Mermet
3	Enhancing the Measurement of Attentional Control: Experimental Validation of Drift Diffusion Models With Time-Varying Drift Rates Using Amortized Bayesian Inference	Simon Schaefer	Simon Schaefer, Jan Göttmann, Anna-Lena Schubert
4	Formally Linking Computational Models of Attentional Control Tasks to Validate Measures and Constrain Theory	Maria Robinson	Maria M. Robinson
5	Panel Discussion: Charting a Path Forward for Measuring Attentional Control	Anna-Lena Schubert	Anna-Lena Schubert, Alodie Rey-Mermet

SYM-39: The Interplay of Orthography and Phonology in Language Production and Learning

Chair(s): Tanja C Roembke

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	The Role of Phonology and Orthography in Spoken and Written L1 and L2 Production: Evidence From Two Picture Naming Studies	Merel Muylle	Merel Muylle, Zita Meijer, Tamara Bijmens, Séverine Casalis, Gonja Jarema, Robert Hartsuiker
2	The Impact of Phonological Co-Activation on Written Language Switching	Tanja C Roembke	Tanja C Roembke, Elena Benini, Andrea M. Philipp
3	Becoming Biliterate: How Children and Adults Integrate Sublexical and Lexical Information When Spelling in EAL	Olivia Afonso	Olivia Afonso, Paz Suárez-Coalla, Carmen Hevia-Tuero, Cristina Martínez-García
4	Does contextual diversity influence the orthographic parafoveal processing of novel words?	Ascensión Pagán	Ascensión Pagán
5	Symposium Discussion	Tanja C Roembke	Tanja C Roembke

18:00 – 19:00: Blitz Talks

B-10: Learning & Memory II

Location: The Diamond, LT1

No.	Title	Presenter	Authors
1	Truth in Inconsistency? The Potential of Differential Mnemonic Consistency in Deception Detection	Ana Philippsen	Ana Philippsen, Nils Brandenburg, Raoul Bell, Axel Buchner
2	Do We All Evoke the Same Details When Recalling a Public Event? Shared Memories for the Eurovision Song Contest	Andreia Ribeiro	Andreia Ribeiro, Pedro B. Albuquerque, Ana Raposo
3	Piloting a Screener Questionnaire for Identifying Children With Working Memory Difficulties	Harry Bennett	Harry Bennett, Richard Allen, Susan Gathercole, Amanda Waterman
4	Tracking Bilingual Eye Movements: The Impact of Dual Subtitles on Visual Attention	Inka Romero-Ortells	Inka Romero-Ortells, Manuel Perea, Jon Andoni Duñabeitia
5	Investigating the Impact of Slide Structure on Students' Cognitive Load and Comprehension	Mohammad Alsager Alzayed	Mohammad Alsager Alzayed, Badria Alajmi
6	Retrieval Advice Can Remediate Decreased Memory Formation During Tech-Based Problem Solving	Patrick P. Weis	Patrick P. Weis, Wilfried Kunde

B-11: Learning & Memory III

Location: The Diamond, LT2

No.	Title	Presenter	Authors
2	Category Label Influences on Scene Recognition Memory	Aaron Cousins	Aaron Cousins, Karla Evans, Silvia Gennari
3	"In Germany, It Is Legal to Marry a Cat": The Role of Plausibility in Memory for Truth and Falsity	Daria Ford	Daria Ford, Lena Nadarevic
4	Affective Congruency Modulates Generalisation Gradients	José A. Alcalá	José A. Alcalá, Celia Martínez-Tomás, Gonzalo P. Urcelay, José A. Hinojosa
5	The Impact of Event Structure and Duration on Time-Compressed Memory Replay	Nathan Leroy	Nathan Leroy, David Stawarczyk, Arnaud D'Argembeau
6	Rediscovering Vladimir Bekhterev: His Contributions, Life, and the Twists of History	Reut Said	Reut Said, Daniel Algom

B-12: Attention & Cognitive Control II

Location: The Diamond, LT3

No.	Title	Presenter	Authors
1	APOE-Specific Cognitive Effects of Levetiracetam in Mid-Age Adults	Claire Lancaster	Claire Lancaster, Nicholas Dowell, Arnold Bakker, Chris Bird, Naji Tabet, Jennifer Rusted
2	Statistical Learning (SL) of Categories: The Effect of Age and Individual Variability in Neural Responses and Behaviour	Claudia Ruzza	Claudia Ruzza, Davide Crepaldi
3	May the Force Be With You, but Not Always: Aware, but Not Unaware Errors, Are Characterised by Reduced Response Force	Josh Khoo	Josh Khoo, Claudia Danielmeier, Roland Pfister, Jan Derrfuss
4	The Interplay of Task Selection and Response Selection in Dual-Task Processing	Patricia Hirsch	Patricia Hirsch, Iring Koch, Otmar Bock
5	Age-Related Differences in a Reference-Back Task With Irrelevant Distractors	Zsófia Anna Gaál	Zsófia Anna Gaál, Boglárka Nagy, István Czigler, Petra Csizmadia, Béla Petró, Petia Kojouharova
6	Embodied Executive Function: The Impact of Body Engagement on Cognitive Control	Fereidoun Malaei	Fereidoun Malaei, Jamin Halberstadt, Gisela Sole, Azra Jahanitabesh, Neil McNaughton

B-13: Reasoning & Language

Location: The Diamond, LT4

No.	Title	Presenter	Authors
1	The Importance of Relational Integration vs. Relation Representation for Relational Reasoning Ability	Adam Chuderski	Adam Chuderski
3	Narrative Identity and Decision Making Among UAE and Hong Kong University Students	Michael O'Sullivan	Michael O'Sullivan
4	Individual Differences in Mental Imagery and Vocabulary: Do They Influence Word	Stephanie Mathey	Stephanie Mathey, Aka Sandra

No.	Title	Presenter	Authors
	Imageability Ratings and Visual Word Recognition?		
5	The Role of Language in Inductive and Deductive Reasoning	Yael Benn	Yael Benn, Isobel Hammond, Rhianna Ledward, Rosemary Varley
6	The Effect of Vertical Reading on Saccade Programming and Lexical Processing in the Roman Script?	Zeynep Gunes Ozkan	Zeynep Gunes Ozkan, Jukka Hyönä, María Fernández-López, Manuel Perea Lara

B-14: Reading & Writing

Location: The Diamond, LT5

No.	Title	Presenter	Authors
1	Are Letters Basic Units for All Orthographies? Evidence of Cost Involved With Maatraa Processing in Hindi	Anurag Khare	Anurag Khare, Mehrun Naaz, Ark Verma
2	Cross-Linguistic Differences and Similarities in Sensitivity to Letter Co-Occurrence Statistics	Davide Crepaldi	Elisabetta De Simone, Valentina Pescuma, Davide Crepaldi
3	The English Pseudoword Lexicon Project - a Megastudy for Investigating Pseudoword Processing	Marco Marelli	Fabio Marson, Rolando Bonandrini, Iva Šaban, Simona Amenta, Marco Marelli
4	Words on Strike: When Is Top-Down Facilitation Needed in Degraded Word Recognition?	Maria Fernández-López	Maria Fernández-López, Inka Romero-Ortells, Ana Marcet, Manuel Perea
5	How Statistical Learning and Explicit Phonics Instruction Work Together at the Very Beginning of Reading Acquisition?	Maria Vazeux	Maria Vazeux, Samantha Ruvoletto, Teng Guo, Daniel Zagar, Hélène Maire, Nadège Doignon-Camus
6	A Matter of Font: Investigating the Neural Activity Behind Brand Name Recognition	Melanie Labusch	Melanie Labusch, Tatiana Davydova, Manuel Perea, María Baena Pérez, Cristina Cano Melle, Esteban Villar Rodriguez, Eric Rivero Zaragoza, Victor Costumero Ramos

B-15: Language & Bilingualism II

Location: The Diamond, LT6

No.	Title	Presenter	Authors
1	How Do Multilingual Experiences and Familial Genetic Risk for Alzheimer's Disease Affect Attentional Control in Middle-Aged Adults? An ERP Study	Janine Rook	Janine Rook, Vincent DeLuca, Greg Poarch, Merel Keijzer
2	The Integration of Emotions Into Reading Processes: EEG Correlates in Children	Gianluigi Serio	Gianluigi Serio, Veronica Debora Toro, Chiara Valeria Marinelli, Eugenio Trotta, Diletta Decarolis, Paola Palladino, Tiziana Quarto
3	Softly Female and Carelessly Male? The Implicit Role of Adverbs in the Attribution of Gender in English	Javier Aguado Orea, David Reynolds	Javier Aguado Orea, David Reynolds, Jane Morgan, Oliver Hawkins
4	Grammatical and Stereotypical Gender Violations in Subject-Verb Agreement: ERP Evidence	Martina Abbondanza	Martina Abbondanza, Luana Serafini, Francesca Pesciarelli
5	Parent-Child Emotion Talk in Singapore: Insights From a Wordless Picture Book Narration Activity	Rui Qi Choo	Rui Qi Choo, Weilin Tay, Rachel M. Y. Wee, Victoria Y. H. Chua, Suzy J. Styles
6	Does Entrainment to Rhythmic Speech Speed up Turn Taking?	Jule Nabrotzky	Jule Nabrotzky, Lars Meyer, Mathias Scharinger

B-16: Embodied Cognition

Location: The Diamond, LT7

No.	Title	Presenter	Authors
1	Spatial Abilities and Domain Expertise: The Case of Combat Sports Athletes and Their Athletic Identity	Marianna Pagkratidou	Christian Healy, Marianna Pagkratidou
2	Challenging Embodied Cognition: Insights From Human and ChatGPT Conceptual Representations	Claudia Repetto	Claudia Repetto, Giuseppe Riva, James A. Hampton, Elisa Scerrati
3	Surviving in L2: Survival Effect Variability in the Bilingual Mind	Halszka Bąk	Halszka Bąk, Jeanette Altarriba, Dailyn Clark
4	Spatio-Temporal Dynamics of Neural Semantic Spaces	Ilaria Appel	Ilaria Appel, Emma Angela Montecchiari, Davide Crepaldi

No.	Title	Presenter	Authors
6	Motor Expertise Modulates Memory for Emotional Action Sentences	Silvia Serino	Silvia Serino, Paola Ricciardelli, Rossana Actis-Grosso, Patrizia Steca

B-17: Statistical & Computational Modelling

Location: The Diamond, WR1

No.	Title	Presenter	Authors
1	Linguistic Context Promotes Learning of Novel Meanings by Leveraging Distributional Features of Words: An EEG Study	Giulia Loca	Fabio Marson, Giulia Loca, Marco Ciapparelli, Marco Marelli
2	Women Under Stereotype Threat Change Their Response Strategies: Diffusion Model Analyses of the Cognitive Mechanisms Underlying Gender-Related Performance Differences	Kim Keller	Kim Keller, Mischa von Krause, Andreas Voss
3	Advisor Credibility and the Dynamics of Informed Advice-Taking	Maayan Pereg	Maayan Pereg
4	Long-Term Memory and Mathematical Skills: Nina Bažela A Fuzzy-Trace Theory-Driven Study		Michał Obidziński, Nina Bažela, Mateusz Hohol
5	Modelling Group-Level Implicit and Explicit Attitudes With Language Models	Manokamna Singh	Manokamna Singh, Dr Katarina Domijan, Dermot Lynott

B-18: Individual Differences

Location: The Diamond, WR2

No.	Title	Presenter	Authors
2	How Expectation Shapes Episodic Memory: The Role of Emotional Valence and Individual Differences	Alex Kafkas	Alex Kafkas
3	Ongoing Thoughts in Daily Life Reveal Individual Differences in Emotion Processing	Anqi Lei	Anqi Lei, Md Faysal, Nerissa Ho
4	What Makes a "Super-Pronouncer"?	Sweekriti Narayanan	Sweekriti Narayanan, Prof. Dr. Kristin Lemhöfer

No.	Title	Presenter	Authors
5	Perpetrators of Sexual Coercion: Experts of Vocal Emotion Recognition?	Valentin Revillard	Valentin Revillard, Geoffrey Duran, George A. Michael
6	Individual Differences in Top-Down and Bottom-Up Prospective Memory Processing: A Bi-Factor Model Approach	Wiebke Hemming	Wiebke Hemming, Kathrin Sadus, Jan Rummel

Abstracts

Abstracts

Wednesday

Symposia

10:30 – 12:10: Symposia

KSYP-01: Maintaining Cognitive Health in Late Adulthood: Individual Differences and Interventions

Chair(s): Claudia von Bastian, University of Sheffield; Tilo Strobach, Medical School Hamburg

Symposium Abstract

Understanding and promoting cognitive health in late adulthood is a pressing challenge with implications for individual wellbeing and public health. In celebration of Professor Sylvie Belleville's research, this symposium highlights work addressing mechanisms of cognitive ageing and benefits of interventions to maintain or enhance cognition. The first talk focuses on intensive longitudinal data to identify within-person and between-person correlates of daily memory lapses, emphasizing the role of cognitive processing speed. The second talk examines processing speed training, revealing task-specific efficiency gains without generalised improvements. The third talk shares initial findings from combining stress management with cognitive training, exploring synergistic effects on mental and cognitive health. The fourth talk investigates the role of metacognition, suggesting that targeting beliefs and motivation may enhance engagement. The fifth talk explores the benefits of real-world implementation of lifestyle-based interventions in community settings. Together, these talks aim to advance our understanding of how cognitive health can be supported through targeted mechanisms, integrative, and scalable approaches.

Correlates of Daily Memory Lapses in Older Adults: Results From an Intensive-Longitudinal Study

Gizem Hülür, University of Bonn; Johanna Hartung, University of Bonn; Jacqueline Mogle, RTI Health Solutions; Allison A. M. Bielak, Colorado State University

This study examined correlates of daily memory lapses in older adults, including cognitive performance, activities, health symptoms, and age awareness. Data came from 142 community-dwelling participants (ages 60-90), who completed daily online assessments for up to seven days. They reported daily activities and experiences of memory lapses, health symptoms, and age perceptions, and took four cognitive tests. Multilevel logistic regression showed that daily cognitive throughput (accuracy/reaction time on a processing speed task) was the most consistent predictor of both individual differences in and the daily experience of memory lapses. Higher cognitive throughput (better performance) was linked to fewer memory lapses. Participants were also less likely to report a memory lapse on days with better Backward Digit Span and Letter Series performance. Age awareness and health symptoms were related to memory lapses at the between-person level, with participants who reported more frequent experiences of age awareness and health symptoms reporting more memory lapses. Activity engagement was unrelated to memory lapses. These findings highlight the relevance of cognitive processing speed for daily memory lapses.

No Transfer After Processing Speed Training Across the Adult Lifespan: Insights From Drift-Diffusion Modelling

Claudia von Bastian, University of Sheffield; Alice Reinhartz, Medical School Hamburg; Eleanor R. A. Hyde, University of Sheffield; Shuangke Jiang, University of Sheffield; Sylvie Belleville, University of Montreal; Tilo Strobach, Medical School Hamburg

Evidence for transfer from cognitive training to untrained abilities is mixed, with one exception: interventions targeting processing speed. In this pre-registered, multi-site study, we used hierarchical drift-diffusion modelling to examine the mechanisms underlying such training effects and their relation to transfer. A total of 388 healthy adults ($M = 49$ years, $SD = 18$, range 18–85) were randomly assigned to one of four groups practising tasks with increasing

attentional control demands. Cognitive performance was assessed before, immediately after, and three months after 10 training sessions. Results indicated that improvements in processing speed were driven mainly by strategic shifts—participants prioritized speed over accuracy—and reductions in non-decision time, reflecting faster perceptual and/or motor processes. However, no transfer to working memory, executive function, reasoning, or everyday cognition was observed. These findings support the view that training enhances cognitive efficiency but not general capacity.

Promoting Well-Being and Cognitive Functioning in Healthy Older Adults – A Randomized Controlled Trial on the Effects on a Combined Cognitive and Stress-Management Training

Melanie Mack, University of Geneva; Chiara Scarampi, Chiara Scarampi, University of Geneva; Emilie Joly-Burra, University of Geneva; Sascha Zuber, University of Geneva; Matthias Kliegel, University of Geneva

Mental and cognitive health are crucial determinants of healthy and successful aging, with a complex interplay between them. Stress can negatively affect cognitive functioning, while cognitive decline may increase stress and diminish overall well-being in older adults. This study aims to investigate the acceptability, feasibility, and effectiveness of a combined stress management and cognitive training intervention for healthy older adults in Switzerland. It employs a single-blind, randomized, controlled 2x2 factorial trial with 72 healthy adults aged 65 and older. Participants will be randomly assigned to one of four intervention arms: (1) WHO Self-Help Plus stress management training (SH+), (2) multidomain cognitive training targeting lifestyle and behavior change (COG), (3) combined SH+ and COG, or (4) an active control group (podcast listening and discussion). Assessments of cognitive functioning and mental health will be conducted at baseline, post-intervention (10 weeks), and 2-month follow-up. This presentation will share the initial findings from this study, shedding light on the potential benefits of integrating stress management and cognitive training for promoting mental and cognitive health in older adults.

Cognitive Interventions to Support Cognitive Functioning Among Older Adults: Does Metacognition Matter?

Elena Carbone, University of Padova; Erika Borella, University of Padova

Memory training, either targeting core processes (e.g., working memory) or teaching the use of effective mnemonics, represent promising interventions to counteract age-related cognitive decline among older adults. Such interventions usually return clear benefits in trained tasks, but their efficacy in providing generalizable, enduring benefits also to untrained cognitive domains is still a matter of debate. Note thoroughly, with aging come changes affecting metacognitive and motivational processes (e.g., beliefs about cognitive aging, sense of control over one's own cognition) that are well-known influence of cognitive performance and, most importantly, of older adults' engagement in challenging cognitive activities. This presentation will discuss available evidence on the efficacy of adopting a metacognitive approach to prompt older adults cognitive functioning also by triggering functional metacognitive-motivational changes. Moreover, latest empirical results of memory interventions combining metacognitive activities with either the teaching of memory strategies or working memory training to support older adults' objective and perceived cognitive functioning will be presented, along with their limitations and future perspectives.

Cognitive Ageing Interventions in Community Settings: Opportunities for Increasing Activity Engagement in the Real World

Alan Gow, Heriot-Watt University

Longitudinal studies have identified a range of lifestyle and behavioural factors that might promote or protect cognitive health with age, and cognitive training studies have supported opportunities to develop interventions targeting those. Some paradigms seek to understand mechanisms of action while others are translatable to real-world settings, for example opportunities that support social engagement or new learning experiences. The Intervention Factory recruited ~330 older adults aged 65 and over, completing a detailed battery of cognitive assessments at baseline before being pseudo-randomised to participate in a novel engagement activity (i.e., an activity the participant had no or limited prior experience of) for 12 weeks. Activities varied in their social, mental and physical demands,

and preliminary analyses will consider intervention-based changes across cognitive domains. In situating research in community settings, the intention is to utilise opportunities that are accessible to older people and consider whether those provide the necessary level of stimulation for cognitive benefit. The strengths of such approaches will be considered as well as the methodological and practical barriers those present.

SYM-01: Eye Movements in Reading Acquisition

Chair(s): Anastasiya Lopukhina, Royal Holloway, University of London

Symposium Abstract

Reading is a complex activity requiring the coordination of multiple skills. These include oculomotor control, which enables effective attention distribution and optimal word fixation, as well as lexical processing, which enables readers to handle words of various lengths, frequencies, and predictability. Skilled readers integrate these abilities to process fixated words and simultaneously preprocess upcoming words in the parafovea. While extensive research has elucidated the mechanisms of skilled adult reading, our understanding of eye movement behaviour in emerging readers remains limited. This symposium brings together eye-tracking research to explore key milestones in reading development across three languages: English, German, and Russian. The studies presented cover diverse aspects of early reading acquisition, including longitudinal changes in lexical effects during reading, saccadic targeting in the first year of reading instruction, refixation behaviour in primary-school children, the development of the perceptual span, and visual processing of dynamic texts such as same-language subtitles. The symposium aims to provide a deeper understanding of when and how children acquire and refine different reading skills.

Changes in Length, Frequency, and Predictability Effects During Reading Development in German: Results From a Longitudinal Eye-Tracking Study

Sascha Schroeder, University of Göttingen; Simon Tiffin-Richards, Leibniz Institute for Science and Mathematics Education

In this talk, we investigate the development of length, frequency, and predictability effects using longitudinal data from the German DevTrack study. A total of 65 primary school children were followed-up from grade 2 to grade 4 while they read single sentences. We computed the length and frequency of each word and collected cloze data from both children and adults to measure the predictability of each word. Mixed-effects models were used to analyze skipping probability, first fixation duration, gaze duration, and total reading time for all words in a sentence. Overall, we found typical length, frequency, and predictability effects, i.e., shorter, more frequent, and more predictable words were skipped more often and received fewer and shorter fixations. Importantly, the three effects changed substantially between grade 2 and grade 4 and showed differential developmental trajectories: While length and frequency effects decreased, predictability effects increased during reading development. This finding indicates that children's eye movement behaviour is initially localised and lexically driven. However, as lexical processing is getting more efficient, top-down context information becomes more important during sentence reading.

Spatial Parameters of Eye-Movement Control During Reading in Russian-Speaking Children

Olga Parshina, Middlebury College; Tatiana Eremicheva, HSE University; Anastasiya Lopukhina, Royal Holloway, University of London

Skilled readers plan and execute saccades to target the center of upcoming words in sentences, ensuring optimal placement within the area of highest visual acuity. Accurate saccadic targeting is crucial for efficient reading. This study examines whether children at the end of their first year of reading instruction target saccades toward the center of words and how this behaviour is influenced by reading proficiency. Seventy-two Russian-speaking first graders read sentences composed of words of uniform lengths (3-, 4-, and 5-letter words) while their eye movements were tracked (see Parshina, Zdorova, & Kuperman, 2024). Results revealed that children tended to land near the beginning of the word, with longer saccades and landing positions shifting slightly closer to the beginning of the word as word length increased. Importantly, reading proficiency was associated with longer saccades and landing positions closer to the word center, suggesting that

more fluent readers process words more efficiently, resembling adult readers. These findings indicate that efficient saccadic targeting is modulated by reading experience, which children have not yet fully developed by the end of their first year at school.

Characterising Children's Refixation Behaviour During Reading in English: A Corpus Study

Sara Milledge, University of Central Lancashire; Chuanli Zang, Liverpool Hope University; Hazel I. Blythe, Northumbria University; Simon P. Liversedge, University of Central Lancashire

Past research examining English child readers' eye movement behaviour has primarily compared when, rather than where, the eyes move relative to skilled adult readers. We used an English eye movement corpus to characterise typically developing 8- to 9-year-old child readers' refixation behaviour during silent sentence reading. We assessed differences in refixation behaviour dependent on word length, launch site, and reading skill. The results show that children's refixation behaviour is less targeted than that of adults. Word length has a greater effect on children's refixation behaviour in comparison to adult readers, whilst launch site has a greater effect on adults' refixation behaviour. In adults, word length and launch site interactively determined refixation probability: higher refixation probability the longer the word and the further away the launch site, but this interactive pattern was not present in the children, apart from when reading skill was accounted for. Reading skill had no effect on adult readers' refixation behaviour. Overall, the results provide new insight into the developmental change that exists within refixation behaviour, a change for which no model of eye movement control during reading can account.

Development of the Perceptual Span in Russian-Speaking Children

Vladislava Staroverova, HSE University; Anastasiya Lopukhina, Royal Holloway, University of London

Perceptual span refers to the amount of information readers can perceive within a single fixation (Rayner, 1975). Our study is the first to assess the size of the perceptual span in Russian-speaking children and examine how cognitive skills influence its development. The experiment involved 138 children from grades 1-4. They read a set of sentences in a

moving window eye-tracking paradigm (McConkie & Rayner, 1975). Each participant also completed five cognitive tests. We found that seven characters to the right of the fixation point were insufficient for undisturbed reading in first graders. Second graders' perceptual span extended to seven characters to the right. Third and fourth graders had a perceptual span of approximately ten characters to the right. In grade 2, better readers tended to have a larger span, whereas in grade 4, better performance on the attention test was associated with a greater span. Our findings suggest that Russian-speaking children may have a larger perceptual span compared to their German- and Finnish-speaking peers. Consistent with other studies, we observed a link between perceptual span and reading fluency. For the first time, we identified an association between perceptual span and attention skill.

Where Do Children Look When Watching Videos With Same-Language Subtitles?

Anastasiya Lopukhina, Royal Holloway, University of London; Walter van Heuven, University of Nottingham; Rebecca Crowley, Royal Holloway, University of London; Kathleen Rastle, Royal Holloway, University of London

Recent campaigns in the UK and USA have argued that turning on same-language television subtitles could help children learn to read. However, it is unclear whether children even look at subtitles. We aimed to determine whether primary-school children pay attention to and read same-language subtitles. We tested 180 British children in Years 1-6. Each participant watched two videos with and two without subtitles, while their eyes were tracked. We also measured children's reading fluency. For the analysis, we divided the screen into the video and the subtitle regions. All children looked at the subtitle region more often when the subtitles were present. Superior readers were more likely to look at the subtitles than poor readers and spent more time attending to them. Looks to subtitles were sensitive to word length and frequency thus implying that they were being read. However, an increased proportion of skipping and regressions compared to static text reading suggests that subtitle reading involves different processing patterns. Overall, some degree of reading fluency is necessary before children pay attention to subtitles. Poor readers tend to ignore subtitles, suggesting that children will not learn to read from subtitles.

SYM-02: Working Memory Beyond the Item

Chair(s): Johanna Hein, University of Geneva

Symposium Abstract

When storing information in working memory, it is often essential not only to retain the item itself, but also to encode and maintain additional information related to it, such as its serial position, the temporal or spatial context in which it was presented, the response associated to it, or the source from which the information was received. Often, this contextual information is crucial for accurately recalling and effectively using the stored items. In this symposium, the focus will be on working memory as a dynamic system that can store isolated pieces of information but that, if needed, is also capable of maintaining contextual information, relationships between features and items, and goal-directed actions, beyond the item. More specifically, talks will address different forms of binding, source forgetting across modalities, stimulus-stimulus associations and stimulus-response associations, the influence of associative knowledge on working memory for real-life objects, as well as working memory for item and order information. Together, these contributions will provide a comprehensive overview of different lines of research united by a shared focus on exploring how working memory operates beyond mere item retention.

Rapid Source Forgetting Across Modalities: Verbal and Visual Information Is Lost

Molly Delooze, University of Cardiff; Dominic Guitard, University of Cardiff; Nelson Cowan, University of Missouri; Candice Morey, University of Cardiff

Working memory is a cognitive system that enables the temporary retention (usually a few seconds) of a limited amount of information. However, recent evidence has posed challenges to the conventional understanding of working memory's persistence. Chen et al. (2018) demonstrated that participants can easily make judgments using a stimulus's identity but cannot recall from which source the information came (presented either as a written word or colour patch) just milliseconds earlier. This 'Source Amnesia' carries substantial implications for working memory models but has yet to be thoroughly explored within the realm of verbal information. We fill this gap by

investigating the robustness and generalizability of this rapid forgetting phenomenon. We first replicate the observed effect within the visual domain (Experiment 1) and subsequently extend it to the verbal domain (Experiment 2). Aligning with the work of Chen et al. (2018), our results consistently reveal a pronounced tendency for rapid forgetting, for both visual and verbal information regardless of whether the information is elicited for recall by format or position cues.

The Role of Prior Associative Knowledge in Visual Working Memory for Real-World Objects

Xinchi Yu, University of Maryland; Weizhen Xie, University of Maryland

As we expand our understanding of visual cognition from simple laboratory stimuli to real-world contexts, a key question arises: how does prior associative knowledge influence our ability to perceive and remember real-world stimuli moment by moment? Unlike basic stimulus features such as color and orientation, real-world objects often carry rich associative information. For instance, encountering a single object can evoke semantic associations (e.g., an Easter egg and a rabbit), even when there is little to no perceptual overlap or direct interaction between them. Additionally, individuals may form relational knowledge based on implied interactions (e.g., cats typically chase rats, but not vice versa). In a recent study, we demonstrated that semantic associations among arbitrary pairs of real-world objects can compensate for perceptual encoding constraints imposed by brief encoding durations (200 ms), thereby enhancing visual working memory (VWM) formation. Furthermore, we investigated how relational knowledge about interactions between objects affects VWM formation. Together, these findings highlight how different forms of prior associative knowledge affect VWM processes beyond individual items with simple features.

Declarative and Procedural Working Memory: Common Processes Underlying Maintenance, Interference, and Learning

Isabel Courage, University of Zurich; Gidon Frischkorn, University of Zurich

Typically working memory (WM) researchers distinguish between declarative and procedural

representations. Declarative ones are objects of thought, such as items, whereas procedural ones are mental or overt actions performed on the objects of thought. Yet, it is unknown whether maintenance, interference, and learning are equal for these representations due to different methods. Declarative tasks change representations during tasks and use accuracy as a performance measure, whereas procedural tasks keep representations constant during tasks and measure response times. To compare the processes underlying maintenance, interference, and learning among these representations, we designed matching declarative and procedural memory tasks and collected data in two experiments (N1 = 27; N2 = 44). In these tasks, memoranda were fully repeated, repeated with varied combinations, or not repeated. Results from a cognitive measurement model analysis indicated that processes underlying learning are comparable for both representations. Also, previous response selections similarly interfered proactively across lists with partially repeated contents for both WM types. These results emphasize the commonalities among declarative and procedural WM.

Exploring Processing and Maintenance of Uni-Modal and Multi-Modal Binding in Working Memory

Hatice Cinar, University of Leeds; Amy Atkinson, Lancaster University; Amanda Waterman, University of Leeds; Richard Allen, University of Leeds

The focus of attention in working memory (WM) is commonly assumed to hold information in uni-modal and multi-modal form. However, relatively little is known about how this might operate for different types of single- and multi-modality input. One approach to investigating this is to examine how performance changes with top-down strategic prioritisation, which examines whether attention can be directed to specific items based on assigned 'value', and with sequence position. The present study reports a series of experiments examining how value-based prioritisation impacts on WM for sequences of stimuli requiring different forms of binding; uni-modal (coloured shapes) and multi-modal (shapes presented visually in synchrony with auditory colour names). We found no strong evidence for differences in overall performance between uni-modal and multi-modal binding, or in the ability to obtain a priority boost for high value items. Further investigations continue to explore the effects of prioritisation in

multi-modal binding, with implications for WM, binding, and attentional control.

The Effect of Attentional Load on Item and Order Memory in Visual and Spatial Working Memory

Johanna Hein, University of Geneva; Robin Remouchamps, University of Liège; Steve Majerus, University of Liège; Evie Vergauwe, University of Geneva

The ability to memorize information in the correct order is crucial for many cognitive activities. However, the mechanisms by which item and order information are maintained in working memory (WM) remain unclear. One proposal is that both item and order information rely on attention for maintenance, with order information being more attention-demanding than item information (e.g., Guitard et al., 2021). We conducted two sets of experiments to test this hypothesis, in both visual and spatial WM. In the first set of experiments, participants were asked to remember series of locations. Memory was tested using either a recall or a recognition task, while a concurrent tone discrimination task was introduced during either the encoding or retention phase to assess the impact of attentional load on item and order performance. Against our expectations, memory for order information was not consistently more affected by attentional load than memory for item information. To test the generality of these findings, we compare them to those of a second set of experiments, in which participants are asked to remember series of shapes, allowing for conclusions across visual and spatial WM.

SYM-03: The Role of Inhibition in Language Selection in Bilinguals: The Current State of Evidence

Chair(s): Aureliu Lavric, University of Exeter; Srimoyee Chatterjee, University of Exeter

Symposium Abstract

How do bilinguals selectively speak words in the intended, or context-appropriate, language, given that lexical representations in the other language(s) may also be active? The answer to this question has remained elusive, despite the multitude of studies that have provided evidence collected in various experimental paradigms. The psychological mechanism that appears to have gained the widest

support is that bilinguals inhibit lexical representations in the unintended language(s) to ensure spoken production in the target language, an account first articulated over two decades ago by Green (1998) in the Inhibitory Control Model. However, some empirical phenomena thought to provide clear evidence for the role of inhibition in language selection have proven unreliable, whereas other empirical phenomena may be interpreted without recourse to inhibition. The present symposium will examine and discuss recent empirical tests of inhibitory control, which were based on several types of experimental manipulations implemented in conventional (participant-computer) and immersive (virtual reality) communication settings.

Language Inhibition or Activation? A Discussion of Data Patterns Often Interpreted as Reflecting Inhibition During Language Selection

Angela De Bruin, University of York

When having to use a specific language, bilinguals are thought to rely on inhibition mechanisms to avoid interference from the non-target language while selecting words in the target language (e.g., Green, 1998). In this talk, I will start with a brief review of different data patterns that have been interpreted to reflect inhibition during language selection. This will include recent data (de Bruin et al., 2023) suggesting that lower inhibition during trilingual language selection is associated with language intrusions, suggesting inhibition can help trilinguals to avoid non-target language interference. I will then focus on another data pattern that is often taken to suggest that bilinguals sometimes over-inhibit the first language (L1): reversed dominance effects. This refers to faster second language (L2) than L1 responses when both languages have to be used interchangeably. Drawing on a series of studies involving different types of multilinguals, I will explore when and why these reversed dominance effects emerge. Importantly, I will discuss whether these data patterns truly arise due to L1 over-inhibition, or whether they can also be driven by L2 over-activation in certain contexts.

Switching Between Listeners During Bilingual Language Production

David Peeters, Tilburg University

Perhaps the main advantage of being bilingual is the capacity to communicate with interlocutors that have different language backgrounds. In the life of a bilingual, switching interlocutors hence sometimes involves switching languages. It has long been proposed that the capacity to switch from one language to another is supported by (inhibition-related) control mechanisms such as task-set reconfiguration. In this talk, I will discuss whether similar neurophysiological mechanisms support bilingual switching between different listeners, within and across languages. Analyses of behavioral data from five virtual reality experiments on Dutch-English bilinguals will show that switching languages consistently comes at a cost over and above the significant cost of switching from one listener to another. Analysis of concurrently recorded event-related potentials indicates similar electrophysiological correlates for switching listeners and switching languages. Together, these findings suggest that a possible bilingual advantage in executive control may not be due to the process of switching per se, and pave the way for the study of inhibitory language control in settings that combine experimental control with ecological validity.

The Role of Inhibition in Bilingual Control: Clear Inhibition but Unclear Effects of Language Dominance

Iring Koch, RWTH Aachen University; Vuslat Karaaslan, RWTH Aachen University; Tanja C. Roembke, RWTH Aachen University; Andrea M. Philipp, RWTH Aachen University; Mathieu Declerck, Vrije Universiteit Brussel

Language control in bilingual settings requires context-dependent flexibility when selecting the target language. According to a major theoretical account, the Inhibitory Control Model (ICM), this flexibility involves inhibitory control. Strong evidence for inhibitory control comes from trilingual settings and n-2 language repetition costs. These denote impairment in n-2 language repetitions (e.g., L1-L2-L1) relative to n-2 non-repetitions (e.g., L3-L2-L1), suggesting persisting after-effects of preceding inhibition when switching away from a language. Here, we examine whether the most dominant language (L1) requires the strongest inhibitory control, as would be predicted by the ICM. However, recent findings using cued digit naming suggested stronger inhibition of L2 than for L1 and strong competition primarily between L2 and L3. Two new experiments using cued naming of non-cognate pictures in L1 (German), L2 (English),

and L3 (French) again showed no clear evidence for strongest inhibition of L1. In sum, these findings cast doubt about the role of language dominance in bilingual inhibition and call for a better understanding of the concept of language dominance.

No Indication of ‘Global’ Language Inhibition Persisting From One Trial to the Next: Evidence From Two Manipulations of Picture Naming

Srimoyee Chatterjee, University of Exeter; Stephen Monsell, University of Exeter; Aureliu Lavric University of Exeter

The ‘n-2 language repetition cost’ (better performance on the final trial n of the cued-naming trial sequence LCLBLA relative to LALBLA) has been viewed as evidence for ‘global’ inhibition applied during trial n-1 to the language used on trial n-2 persisting to trial n. But all/most previous studies: confounded n-2 language repetition with n-2 language cue repetition, used number naming (which may bypass semantic access), and did not include n-1 language repetitions. Using a design that avoided n-1 and n-2 cue repetitions, we asked fluent trilinguals to name pictures in two sessions – with/without n-1 language repetitions. There was no n-2 repetition cost in either session. In another study, we examined the influence of a trial n ‘cognate effect’ (shorter RT for words with phonologically similar translations) on n+1 language switches. If inhibitory control is sensitive (‘re-active’) to cross-language conflict, less inhibition should be applied on cognate trials – which should facilitate n+1 switching. We found a large cognate effect, but no effect of cognate status on n+1 switches. We conclude that if inhibition plays a role in language selection, it is not ‘global’ (but item-specific) and/or not ‘reactive’ (but sustained).

Symposium Discussion

David Green, University College London
Symposium Discussion

SYM-04: Cross-Disciplinary Perspectives on Real-Time Speech Processing: When Top-Down Prediction Meets Bottom-Up Input

Chair(s): Xin Xie, University of California Irvine

Symposium Abstract

This symposium explores the integration of sensory signals and top-down predictions in real-time speech comprehension, a process that requires millisecond-level synchronization. The interplay between bottom-up and top-down processing has long been central to our understanding of speech perception, and human cognition more broadly. Recent advances in technology are allowing researchers to revisit this complex issue with unprecedented precision and insight. Featuring four talks from leading experts across the United States, Europe, and Asia, this symposium highlights innovative approaches and cutting-edge methods—including behavioral tasks, EEG, MEG, fMRI, Neuropixels, and computational modeling—that allow us to address enduring questions from fresh perspectives. The talks will be followed by a panel discussion aimed at fostering interdisciplinary dialogue across psycholinguistics, cognitive science, and neuroscience, advancing a unified understanding of the dynamic mechanisms underlying speech processing.

The Role of Phonological Prediction in Comprehension: A Meta-Analysis

Aine Ito, National University of Singapore

Prediction has been proposed as an important mechanism that facilitates processing and learning (e.g., Dell & Chang, 2014; Gambi, 2021). Predictions that are detailed to the phonological level may be particularly important for learning as they can signal prediction errors. However, the evidence for phonological prediction is largely inconsistent, and the robustness of phonological prediction is under debate (e.g., Nieuwland et al., 2018; DeLong et al., 2017). The current meta-analysis tested the robustness and the time-course of phonological prediction using 20 visual-world eye-tracking experiments. The meta-analysis showed that the effect of phonological prediction was small but reliable, and it was modulated by the cloze probability of the target word (even within the cloze range of 85-100%). The effect occurred immediately after it became detectable, rather than being closely aligned to the predictable word onset. This suggests that people predict phonological information as soon as possible.

Neural Signatures of Speech Prediction Error Are a Biological Marker for Spoken Word Recognition

Matt Davis, *University of Cambridge; Ediz Sohoglu*, *University of Sussex*

Speech perception and spoken word recognition are well explained by Bayesian mechanisms: accurate perception is achieved by combining sensory inputs with prior knowledge (predictions). Here we provide neural evidence that prediction error computations play a central role in Bayesian speech processing. Listeners heard spoken bisyllables that varied in the strength and accuracy of between-syllable predictions. Lexical predictions are stronger for words with high conditional probabilities between first and second syllables (bingo, snigger), compared to the same syllables in less predictive contexts (tango, meagre). Prediction accuracy is manipulated for pseudowords with second syllables that mismatch with lexical predictions (binger, sniggo). In fMRI and MEG studies we see opposite effects of prediction strength on neural representations of syllables in words and pseudowords. Computational simulations show that interactions of prediction strength and lexical (mis)match are compatible with prediction error representations and challenge ‘sharpening’ theories in which neural representations directly encode syllable probability.

Sensory Processing and Prediction During Speech Comprehension: Neural Implementation in Single Cells and Region-Wide Structures

Laura Gwilliams, *Stanford University*

Humans understand speech with such speed and accuracy, it belies the complexity of transforming sound into meaning. In my talk, I will present a series of studies that examine neural responses at different spatial scales: From population ensembles using magnetoencephalography and electrocorticography, to the encoding of speech properties in individual neurons across the cortical depth using Neuropixels probes in humans. The results provide insight into (i) what auditory and linguistic representations serve to bridge between sound and meaning; (ii) what operations reconcile auditory input speed with neural processing time; (iii) how information at different timescales is nested, in time and in space, to allow information exchange across hierarchical structures. My work showcases the utility of combining neural data across spatial scales to understand the interplay between bottom-up sensory processing and predictive computations across timescales.

The Consistency of Speech Perception Is More Important Than the Nature of Speech Categories: The Role of Top-Down Factors

Bob McMurray, *University of Iowa; Hyoju Kim*, *University of Iowa; Ethan Kutlu*, *University of Iowa; Sita Carraturo*, *University of Iowa; John Muegge* *University of Iowa*

Research has long sought links between speech categorization and real-world outcomes like communicative impairments or second language attainment. Much work has focused on the degree to which representations are categorical or gradient. However, work with continuous rating tasks suggests the trial-by-trial consistency of responding is the more important factor. This presentation starts with work showing that differences in consistency predict about 30% of the variance in language ability (N=133) and predicts language and reading disorders in children (N=237). This raises questions about mechanisms that may help stabilize the percept. We ask if this is a product of top-down knowledge by comparing categorization consistency in acoustically-matched words and nonwords (N=50), and across word and nonword sides of the same continua (e.g., kiss/giss, N=118). In both cases consistency was greater for words than nonwords, despite matched bottom-up input, suggesting top-down knowledge may help stabilize perception, with downstream consequences for language and reading.

Symposium Discussion

Xin Xie, *University of California Irvine*
Symposium Discussion

SYM-05: Déjà Vu and Beyond: Investigating Spontaneous Cognitive Experiences

Chair(s): Krystian Barzykowski, *Université Grenoble Alpes*

Symposium Abstract

Spontaneous cognitions, such as involuntary autobiographical memories (IAMs), déjà vu, jamais vu, zoning out, the tip-of-the-tongue state, and error detection, are common yet often explored in isolation. Research typically treats these phenomena separately, leading to fragmented insights. This symposium aims to bridge this gap by exploring shared mechanisms underlying these experiences.

Gardette and collaborators will examine the role of familiarity in memory, highlighting its connection to phenomena like déjà vu and IAMs. Cleary and Mills will present evidence for a new perspective on déjà vu, as recently proposed by Barzykowski and Moulin, viewing it as an involuntary thought interruption rather than a memory anomaly. O'Connor and Robbins will explore the developmental emergence of spontaneous cognitions, focusing on when children first report experiences like déjà vu. Polianskaia and colleagues will discuss the relationship between age, metacognitive development and the prevalence of déjà-vu. The symposium will conclude with Kvavilashvili synthesizing the findings and moderating an engaging discussion, paving the way for a unified approach to future research on spontaneous cognitions.

What Is Familiarity? The Complex Nature of an Apparently Simple Form of Memory

Jérémy Gardette, University of Liège; Christine Bastin, University of Liège; Emma Delhay, University of Liège

Humans rely on familiarity in many situations in everyday life. Yet its cognitive and neural bases have received less attention than those of recollection. In this opinion presentation, we will emphasize the complex nature of familiarity and focus on two dimensions: its representational dimension and its phenomenal dimension. A better understanding of these dimensions may support the identification of common processes to a variety of memory phenomena, such as déjà vu and involuntary autobiographical memory.

A Comparison of Déjà Vu, Involuntary Autobiographical Memories, and Unexpected Thoughts Across the Lifespan

Anne M. Cleary, Colorado State University; Caitlin Mills, Colorado State University

Déjà vu has only been a subject of investigation in mainstream psychological science for approximately the past 20 years. Most empirical research on it has investigated it from the perspective that it is an odd, often illusory quirk of human memory. This talk presents evidence for a new perspective on déjà vu, which is that rather than merely being an odd quirk of memory, déjà vu serves as a form of involuntary thought interruption that redirects the focus of one's thoughts. We also compare déjà vu to two other

commonly studied forms of involuntary thought, namely Unexpected Thoughts and Involuntary Autobiographical Memories, and we present evidence for how these three forms of thought are both experienced and described differentially.

Understanding the Development of Déjà Vu and Other Spontaneous Cognitions in Children

Akira O'Connor, University of St Andrews; Erin Robbins, University of St Andrews

It is often reported that people first experience déjà vu when they are between ages 6 and 10. A range of cognitive prerequisites have been proposed as necessary to report déjà vu, including: i) the ability to understand what a question probing déjà vu occurrence is referring to; ii) experience of others describing the déjà vu experience (e.g. in literature or conversation); and iii) the metacognitive faculties to identify the experience in oneself. We are testing UK primary school-age children (age 4-11) on markers of these prerequisites, to better understand the emergence of déjà vu and other spontaneous cognitions.

Relationship Between Metacognitive Accuracy and Déjà Vu Incidence: Evidence From Children Aged 10-16

Taisiia Polianskaia, Université Grenoble Alpes; Krystian Barzykowski, Université Grenoble Alpes; Chris J.A. Moulin, Université Grenoble Alpes

According to the top-down perspective of déjà vu, this phenomenon is thought to involve high-level metacognitive processes. This study offers the first empirical evidence for this hypothesis in 92 neurotypical children aged 10 to 16. We compared a standard perceptual metacognitive task (N = 30) with déjà-vu incidence while accounting for demographic and environmental factors. A significant positive correlation was found between metacognitive accuracy in our experimental task and déjà vu incidence as measured by our questionnaire. These findings underscore the role of metacognitive development in enabling children to recognize subjective experiences like déjà vu. In this talk we will discuss the relationship between age, metacognitive development and the prevalence of déjà-vu, highlighting the need for further exploration of its cognitive and neurophysiological underpinnings.

Bridging Perspectives on Spontaneous Cognition: Towards a Comprehensive Understanding

Lia Kvavilashvili, University of Hertfordshire

As the discussant, Professor Lia Kvavilashvili will summarize the key points from the symposium presentations, providing insights into the common cognitive mechanisms underlying spontaneous phenomena like involuntary autobiographical memories (IAMs) and déjà vu. Following a concise overview of each talk, she will facilitate an engaging discussion between the presenters and the audience, exploring the implications of the findings and future research directions. This dialogue will emphasize the importance of integrating diverse perspectives to deepen our understanding of spontaneous cognition.

SYM-06: Sense of Agency (SoA): Towards Empirically Driven Measures and Beyond

Chair(s): Robrecht van der Wel, Rutgers – Camden; Pernille Hemmer, Rutgers – New-Brunswick; Agnieszka Wykowska, Italian Institute of Technology

Symposium Abstract

This symposium seeks to provide a comprehensive overview of our understanding of the Sense of Agency (SoA) and its measurements. SoA refers to the feeling of control over our actions and their outcomes and is a fundamental aspect of the human experience. Despite the importance of understanding SoA little progress has been made in recent decades. Here, an international team of researchers working on various aspects of SoA, will address both the current shortcomings in measurements and theory development as well as several paths forward in investigating SoA. The symposium will cover five core topics: 1) an introduction to current theories and measurement approaches 2) evaluating self-report as a reliable measure of SoA 3) evaluating whether actions and outcomes carry equivalent weight in SoA 4) evaluating the relationship between implicit and explicit measures in goal directed action and 5) investigating SoA for joint action – a significantly underexplored field.

The Association of Trait Sense of Agency and Action Decisions

Katharina Schwarz, Trier University

We tend to assume agency over our actions and their consequences in situations that leave little room for doubt in our role in planning and producing those events. Particularly, our experience of agency is strong when our actions are premeditated, their consequences predictable, and when those actions and consequences are clearly attributable to ourselves. However, in many real-life situations, the association between action, consequence, and causal agent becomes blurred, and authorship assumptions are then more strongly affected by individual tendencies. Here I will give a brief introduction to current theories of sense of agency (SoA), and then present studies in which we associate trait agency assumptions regarding sustainability efforts with the participants' actual choices regarding sustainability behaviour within the NICE (narrative-interactive choice experiment) paradigm. This opens up the floor for a discussion on the merits of trait vs. situational SoA measures, especially for situations that allow space for individual interpretation.

How to Measure Sense of Control Using Explicit Reports

Mateusz Woźniak, Italian Institute of Technology; Agnieszka Wykowska, Italian Institute of Technology

The study of sense of control has been dominated by implicit measures while explicit measures have been regarded as highly biased and unreliable. However, implicit measures are often too inflexible for many practical applications. In our recent study we investigated the reliability of explicit reports across different measurement scales. We manipulated the objective degree of participants' control over a moving object and requested participants to evaluate their sense of control. We compared 5 types of measurements: linear, percentage, 7-point Likert, 4-point Likert, and a binary scale. We found that the results were remarkably consistent across almost all scales. The same response bias emerged in all but a binary scale, and cluster analysis revealed strikingly similar results. Moreover, we found that data from single trials was reasonably consistent with averages from multiple trials. Our results call to reevaluate the use of subjective reports for assessment of sense of control.

Unpredictable outcomes negatively impact the sense of agency more than unpredictable actions

Laura Saad, US Naval Research Laboratories, USA

The sense of agency represents the everyday experience of control over our actions and their outcomes. We propose a new framework, Goal-to-Control (G2C) that defines the sense of agency as consisting of three main components: the presence of a goal, the sense of control of the self, and the sense of control of the environment. Across ten experiments, we alter participants' sense of agency over their actions and outcomes by manipulating the predictability of each individually. As predicted by G2C, we find that participants' reports of control are consistently the highest when both actions and outcomes are predictable. However, contrary to previous theoretical predictions, we find that unpredictable outcomes impact participants' sense of agency more negatively than do unpredictable actions. These findings can be readily explained in the context of our framework as a function of the participant's goal. We discuss implications and suggestions for future work in this field.

Sense of Agency: Improving Our Understanding of Its Measurements

Robrecht van der Wel, Rutgers – Camden; Pernille Hemmer, Rutgers – New-Brunswick

Sense of Agency (SoA) has been studied with explicit and implicit measures. Recent findings suggest that the most common implicit measure, i.e., Temporal Binding (TB), may reflect processes other than SoA. The reason is that it involves estimating previously perceived time intervals between actions and (often arbitrary) outcomes. To better understand measures of SoA, we implemented two implicit and an explicit measure in a goal-directed extended action task. Participants watched or produced dot movements to a target of choice and then estimated the duration between two tones that played either upon movement completion (TB1, akin to traditional TB studies) or based on the start and end of movements (TB2). Participants reported stronger explicit SoA during active than passive movements. TB results were only consistent with action-outcome binding when the judged tones related directly to the produced movements (TB2). We discuss implications for the measurement and theorizing about SoA.

Understanding Joint Agency: What Is It and How Can We Measure It?

Janeen Loehr, University of Saskatchewan

In recent years, there has been growing interest in the sense of agency during interpersonal coordination. It has been proposed that people can experience not only individual agency over their own and others' contributions, but also individual and/or joint agency over the joint outcome of coordinated actions. Moreover, it is currently debated whether joint agency is best defined as interdependent individual agencies, a singular collective agency, or can take either of these forms. In this talk, I will discuss explicit measurement scales that are currently used in studies of joint agency and present data from multi-methods studies aimed at refining our understanding and measurement of joint agency. These include qualitative studies in which people provide detailed written reports of their experiences of joint agency and quantitative experiments that compare explicit measurement scales and investigate whether joint and individual agency can be independently manipulated and assessed.

SYM-07: Interplays Between Creativity and Emotion in Music Listening and Performance

Chair(s): Renee Timmers, University of Sheffield

Symposium Abstract

Both emotional responses and creative action and thinking are core aspects of music cognition. They indeed have received considerable attention in the research literature. However, generally speaking, most research has investigated these aspects of music cognition separately. For example, theories and research of emotions perceived, felt or expressed in music hardly ever refer to or also investigate creativity. Similarly emotion may only feature tangentially as part of theories and research on creative processes in musical behaviours. This symposium brings together research that examines the interplay between musical creativity and emotion in listening and performance. In doing so, it aims to examine the relevance of the combined investigation of creativity and emotion in music and the kind of insights this combination affords. The symposium features talks that present the results of a scoping review on the

topic and that present empirical results of research examining this interplay in music workshops with a well-being purpose, in music listening, and in music performance.

Creativity Facilitates the Flow Experience in Improvising Flamenco Duos

Atila Vrasdonk, University of Oslo; Peter E. Keller, Aarhus University; Tor Endestd, University of Oslo; Jonna K. Vuoskoski, University of Oslo

Creativity and flow often appear together in research on improvisation in performing arts like music and dance. However, their direct relationship remains unexplored. Improvisation, seen as a momentarily creative act, is commonly practised in Flamenco ensembles. This study aimed to explore how improvisational creativity impacts the intensity of the "flow" state in professional flamenco dancers and musicians by manipulating the degree of improvisational freedom. Eleven duos were examined, performing rehearsed pieces, free improvisation, or a combination of both. The analysis revealed that highest flow was experienced during free improvisation, followed by mixed performances and rehearsed performances, suggesting that flow intensity can be influenced by varying degrees of improvisational freedom. Furthermore, a positive linear relationship between flow and connection with the partner, improvisational creativity, absorption by activity, fluency of performance and rhythmic complexity was found. These results emphasise the multifaceted nature of flow and the significance of group dynamics, creativity and connection with the partner in achieving this state within an improvising ensemble.

Creativity and Emotion in Group Music-Making for People Living With Dementia

Jennifer MacRitchie, University of Sheffield; Justin Christensen, University of Sheffield

Research into music interventions for people living with dementia largely encourages the use of personalised, familiar music to promote positive emotional outcomes and general wellbeing. Opportunities for active participation can be rare, with agency often limited to choosing the music to listen to or playing simple percussion instruments. This presentation examines the use of two devices

developed by the Music, Dementia, Technology team; these devices empower individuals living with dementia by putting them in control of the range of music generated. We examine how both familiar and unfamiliar music contexts may promote creativity and how this intersects with emotional responses to music. Drawing on a dataset of 81 video recordings of group-based musical engagements with these devices, this talk examines a subset of interactions, evaluating them for evidence of creativity. We discuss how familiar music may support identity connected to mostly positive emotional responses, while unfamiliar musical contexts, rather than detracting from these benefits, may enable a more dynamic construction and negotiation of identity. Implications are for further developing musical activities to support a range of creative engagement.

A Scoping Review of Literature on Creativity and Emotion in Music Cognition

Renee Timmers, University of Sheffield; James Vaidya, University of Sheffield

Creativity and emotion are central to musical behaviour, yet little is known about their joint contributions to music's affordances. How does research hypothesise the link between creativity and emotion in music cognition? A scoping review of research literature was conducted using terms like 'creativity,' 'emotion,' 'music,' and 'human experience' across Scopus, Web of Science, and PsycInfo databases. From 709 initial records, 28 were selected for detailed review. Half of these examined music as a creative activity influencing emotional outcomes. Most other studies used music to induce emotions and tested its impact on creativity. Few studies explicitly investigated the interaction between creativity and emotion in music. This review reveals an implicit hypothesis of music as either an emotion inducer or a form of creative behaviour. Very little is known about how important creativity is for music's emotional effect or vice versa - the role of emotion in creative musical engagement. Addressing this gap is crucial to advancing understanding of music's affordances in performance, aesthetic enjoyment, and therapy.

Creativity and Emotion in Expressive Performance of Western Classical Music

Yuko Arthurs, Goldsmith, University of London; You Yue, University of Sheffield; Renee Timmers, University of Sheffield

Musical performance is part of the creative process for musicians, and listeners enjoy hearing expressive performances in which they recognise the expression of emotion. One of the things a performer can do is to vary musical properties such as timing, dynamics, and accenting. Nevertheless, classical musicians are restricted in their expressive potential as they are expected to follow what is written in the score which instructs what and how to play. Given these restrictions, how do classical musicians achieve an original and expressive performance? Our study of classical musicians from the UK and Japan revealed the employment of various strategies to express emotion and create a personal interpretation of the music, whilst still being faithful to what is written in the notation. Overlap and differences were found between the two groups. Analysis of recorded violin performances and of interviews with violinists further reveal the acoustic features of expressive performances compared to those that lack expression, violinists' techniques, and the various cognitive and emotional approaches to making performances more expressive.

Construction of Emotion in Music Listening: The Role of Self-Construal Across Cultures

Jonathan Tang, University of Sheffield

Research on music and emotions has predominantly adopted basic emotions theory, often using a limited range of emotions. Additionally, cross-cultural studies have mainly explored how familiarity with and exposure to specific music genres affect emotion perception. A constructionist approach to music and emotion requires going beyond basic emotions to include a broader range of emotion terms and examining specific cultural factors that influence how emotions are perceived in music. I present two studies examining the role of culture in music emotion perception by integrating cultural factors (interdependent and independent self-construal) and applying interpersonal and intrapersonal models of emotions (socially engaging vs. socially disengaging). The findings reveal that interdependent self-construal is associated with feeling and perceiving socially engaging emotions in response to favourite music, while independent self-construal is associated with

socially disengaging and aesthetic emotions. These results highlight music listening as an active, creative process shaped by the dynamic interplay between the self, music, and emotions. This leads to the reflection of the role of self-construal in musical creativity.

12:30 – 14:00: Poster Session 1(P-01)

Sensation & Perception I

The Speed and Automaticity of Action Categorisation

Filip Durovic, Bangor University; Angelika Lingnau, University of Regensburg; Marieke Mur, Western University; Paul Downing, Bangor University

Visual neuroscience has demonstrated the rapid and efficient processing of objects, scenes, bodies, and faces. However, less is known about the time-course of action processing. If understanding actions requires integrating information about people, things, and places from different domain-specific systems, we might expect this process to take longer and to be less automatic than categorising any one of the individual elements. To test this hypothesis, participants completed three tasks in three different experiments (N=16, N=16, N=36): a same-different action image matching task; a word-image action matching task; and a rapid serial visual presentation (RSVP) task. To reveal how long it takes to successfully categorise actions, we manipulated image presentation times. In all tasks, exposure durations less than 100ms were sufficient for action categorisation. Additionally, in the RSVP task, concurrent working memory demands had minimal impact on categorisation performance, indicating a relatively automatic process. Action classification, which involves integrating cues from multiple sources, may largely occur in parallel with the analysis of these component cues.

Implicit Bias in Associating Educational Roles: Gender, Age, and Appearance

Olga Daneyko, Sheffield; Daniele Zavagno, Milano-Bicocca

This study investigates implicit biases related to gender, age and physical appearance in the assignment of educational roles. Participants viewed images of male and female personas with varying

ages and hair colours, generated through a face app to maintain consistent facial features. Suitability of these personas were rated on 7-point Likert scales for the following educational roles: early years teacher, primary school teacher, secondary school teacher, and university lecturer. Results reveal that women were more often associated with early-stage teaching roles, while men were linked to university lecturer positions. Along with an age effect, also a "Marylin Monroe" effect emerged, with women having darker hair more frequently assigned to academic roles than those with blonde hair. These findings highlight the persistence of gendered stereotypes in education, shaped by societal norms. To address these biases in educational settings, it is essential to implement strategies such as bias-awareness training for hiring committees, promoting diverse role models among staff and leadership, and adopting equitable, bias-free recruitment practices.

The Influence of Second-Order Facial Features on Gaze-Following Behaviour and Attentional Biases

Federico Paulesu, University of Milano-Bicocca; Daniele Zavagno, University of Milano-Bicocca; Matteo De Tommaso, University of Milano-Bicocca; Rossana Actis-Grosso, University of Milano-Bicocca

In social scenarios, attention is drawn to another person's gaze, compelling individuals to follow it. This tendency, known as joint attention, can be inhibited with delayed Reaction Times (RTs). In a previous study we showed that Second-Order Facial features (SOFs, e.g. makeup for females, beard for males) modulate Gender Science Stereotype (i.e. women are seen less competent than men in scientific fields). We present an experiment aimed at testing the automatic nature of stereotypical attributions modulated by SOFs, focusing on attentional biases in a gaze-following behaviour (GFB) paradigm. Participants performed left or right saccades when a fixation dot changed colour, ignoring a centrally presented face with congruent or incongruent gaze direction. Distracting faces were 32 male and female faces modified by hair colour/length, makeup/beard. Results confirmed GFB, with more errors and slower RTs in incongruent trials. A stronger GFB was present on faces with pronounced SOFs, regardless of gender, suggesting perceptual saliency may override gender stereotypes in implicit tasks. We are currently running a dot-probe test to further explore the role of SOFs in gender stereotypes.

Numerical & Mathematical Cognition I

Which of the Familiar Fractions $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ Are Represented More Precisely Than Unfamiliar Fractions on the Number Line?

Yuki Tanida, Hanazono University; Masahiko Okamoto, Osaka Metropolitan University

Magnitude representations play a crucial role in numerical cognition. For whole numbers, well-established models consistently suggest that smaller values have more precise representations. Yet, for fractions, it remains unclear which are represented more precisely. We examined fraction magnitude precision by categorizing $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ as familiar fractions and used a magnitude comparison task with number line estimation. Our Japanese adult participants performed a magnitude comparison task with a serial presentation paradigm, comparing a preceding symbolic fraction—either familiar or unfamiliar (e.g., $\frac{2}{7}$)—with a non-symbolic magnitude represented by an arrow on a number line after the symbolic fraction. The symbolic fraction appeared on the left side of the screen and the non-symbolic magnitude on the right. Bayesian analyses with informative priors tested whether each of the individual familiar fraction had lower error rates than unfamiliar fractions. Results showed that $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$ had lower error rates even after sensitivity checks (BFs > 14.252). The findings suggest that these three fractions have more precise magnitude representations than unfamiliar fractions.

Evidence for Early Automatic Detection of Symbolic Numbers as a Category: A Visual Mismatch Negativity (vMMN) Study

Petia Kojouharova, Institute of Cognitive Neuroscience and Psychology, HUN-REN Research Centre for Natural Sciences; Zahra Biabani, Faculty of Science, ELTE Eötvös Loránd University

Number representations are assumed to be automatically activated. However, this claim has been supported only by studies in which numbers are attended, task-relevant stimuli. Using the visual mismatch negativity (vMMN), an ERP signature of automatic detection of violation of regularity, we investigated this directly. In a passive OFF-ON oddball

paradigm, segments of the number 8 disappeared (OFF event) to form either a number (same category), a letter, or a character (different category), then reappeared (ON event). The within- and between-category changes could be either rare (deviant) or frequent (standard). We expected smaller vMMN, as observed in the deviant-minus-standard difference potential, for deviant within-category compared to between-category changes. Thirty participants (22.5 ± 3.5 yrs) performed an unrelated tracking task while the oddball sequences were presented. VMMN to deviant OFF events emerged for between-category (130-150 ms, 180-220 ms) but not for within-category changes, while ON-events elicited a mismatch response (250-280 ms, 280-310 ms) only after within-category deviants. The results suggest that vMMN reflects the automatic activation of number representations in the context of another stimulus category.

From Numbers to Attention: Exploring the Interaction Between Numerical Cognition and the Orienting Network Through the SNARC Effect

Sema Yıldırım, Ankara Yıldırım Beyazıt University; **Gülten Ünal**, Ankara Yıldırım Beyazıt University

The SNARC Effect (Spatial-Numerical Association of Response Codes) reflects the interaction between numerical cognition and spatial cognition, suggesting that smaller numbers align with the left space and larger numbers with the right. The current study examines how numerical magnitude influences orienting attention, the process of directing attention to specific spatial locations, by using a modified Attentional Network Test (ANT) and SNARC paradigm. In this study, participants will complete a spatial cueing task where numerical stimuli (1-4, 5, 6-9) precede directional arrows (left or right) at different locations (center, above, below). The study employs a 3 (numerical condition) $\times$ 3 (arrow location) $\times$ 2 (arrow direction) factorial design with repeated measures. We hypothesize that congruent numerical-spatial pairings (e.g., small numbers-left, large numbers-right) will facilitate faster reaction times, whereas incongruent pairings will induce cognitive conflict, leading to slower responses and increased errors. Expected findings aim to deepen our understanding of the relationship between numerical cognition and orienting attention, contributing to broader research on spatial-numerical associations and attentional networks.

Evidence for Varying Levels of Task Conflict in the Gestalt Stroop Task

Ronen Hershman, University of Innsbruck; **Eldad Keha**, The Hebrew University; **Lisa Beckmann**, Ludwig-Maximilians-Universität München; **Avishai Henik**, Ben-Gurion University of the Negev; **Ayelet Sapir**, University of Greenwich

In the color-word Stroop task, participants identify a word's color while ignoring its meaning, leading to two types of conflict: Information conflict arises from processing contradictory information, shown by faster reaction times (RTs) in congruent trials than in incongruent ones. Task conflict reflects the added effort of performing two tasks, which is evident in faster RTs in neutral trials than in congruent trials (reverse facilitation). In the Gestalt color-word Stroop task, participants are presented with colored segments that could be perceived as words. Slower RTs in incongruent trials suggest involuntary word reading and reverse facilitation, indicates increased effort when reading takes place. Across three further experiments using the color-digit Stroop task, we varied the difficulty of processing irrelevant stimulus dimensions. Information conflict remained stable, but task conflict increased with processing difficulty, suggesting it depends on cognitive resources allocated to the irrelevant task. Our findings highlight that suppressing automatic processes is limited—even when the irrelevant task is demanding, it still occurs.

Three-Minute Number Line Estimation Tasks

Hanit Galili, Haifa University; **Avishai Henik**, Ben-Gurion University of the Negev

The number line estimation task has gained considerable attention as a potential tool for assessing and predicting students' mathematical competence. Traditionally, participants position numbers on a line starting at 0 to a fixed endpoint (e.g., 1, 100 or 1000). A small, predefined set of numbers is used, which may introduce learning effects in repeated administrations and may limit predictive validity. We introduce a novel time-limited version where participants position as many numbers as possible from a large set of numbers within a fixed time. A mixed version further varies endpoints on a trial-by-trial basis. Comparing a 3-minute mixed task to multiple blocked tasks with fixed endpoints, we show that the mixed task can effectively replace

multiple assessments. Results reveal faster and more accurate estimations for whole numbers than fractions. Percentage Absolute Error (PAE) and response times remain stable across traditional and time-limited tasks, suggesting PAE is a robust measure unaffected by time constraints. While number line tasks correlate strongly (0.61-0.74), their correlations with two math performance tasks were weaker. The latter correlations question the use of this task as a predictor of math performance.

Task-Dependent Nature of the SNARC Effect: A High-Powered Investigation in Turkish Participants

Hakan Çetinkaya, Yaşar University; Seda Dural, İzmir University of Economics; Merve Bulut, Yaşar University; Ayşenur Cendemir, İzmir University of Economics; Melike Şefikoğlu, İzmir University of Economics; Beria Haugen, University of Minnesota

The SNARC (Spatial-Numerical Association of Response Codes) effect refers to faster left-hand responses for small numbers and right-hand responses for large numbers, a robust phenomenon in left-to-right reading Western cultures. However, findings from Turkish participants, who also read left to right, have been inconsistent, suggesting that task design, statistical power, and measurement precision may influence the effect. We examined spatial-numerical associations in Turkish participants using diverse tasks, and high-powered experimental designs to investigate this. In Experiment 1, we assessed the SNARC effect in parity judgment (PJ) (N=92) and magnitude classification (MC) (N=106) tasks. Experiment 2 employed modified go/no-go versions of both PJ (N=66) and MC (N=66) tasks to manipulate spatial-numerical positioning. A reversed SNARC effect emerged in the PJ, while the typical SNARC effect was observed in the modified PJ. No SNARC effect was found in the MC, but it appeared in the modified MC. These results indicate the role of the methodological factors in shaping the SNARC effect and highlight its task-dependent variability.

Do Mathematicians Process Numbers Uniquely? A Multilab Preregistered Study on Automatic Number Processing in Experts and Controls

Mateusz Hohol, Jagiellonian University; Martyna Sroka, Jagiellonian University; Michał Obidziński, Jagiellonian University; Roland H. Grabner, University of Graz; Michaela Meier, University of Graz; Mariagrazia Ranzini, University of Padova; Krzysztof Cipora, Loughborough University

Understanding individual differences in mathematical skills remains a key challenge in numerical cognition. Relatively little is known whether mathematicians differ from controls in elementary number processing. Studies have mostly shown no such differences (except for the SNARC effect). However, most studies used tasks in which participants intentionally processed the semantics of stimuli. Humans do automatically process numerical information even if they are not required to process any semantic aspect of the numbers. Surprisingly little is known whether professional mathematicians differ from controls in such automatic processing. In a preregistered (<https://osf.io/wfyqd>) multilab (Krakow-Loughborough-Graz-Padova) study, we are testing the dimensions of automatic number processing: Color SNARC and color judgements on equations, Size and Ordinal Congruity effects. Our sample includes PhD students and postdocs in math matched with controls (education level, age, gender, and IQ). Our study, set to complete data collection in June, will provide missing evidence on automatic number processing and has a chance to bring new theoretical insights into our understanding of individual differences in math skills.

Magnitude Discrimination and Its Stability in House Cricket (*Acheta Domesticus*)

Bartosz Baran, Jagiellonian University; Julia Klimecka, Jagiellonian University; Krzysztof Cipora, Loughborough University; Mateusz Hohol, Jagiellonian University

Magnitude discrimination—the ability to perceive and differentiate quantities—is key to numerical cognition. While well-studied in vertebrates, it remains underexplored in insects. Evidence suggests invertebrates process magnitudes similarly to vertebrates, yet research has focused on a few evolutionary distinctive species. This study examines magnitude discrimination and preference stability in *Acheta domesticus*. In a preregistered study (<https://osf.io/cs6y3>), thirty adult crickets were tested over seven days in an arena (50×35×25 cm) with two visual stimuli: a thin (2 cm) and a thick (4 cm) black stripe. After a 5-minute habituation period, each cricket underwent a 5-minute free exploration test. Behavioral data—including initial choices, time spent near each stimulus, and movement patterns—were analyzed. Contrary to predictions, crickets showed a significant preference for the thin stripe, spending

more time near it and visiting it more frequently. These findings provide insights into magnitude processing in a non-social insect, offering evolutionary comparisons with well-studied species and contributing to research on insect numerical cognition.

Math and Verbal Fluency Across Adulthood: Insights Into Aging and Individual Differences

Yarden Gliksman, Ruppin Academic Center; Sharon Naparstek, Bar Ilan University

Life expectancy is increasing, raising concerns about cognitive aging. While cognitive abilities decline with age, the extent varies across domains. This study examined the effects of aging on math and verbal fluency. Math fluency was assessed with an oral test and the BGU-MF (Ben Gurion University Math Fluency) computerized test, which measures reaction times. Verbal fluency was evaluated with semantic and phonological tasks. Results showed that math fluency declined with age in both oral and computerized tests, with addition being least affected and division most affected. Verbal fluency also declined but to a lesser extent. Individual differences, including education, time since retirement, executive functions, and processing speed, influenced math fluency, highlighting the role of cognitive reserve. These findings support neurocognitive aging models emphasizing the importance of maintaining proficiency to preserve cognitive abilities. Addressing numerical difficulties in older adults through targeted interventions could enhance quality of life and independent functioning.

Mid-Sagittal Expression of the SPoARC Effect: Sustainability of the Cultural Assumption?

Lucie Attout, Université de Genève; Suzanne Lefevre, Université de Montpellier Paul-Valéry; Pom Charras, Université de Montpellier Paul-Valéry

Spatialization in numerical cognition (SNARC effect) and working memory (WM) (SPoARC effect) has been studied separately. While the cultural explanation for the SNARC effect, associating quicker left hand responses to small numbers and right hand responses to large numbers, is debated, this is not the case for the SPoARC effect, which aligns sequence items in WM spatially (start on the left, end on the right), directionality largely influenced by reading

experience. The present study aims to challenge the cultural account of spatialization in WM, by testing whether the SPoARC effect can manifest along the mid-sagittal axis (organization from close to far space) by using a single three-phase paradigm assessing at the same time both effects on the horizontal and mid-sagittal axes in a group of 51 healthy adults. In addition to replicate the effects documented in existing literature, such as a SNARC effect on both axes, we also identified a SPoARC effect on the mid-sagittal axis. Crucially, we observed a correlation between numerical and WM spatialization inside of a same axis. This challenges the cultural influence on the SPoARC effect, as a mid-sagittal representation is hard to attribute solely to cultural influences or practices.

Learning & Memory I

Numbers in the Brain: How Linguistic Experience Shapes the Neural Representation of Numbers

Silvia Angela Mansi, Department of Brain and Behavioral Sciences, University of Pavia; Valentina Bianco, Department of Brain and Behavioral Sciences, University of Pavia; Paola Previtali, Department of Brain and Behavioral Sciences, University of Pavia; Laura Ciaccio, Department of Brain and Behavioral Sciences, University of Pavia; Chiara Catalano, Department of Brain and Behavioral Sciences, University of Pavia; Tommaso Vecchi, Department of Brain and Behavioral Sciences, University of Pavia; Marco Marelli, Department of Psychology, University of Milano-Bicocca; Luca Rinaldi, Department of Brain and Behavioral Sciences, University of Pavia

The nature of numerical representations, whether abstract and notation-independent, still sparks a fervent debate in the numerical cognition field. Recent behavioral evidence using distributional semantics have challenged the abstract coding view, showing that linguistic experience accounts for notation-dependent distance effects. This study examines whether linguistic priors also account for neurophysiological responses, using EEG in healthy adults. EEG data from 64 channels were recorded while participants completed three tasks: (1) passive viewing of single digits, (2) sequential number comparison, and (3) simultaneous number comparison. Representational Similarity Analysis (RSA) was used to determine whether neural patterns align with predictions from distributional semantic

models. Preliminary analyses replicate the behavioral pattern observed in previous studies, with linguistic priors predicting performance better than real numerical distance. Importantly, EEG patterns also align better with the linguistic distribution of numbers. Behavioral results confirm that. These findings challenge the amodal representation of numbers, calling in turn for more comprehensive accounts integrating the role of experiential priors.

Is It Space, Time, or Something Else? Exploring Event Segmentation in Long-Term Recall

Jamie P. Cockcroft, University of York; Akshata Sheth, University of York; Matthew R. Logie, Université Paris-Saclay; Aidan J. Horner, University of York

Research suggests that spatiotemporal boundaries enhance recall (Logie & Donaldson, 2021). However, it remains unclear whether this benefit arises from the boundaries themselves or how they allow for post-encoding processes (e.g., elaborative rehearsal). Across two experiments, participants viewed words in a virtual environment under three conditions: (1) non-segmented, with continuous word presentation in the same room; (2) segmented, with a new room every four words, introducing spatiotemporal boundaries; and (3) non-segmented (time), with word presentation in the same room, but with structured pauses to match the segmented condition's encoding block time. Both experiments demonstrated better recall in the segmented and non-segmented (time) conditions compared to the non-segmented condition, with no difference between the segmented and non-segmented (time) conditions. These findings suggest recall benefits in prior work may reflect post-encoding processes rather than the presence of boundaries per se. Ongoing experiments aim to determine whether these effects result from elaborative rehearsal processes, the replenishment of encoding resources, or a drifting temporal context.

The Influence of Negative Emotion on the Temporal Compression of Events in Episodic Memory

Charline Colson, University of Liège; Gaëlle Panneels, University of Liège; Arnaud D'Argembeau, University of Liège

Recent studies have revealed that the continuous flow of information that characterizes naturalistic events is temporally compressed in episodic memory, so that

remembering an event takes less time than the duration of the past episode. However, the specific characteristics of an event that influence its temporal compression in memory remain poorly understood. In the present study, we examined the extent to which the emotional nature of events impacts their rate of compression in memory representations. We conducted two experiments in which participants were instructed to mentally replay a series of videos depicting negative or neutral events. The results showed that the course of emotional events was less compressed in memory than that of neutral events: the time taken to mentally replay a video, relative to the actual video duration, was significantly longer for negative than for neutral videos. In addition, compression rates were predictive of the subjective quality of memory. Taken together, these results suggest that negative emotion increases the sampling rate of the units of experience that represent the course of events, leading to a lower compression of events in memory representations.

Cognitive Load and Procedural Learning in a Virtual Environment: Exploring the Impact of Secondary Tasks on Learning Phases

Anaïs Raison, Univ. Brest, Lab-STICC, CNRS UMR 6285; Nathalie Le Bigot, Univ. Brest, Lab-STICC, CNRS UMR 6285; Olivier Augereau, ENIB, Lab-STICC, CNRS UMR 6285; Franck Ganier, Univ. Brest, Lab-STICC, CNRS UMR 6285

Procedural learning involves distinct phases, shifting from effortful processing to automatization. Using a dual-task paradigm, this study examines how different secondary tasks influence these learning phases. Thirty participants completed a procedural task in virtual reality while simultaneously performing one of three secondary tasks engaging various aspects of information processing: simple reaction time, go/no-go, or choice reaction time. Results confirm progressive performance improvement in the primary task and reduced mental effort. Secondary task reaction times varied across some phases, reflecting cognitive resource allocation shifts. When comparing reaction times in dual-task versus single-task conditions, only complex secondary tasks (go/no-go, choice reaction time) showed increased reaction time in early phases and no difference in the late phase. This suggests differential cognitive load interference based on task demands and learning progression. Findings are discussed in line with a proposed model, which aims to identify learning

phase progression in real time and optimize virtual learning environments based on individual learner needs.

Survival Shapes Memory: Resistance of High-Value Stimuli to Intentional Forgetting

Andres E. Zerpa, Universidad de La Laguna; Veronica Benitez, Universidad de La Laguna; Shivani Daryanani, Universidad de La Laguna; Maria A. Alonso, Universidad de La Laguna

Adaptive memory suggests that memory systems prioritize survival-relevant information. While much research has examined its preferential recall, less is known about its resistance to intentional forgetting. This study tested whether stimuli with intrinsic survival-value are less susceptible to forgetting. We hypothesized that high-survival-value would be more resistant due to their adaptive significance. Two experiments focused on key survival dimension: obtaining food and avoiding death. Using the item-method directed forgetting paradigm, we compared memory performance for words with high and neutral survival relevance. Results showed that high-survival-value stimuli exhibited enhanced recall and recognition, indicating resistance to intentional forgetting. These findings suggest that intrinsic survival relevance play a distinct role in memory, shaping how information is retained or discarded.

Self-Reported Strategies of Time Monitoring in Time-Based Prospective Memory

Gianvito Laera, Faculty of Psychology and Educational Sciences, University of Geneva; Adriana Rostekova, Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva, Switzerland; Chiara Scarampi, Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva, Switzerland; Charikleia Lampraki, Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva, Switzerland; Nora Turoman, Faculty of Psychology and Educational Sciences, University of Geneva; Emilie Joly-Burra, Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva, Switzerland; Melanie Mack, Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva, Switzerland; Andreas Ihle, Centre for the Interdisciplinary Study of Gerontology and Vulnerability, University of Geneva, Switzerland; Matthias Kliegel, Faculty of Psychology and Educational Sciences, University of Geneva; Sascha Zuber, Centre for the Interdisciplinary

Study of Gerontology and Vulnerability, University of Geneva, Switzerland

This study investigates the role of self-reported strategies in time-based prospective memory (TBPM) tasks, focusing particularly on participants' awareness of the strategies engaged in the tasks. So far, research mainly used predefined sets of strategies; this study takes a novel data-driven approach by asking participants to spontaneously report their strategies after completing TBPM tasks. Across three experiments with a pooled sample of more than 300 participants, individuals performed TBPM tasks embedded within a lexical decision task. A post-task questionnaire assessed whether and how participants monitored time. Verbal reports were analyzed using textual analysis and hierarchical clustering to categorize the strategies, while correlation analyses examined the relationship between self-reported strategies, time-monitoring behavior, and TBPM performance. The results will be discussed in light of recent theoretical advancements in the literature of prospective memory, focusing on the typologies of spontaneous time-monitoring strategies, and on how individuals naturally manage TBPM tasks. This study can be part of the theoretical foundations supporting time management interventions and cognitive support strategies.

Sequential Changes in Reward Prospect Modulate Cognitive Control Even With Implicit Learning of Reward Cues

Kerstin Fröber, University of Cologne; Sarah Wilts, University of Cologne

Reward prospect modulates cognitive control, promoting either more stable or more flexible behavior depending on the immediate reward history: Previous studies have shown that specifically remaining high reward prospect enhances stability, as reflected by reduced voluntary task switching. However, it remains unclear whether sequential changes in expected reward magnitude influence only conscious control processes or also affect behavioral stability without explicit awareness of these changes. In this study (n=42), we used a voluntary task-switching paradigm with cues announcing varying reward prospects. However, the meanings of the cues, indicating either high or low reward magnitude, were not explicitly instructed to participants. Results showed that participants nevertheless learned the

cue meanings, as they responded faster on high-reward trials than on low-reward trials. In addition, sequential changes in reward prospect influenced behavioral stability, with participants switching tasks less frequently specifically on "remain high" trials. These findings confirm previous results with explicitly instructed reward cues and suggest that cue meanings can be acquired implicitly, as participants were unable to report them verbally.

Investigating the Impact of Task-Switching on Simultaneous Auditory-Verbal Memory Encoding in a Free-Recall Memory Task

Sandra Hensen, RWTH Aachen University; Iring Koch, RWTH Aachen University; Patricia Hirsch, RWTH Aachen University

Previous research has shown that dual-tasks at the memory encoding stage lead to impaired memory performance. However, the cognitive mechanisms underlying these dual-task costs are yet not fully explained. In this study, we investigated how task-switching affects simultaneous memory encoding to better understand the role of cognitive control in dual-task costs. Participants switched between two visual-manual reaction-time (RT) tasks while simultaneously encoding auditory-verbal words in a free-recall memory task. Memory task performance was assessed in single-task and dual-task conditions, and it was analyzed if words encoded during switch trials of the RT tasks are less likely to be recalled compared to words encoded during repetition trials. Preliminary results ($N = 50 / 72$) showed impaired recall performance in dual-task conditions compared to single-task conditions. Moreover, recall was decreased for words encoded during switch trials compared to repetition trials, but this effect was only numerical and did not reach significance. Together, these preliminary findings suggest that dual-task costs at the memory encoding stage are due to shared capacity limitations and are not further influenced by changes in cognitive control.

Evaluating the Impact of Explicit Encoding Instructions on Verbal Learning

Helena Leach, Cardiff University; Jean Saint-Aubin, Université de Moncton; Dominic Guitard, Cardiff University

The Hebb repetition effect—enhanced memory for repeated compared to non-repeated information—is

a cornerstone of memory research, although its underlying mechanisms remain unclear. Explicit awareness has recently been proposed as a potentially crucial component of sequence learning. In four experiments, using a serial-recall task, we tested this proposition by examining the effects of explicit awareness on sequence learning. In Experiment 1, foreknowledge of a repeating word sequence did not eliminate the pool-size effect: repeated sequences were better recalled in an open pool than in a closed pool of stimuli. Experiment 2 showed foreknowledge offered no added benefit on sequence learning with an open pool. Experiments 3 and 4, using a closed pool, found foreknowledge slightly improved sequence learning, particularly for nonwords (Experiment 4) compared to words (Experiment 3). These findings suggest that explicit awareness can enhance learning under conditions of higher interference between repeated and non-repeated lists, but it is not essential for sequence learning. The implications of these results are discussed for the two prevailing models of Hebb sequence learning (Burgess & Hitch, 2006; Page & Norris, 2009).

The Role of Proactive Interference in the Phonological Similarity Effect

Xuan Ng, National University of Singapore; Winston Goh, National University of Singapore

The phonological similarity effect (PSE) posits that short-term memory is worse for acoustically similar items than that for dissimilar items. Many studies suggest the effect arises from within-list similarity, but the possible contribution of between-list proactive interference (PI) was tested by Baddeley et al. (2018) using serial reconstruction, with results supporting the within-sequence similarity account. A limitation is that reconstruction tasks may not be ideal for examining PI as providing item information may mitigate between-list interference. Another limitation is using repeated words inconsistently across conditions. The present study addressed these issues with immediate serial recall and non-repeated words. It also included a release-from-PI trial within each condition to test the PI account. Four conditions, each with four six-word lists, were created by crossing Similarity/Dissimilarity and Between/Within Lists variables. Phonological similarity was manipulated via vowels, with no repeated words. Both between and within list similarity reduced recall, but no evidence of

a release-from-PI effect was found. These results suggest a greater role of within-list similarity in the PSE in immediate serial recall.

Towards a Mega-Study of Statistical Learning: Regularity Extraction in Diverse Inputs

Natan Ilani Shames, The Hebrew University of Jerusalem; Nadav Weisler, The Hebrew University of Jerusalem; Noam Siegelman, The Hebrew University of Jerusalem

Most studies on Statistical Learning (SL)—the human ability to extract statistical regularities from sensory inputs—have focused on constrained, simplified statistical structures, limiting the field's ecological validity and our understanding of SL in real-world contexts. To address this gap, we are currently conducting the first SL mega-study, collecting behavioral data across a diverse set of statistical structures, designed to encompass a broader range of more realistic learning environments. Each participant in the mega-study is assigned to one out of twelve conditions defined by a distinct pseudo-continuous Transition Probability (TP) matrix, which determines element co-occurrence probabilities during exposure in a visual statistical learning paradigm (N=30 per condition, N=360 total). Then, in the test phase, learning is assessed via familiarity ratings for patterns that continuously vary in their level of regularity. Both the dataset and the framework for generating the statistical structures will be made publicly available, enabling secondary analyses and further extensions of the database. Data collection is currently ongoing, and the data will be available for presentation at the conference.

A Computational Companion to Human Ratings Is Available

Vittoria Dentella, Department of Brain and Behavioral Sciences, University of Pavia; Marco Marelli, Department of Psychology, University of Milano-Bicocca; Luca Rinaldi, Department of Brain and Behavioral Sciences, University of Pavia

Human ratings (HRs) are widely used in cognitive neuroscience to predict behavioral and neural responses. Yet: (1) HRs are often employed as independent variables in order to predict behavioral/neural responses in the same domain. This results in a tautological re-labeling of the phenomenon rather than in its explanation. (2) When HRs are used to predict latent responses in different

domains, HRs conceal the representations and processes involved to generate them. (3) From a practical angle, HRs are taxing to collect. We discuss domain-specific computational models (CMs), such as convolutional neural networks for image processing and distributional semantic models for language, as a complementary tool to HRs. Specifically: (1) CM-derived values are an external source of prediction to the ad-hoc cognitive process employed by humans and can be used as independent variables, avoiding tautology. (2) CMs have partially interpretable algorithmic structures and allow inferences on which experiential source accounts for the variance. (3) CMs are often freely available, facilitating access. In sum, CMs present with a set of advantages that we argue should be promoted, as they can enhance theory building in cognitive neuroscience.

Does It Take One to Know One? Statistical Learning Affects Attention in a Target Detection Task

Yoel Sheinenson, Hebrew University of Jerusalem; Tali Kleiman, Hebrew University of Jerusalem; Noam Siegelman, Hebrew University of Jerusalem

Statistical Learning (SL) enables humans to assimilate a wide range of environmental regularities, and it is thus believed to play a role across many cognitive functions. However, how SL interacts with basic cognitive systems – including perception and attention – remains relatively understudied. To better understand these interactions, we tested whether the degree to which individual stimuli predict and are predicted by other elements in a continuous stream modify their representations and the attention they garner. In two experiments (N=86 and N=89), participants were first exposed to a structured stream consisting of structured pairs of visual shapes, and were then tested using a target detection task to examine their recognition of individual shapes. In both experiments, we found that recognition RT was significantly faster for shapes presented following a shape that was generally predictive of elements during exposure (even when it predicted other shapes). In contrast, the level of predictability of the target itself was not related to its RT. These findings indicate that attention is guided by knowledge of statistical regularities, and that SL interacts with attention to help minimize uncertainty in structured environments.

Social Cognition I

Socio-Cognitive Benefits of Exposure to Visual Illusions in Patients With Psychotic Disorders

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Social interactions rely on the ability to attribute mental states to others, a capacity often impaired in individuals with psychotic disorders. Existing trainings of this ability show limited generalization, due to similarities between assessment and intervention materials. One way to address this limitation is to rely on bottom-up strategies targeting low-level processes (e.g. focusing on visual representations) in order to induce effects on higher-order representations (e.g. thoughts). In this vein, multiple-perspective illusions (e.g. an object that may appear as a square or a circle from different standpoints) could provide an opportunity to facilitate perspective-taking. Accordingly, this study evaluated the effect of exposure to such illusions on mental states attribution, using a pre-post intervention design in a group of patients with a first-episode psychosis. Analyses revealed a significant post-intervention improvement on the Faux-Pas task, a classic measure of mental states attribution. These preliminary findings support that sensorimotor trainings might generalize at more abstract levels. Our results offer opportunities for innovative training targeting social cognition in psychotic disorders.

Comparing Hindsight Bias and Cognitive Dissonance as Explanations for Choice-Induced Preference Change

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A tendency to change preferences after choosing between similar options has been extensively studied under the free-choice paradigm (Brehm, 1956). Typically, preference increases for chosen items and decreases for rejected ones, which is often explained by cognitive dissonance reduction (CD) (Festinger, 1957), since this way we convince ourselves our

decision was right. However, we propose a complementary perspective based on hindsight bias (HB), the tendency to project newly acquired knowledge onto past events (Fischhoff, 1977). In HB, the feedback we receive about the outcome updates our knowledge and we believe that we had “knew-it-all-along”. A choice we make, can be thought of as self- provided feedback – choosing or rejecting something updates our knowledge about our preferences. In two experiments, we followed CD studies by emphasizing the personal nature of a choice and asking participants for re-rating items, and HB studies by asking participants to take someone else’s perspective and recall initial ratings. In both procedures, we observed choice-consistent changes: An increase in ratings for chosen items in the HB procedure and a decrease in rating for rejected items in the CD procedure.

Preliminary Findings of Adaptive Decision-Making Performance in Stadium Simulation: Comparison Between Neutral and In-Group Disadvantageous Conditions

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The study examines adaptive decision making in football fans using a stadium simulation. 15 young adults (12F/3M) performed the task consisting of two conditions (75 trials each). Unbeknownst to participant, players in gray jerseys with white triangles and squares in the neutral condition (NC) and those in rival and favorite team jerseys in outgroup (rival team)-advantage condition (OC) are associated with high (HP, 60%) and low (LP, 40%) reward (GOAL) probabilities, respectively. Participants were instructed to pick a player in each trial where their choice would result in a GOAL or OUT and try to score as high as possible. Each GOAL/OUT received positive

(applause) or negative (booing) auditory feedback with 1 point on the scoreboard. We calculated net scores subtracting the disadvantageous choices from advantageous ones for both conditions. We expected lower net-scores in OC. Wilcoxon test showed reduced net-scores in OC (-2), relative to NC (8) ($p = .040$). Our preliminary findings revealed that net scores decreased when team-related cues were present, indicating an impairment in adaptive decision-making. The study was supported by Scientific and Technological Research Council of Turkey (TUBITAK, Grant Number 223K217).

An Adapted Privileged Knowledge Task to Discriminate Perspective Taking Abilities Among Neurotypical Adults

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Perspective taking—the process that enables one to represent others' mental states by adopting their point of view—is essential for effective social interaction. Yet, its measurement in neurotypical adults is challenging because most tasks were developed for children or clinical populations. To overcome this limitation, we designed a privileged knowledge task that elicits variability among healthy adults. In this task, participants observe a card game and judges whether a given player expects to win, while sometimes having access to the opponent's hand (i.e. the privileged knowledge). The primary measure is an egocentric bias score (reflecting decisions influenced by the participant's privileged knowledge), complemented by response times indexing inhibitory processes. Preliminary results from four experiments (three completed, one ongoing; $N > 300$) suggest that the task allows to discriminate perspective-taking performance. Following further exploration of its convergent validity in future studies, these findings could facilitate investigations of perspective-taking modulators in both healthy and subtly impaired populations, advancing our understanding of the organization of social cognitive capacities.

Brain-To-Brain Coupling Forecasts Future Joint Action Outcomes

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Successful joint action entails sharing a common goal while incorporating feedback to adjust performance. We examined whether brain-to-brain coupling patterns could predict performance in a time estimation task that requires two players to cooperate. Participant pairs synchronised button presses after converging on a shared representation of short, medium, and long time intervals while utilizing feedback to adjust responses. We used EEG-hyperscanning and focused on post-feedback brain activity. We found that negative feedback led to increased frontal mid-line theta activity. Moreover, a correlation in post-feedback theta power between players forecasted failed joint action, while an anti-correlation forecasted success. Feedback induced theta activity is thought to reflect network changes underlying behavioural adjustment. We propose that temporally coupled feedback-related brain activity between two individuals serves as an indicator of redundancy in adjustment of a common goal representation. The anti-correlation of this activity reflects cognitive strategic mechanisms that ensure optimal joint action outcomes. Rather than a paired overcompensation, successful cooperation requires flexible strategic agility from both partners.

The Perception of Eye Contact Is Associated With Men's Need to Belong, Self-Esteem, and Loneliness

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Direct gaze can signal affiliation and acceptance in social interaction. We investigated whether eye contact perception, measured by the cone of direct gaze (CoDG; a range within which slightly averted gaze is accepted as direct), predicts the need to belong (NTB). We also explored whether NTB strength acts as a mediator and/or a moderator through which CoDG width affects levels of self-esteem and loneliness. Participants ($N = 367$; UK) completed an online eye contact judgment task, judging whether a neutral face was looking at them or not (gaze directions: 0° , 2° , 4° ,

6°, or 8° left/right). Their NTB, self-esteem, and loneliness were then measured. Pearson correlation, serial mediation, and moderated mediation analyses were conducted. In men, a narrower CoDG predicted higher NTB, lower self-esteem, and greater loneliness, but this pattern was not observed in women. Moreover, in men, NTB mediated and moderated the effect of a narrow CoDG on self-esteem and loneliness. The findings suggest that interpreting ambiguous social cues in a more affiliative manner or fostering inclusive networks, may enhance men's self-esteem and reduce loneliness. Future research should also identify factors linking CoDG to socioemotional traits in women.

Racialised Gaze-Cueing Among Black and White British People

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In social interactions, people tend to shift their attention in alignment with others, and this can be influenced by other social factors. People tend to be quicker and more accurate in response to information presented at locations that are cued by gaze. The social construct of race has been shown to moderate this effect. This present research investigated the robustness of the gaze-cueing effect in a British population. Further, understanding of mechanisms behind any racial processes was explored via use of the secondary measures of implicit racial bias, explicit racial identity, and self-esteem. Contrary to previous results, in this sample, it was Black participants (n=56) who demonstrated an ingroup bias in gaze-cueing, whilst White participants (n=56) showed no preferential variance. The secondary measures did not influence the direction of these results. Overall, these findings highlight the importance of understanding intergroup variability as it pertains to the manifestation of racialised gaze-cueing. Future research looks to explore racialised gaze-cueing in the UK among different age groups to consider a developmental approach and consider other factors like environmental diversity and the role of trustworthiness.

Cognitive, Affective, and Spatial Perspective-Taking in Children and Adults With Cerebral Visual Impairments

Perside Ngani, Sorbonne-Université; Sylvie Chokron, Université de Paris-Cité; Malika Auvray, Sorbonne-Université

Perspective-taking, i.e. our ability to adopt another's perspective, is a distinct feature in social interactions. It involves distinguishing between self versus other people's intentions (i.e., cognitive), emotions (i.e., affective), and visuospatial experiences. Presently, the data on the relationship between the cognitive, affective, and visuospatial perspective-taking constructs remains scarce. Our study investigates whether individuals with cerebral visual impairments (CVI) experience difficulties in spatial, cognitive and affective perspective-taking. Perspective-taking abilities in adults and children were investigated using Theory of mind batteries and measures that allow the comparison of self versus others' emotions in affective scenarios. The graphesthesia task, developed by our team, allowed investigating people's ability to perceive other spatial viewpoints through touch. Our data compares perspective-taking performance in CVI to that of control participants. This study yields insights into CVI's capabilities at the visuo-spatial, cognitive, and affective levels, and contributes to the research tackling the direction of the link between the visuospatial, cognitive and affective perspective-taking.

Cognitive Ageing

How Memory Links Objects by Actions: Neural Dynamic of Encoding-Retrieval Similarity in Younger and Older Adults

Véronique Huffer, Saarland University; Axel Mecklinger, Saarland University; Roni Tibon, University of Nottingham

Action relations between visually presented objects can facilitate the creation of a joint representation that supports retrieval. This study examined the neural correspondence between encoding and retrieval of action-related vs. unrelated object pairs in younger and older adults. Participants (N = 47) studied semantically unrelated object pairs, arranged to either afford an action (e.g., a milk bottle above a shoe) or not (e.g., a shoe above a milk bottle), and later distinguished between old, recombined, and new pairs. EEG-based encoding-retrieval similarity was analysed to assess trial-based correspondence across mnemonic phases and its modulation by action relations and age. Across both age groups,

greater similarity emerged for action-related vs. unrelated pairs in the 300–500 ms time window, linked to item familiarity. No significant effects were found in earlier (0–300 ms) or later (500–800 ms) windows. These results suggest a familiarity-based item representation at encoding, reinstated at retrieval, with no age-related differences.

Pupillary Responses in Healthy Aging: Investigating the Role of Automatic and Controlled Processing

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In late life, cognitive decline may emerge, which involves deficits in memory, attention and executive functions. The locus coeruleus-noradrenergic (LC-NA) system has an important role in optimizing cognitive performance and its dysfunction is associated with pathological cognitive decline. Pupil size changes might indicate LC-NA dysfunction but results on pupil dilation and cognitive decline are conflicting, as cognitive effort could function as a confounding variable, potentially masking LC-NA system deficits. In our study, we investigated whether age-related differences can be observed across tasks relying on cognitive control processes to different degrees. For this purpose, we compared the pupil responses of elderly and young adult participants during an n-back and an auditory change detection task. According to our results, elderly participants showed a decreased pupil response during the n-back task and when detecting subtle auditory changes. In contrast, no group differences were observed for salient auditory changes. Our results suggest that age-related differences in pupil dilation are linked to task requirements. These patterns of selective impairments can provide insights into the underlying neural mechanisms.

What Semantic Clues Distinguish Early Alzheimer's Disease From Depression in Aging?

Isabelle Simoes Loureiro, UMONS; Sandra Invernizzi, UMONS; Laurent Lefebvre, UMONS

Distinguishing Alzheimer's disease (AD) from depression in the elderly is challenging due to overlapping cognitive and affective symptoms.

Semantic memory (SM) assessment provides key insights, as impairments differ between these conditions. This study included 101 participants: 40 with early-stage AD (73.43 ± 4.3 years, $MMSE = 24.3 \pm 3.0$), 20 elderly individuals with depression (68.05 ± 6.8 years, $MMSE = 26.7 \pm 2.1$), and 41 controls (67.63 ± 4.5 years, $MMSE = 28.5 \pm 1.2$). Assessments covered psycho-affective measures (STAI-S, STAI-T, GDS, McNair) and semantic tasks (fluency, WAIS vocabulary, mini-QCS, Camel and Cactus Test). Age was included as a covariate ($p < 0.001$). MMSE scores were lower in AD ($p < 0.001$). Psycho-affective measures did not differentiate groups, except for depression ($p = 0.003$), but post-hoc tests found no difference between AD and depression. Cognitive complaints followed a similar pattern. Notably, semantic fluency ($p = 0.004$) distinguished AD from depression. In conclusion, a detailed semantic profile, particularly fluency, helps differentiate AD and depression. Further studies with larger samples and neuroimaging are needed to refine diagnosis and guide interventions.

Menopause Symptoms Linked to Poorer Processing Speed and Self-Reported Executive Function in Mid-Life Women

Karen Barnor, University of Nottingham; Chhanda Karmaker, University of Nottingham; Prerita Chawla, University of Nottingham; Lucy Cragg, University of Nottingham; Harriet Allen, University of Nottingham

During menopause transition, some women experience executive function (EF) challenges and menopause-associated symptoms. We asked whether menopause stage influenced women's self-reported problems with executive functions and report some initial results from an objective lab-based comparison study. 750 women aged 40–69 years were surveyed. Participants self-reported executive functioning using Behaviour Rating Inventory of Executive Function-Adult version (BRIEF-A). Perimenopausal women reported significantly worse executive functions in comparison to premenopausal women ($p < .05$, ANCOVA controlling for age). A second group of women (177 women aged 35–65 years) carried out objective computer-based tests of EF. There was a positive correlation between processing speed and menopause symptoms as measured by the Greene Climacteric Scale ($r(177) = .221, p < .01$). Both studies showed a positive correlation between menopause symptoms and self-reported EF. Women

in perimenopause are reporting worse executive functions, and this might be at least partially underpinned by a decrease in processing speed as they enter perimenopause. Better understanding of this relationship may help support women experiencing cognitive difficulties in everyday life.

Does More Mean Faster? The Influence of the Number of Semantic Features on Word Recognition in Young and Older Adults

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Semantic features are the attributes used to describe a concept (e.g., dog : <barks>, <has four legs>, <is an animal>). The number of features (NoF) has been shown to facilitate visual word recognition in young adults. Since previous work suggests that semantic memory network undergoes age-related changes, the present study aims at investigating whether and to what extent the NoF effect in visual word recognition changes during aging. To do so, 54 young adults (M = 21.4 years) and 52 older adults (M = 69.7 years) performed a go/no-go lexical decision task and completed vocabulary tests. Based on a preliminary study, we selected 130 concrete French nouns, 65 of which had a high NoF and 65 with a low NoF. We matched these two sets based on several linguistic characteristics. Analyses conducted with mixed-effects models showed that high-NoF words were responded faster than low-NoF words, with a larger effect in young than in older adults. This NoF x Age interaction remained significant after controlling for vocabulary. Our findings suggest that the high-NoF advantage still benefits older individuals, albeit to a lesser extent, which we discuss in terms of changes in semantic networks during aging.

Language Control With Ageing in Heritage Language Speakers: Cued and Voluntary Language Switching Contexts

Zlatomira Ilchovska, University of York; Farah Nazir, University of York; Angela de Bruin, University of York

Bilingual language control in ageing has mostly been studied through tasks posing high demands on switching. In comparison, voluntary switching (dense code-switching) has been argued to recruit less language control (Green & Abutalebi, 2013). Previous research has suggested older adults' difficulties with

(proactive) language control depend on the type of switching context: they might be most pronounced during cued switching tasks that place higher demands on language control and might be reduced or absent during voluntary code switching (de Bruin et al., 2020). As part of a larger project on ageing and multilingualism, we here investigate how age influences reactive and proactive control in different switching contexts. We focus on understudied heritage-language speakers (target N = 120 younger and 120 older Pahari-Pothwari (Indo-Aryan:Pakistan/Kashmir/UK) speakers, data collection ongoing). Participants named pictures in response to external cues, instructing them when to use English or Pahari-Pothwari (cued switching), and in tasks where they could use the two languages freely (voluntary switching). We will present data discussing the impact of context and ageing on reactive and proactive language control.

Age-Related Differences in Information Control, but Not in Task Control in the Color Word Stroop Task

Eldad Keha, kibbutz givat brener; Daniella Aisenberg, Ruppin Academic College; Shachar Hochman, University of Surrey; Eyal Kalanthroff, Hebrew University of Jerusalem

Older adults were found to struggle with tasks that require cognitive control. One task that measures the ability to exert cognitive control is the color-word Stroop task. Almost all studies that tested cognitive control in older adults using the Stroop task have focused on one type of control – Information control. In the present work, we ask whether older adults also show a deficit in task control. To that end, we tested older and younger adults by isolating and measuring two types of conflict – information conflict and task conflict. Information conflict was measured by the difference between color identification of incongruent color words and color identification of neutral words, while task conflict was measured by the difference between color identification of neutral words and color identification of neutral symbols and by the reverse facilitation effect. We tested how the behavioral markers of these two types of conflicts are affected under low task control conditions, which is essential for measuring task conflict behaviorally. Older adults demonstrated a deficit in information control by showing a larger information conflict marker, but not in task control markers, as no differences in task conflict were found

Emotion I

Categorized Affective Pictures Database Designed for a Wide Age Range

Ilona Glebov-Russinov, Ben-Gurion University; Avishai Henik, Ben-Gurion University

Emotion recognition plays a critical role in developmental processes, shaping behavior, social interactions, and learning across various settings and age groups. Despite its importance, limited studies have developed picture databases suitable for investigating emotion recognition across diverse ages, including children as young as five years old. This study addresses that gap by creating a database of emotional pictures tailored for such research. To ensure the pictures' appropriateness for younger audiences, experts carefully screened potential pictures. Subsequently, we established normative data by presenting the pictures to adults, who rated each one on emotional category, confidence, and intensity. The result is a validated set of 566 emotional pictures, providing a valuable tool for studying emotion recognition across age groups. To evaluate the reliability of this database, we conducted a series of tests, including dividing the pictures into 14 subsets and calculating dominance measures. Correlations between subsets were exceptionally high ($r > .9$). This study offers a practical resource and a reliable framework for emotion research, bridging developmental and experimental boundaries.

Effects of Emotional Context on the Choice and Execution of Memory Strategy, and Memory Performance of Neutral Word Pairs as a Function of Age

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Memory is better for emotional stimuli, particularly negative in young adults and positive in older adults. Emotional context can either increase or decrease memory. To remember information, it is useful to use an effective memory strategy, particularly to bind unrelated elements. Less is known about whether and how the emotional context can influence the choice and execution of memory strategies. We predicted that an emotional context would capture attentional resources and, by leaving fewer resources for in-depth

encoding strategies, would lead to the use of superficial ones and reduce memory. This, would be more the case in a negative context for young adults and positive one for older adults. Young and older adults, 32 in each group, had to choose between mental imagery and repetition to memorize pairs of neutral words presented on emotional or neutral images (contexts). Emotional context did not influence the choice of strategy or free recall of neutral words pairs in neither young or older adults. In both, cued recall was lower in negative and positive context than in neutral one, but only when a mental imagery was used. This study provides new data that adds to our knowledge of the effects of emotion on memory processes.

Imageability and Emotionality Effects in Word Identification and Free Recall: Distinct or Similar Processes?

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Prior studies conducted either in the field of visual word recognition or memory have suggested that imageability interacts with word emotionality. Therefore, it is important to determine whether these effects are underpinned by similar processes. This is the aim of the present study. A total of 37 young adults successively performed a progressive demasking task (PDT) and a free recall task in which word imageability and emotionality were orthogonally manipulated in four conditions: low-imageability negative words, low-imageability neutral words, high-imageability negative words, and low-imageability neutral words. The results from both tasks showed facilitatory effects of word imageability. A main effect of emotionality was found in free recall only. Importantly, emotionality interacted with imageability in the PDT, but not in free recall. No relationships were found between PDT and recall performance. Finally, individual state anxiety was negatively linked with the recall of low-imageability negative words. These results highlight the differential effects of imageability and emotionality in word identification and recall and suggest that different underlying processes intervene in the two cognitive activities.

Motor Cognition I

Decisional Processes in Motor Response Execution: Assessing Decision Bias and Response Confidence

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Emerging evidence suggests that decision-making extends into motor response execution. This study examined the functional characterization of motor decisional components. Participants performed lexical decision tasks, categorizing strings of letters as words or nonwords, and electromyographic (EMG) traces were used to partition response times into premotor (PMTs; from stimulus to EMG onset) and motor times (MTs; from EMG onset until the button-press). In Experiment 1, the lexicality effect (slower latencies for nonwords than for words) was measured across different response bias conditions (.25, .50, or .75 of nonwords). While its PMTs component was modulated by response bias, the effect on MTs remained constant. In Experiment 2, participants provided confidence ratings for each trial. Here, different types of stimuli (i.e., high and low frequency words; nonwords varying in terms of word-likeness) produced independent effects on MTs and confidence ratings. The two experiments point to a functional independence between premotor and motor decisional components and suggest that the decisional phenomena observed during response execution cannot be entirely explained in terms of response confidence.

To Know or Not to Know? Different Decisional Dynamics in Motor-Response Execution

Elisa Fiora, University of Milano Bicocca; Michele Scaltritti, University of Trento; Simone Sulpizio, University of Milano Bicocca

In binary decision-making tasks based on (semantic) memory, people have to categorize stimuli as known or new. We investigated whether these two types of response entail different decisional dynamics at the level of motor response execution. Participants performed a lexical decision task, categorizing strings of letters either as words or nonwords via button press. Stimuli included: high-frequency words (HFs), low-frequency words (LFs), pseudowords (PWs, i.e., non-existing words derived from words by changing

one letter), nonwords (NWs, i.e., non-existing words not resembling any words), and illegal strings of letters (STRs). Electromyographic (EMG) traces were used to partition response times into premotor time (PMT; from stimulus onset to EMG burst onset) and motor time (MT; from EMG burst onset to button press). PMT was shorter for STRs, followed by HF words, LF words and NWs, and PWs. Differently, MT was comparable for HFs, LFs and STRs, which were all faster than both NWs and PWs. MT results point to a partial differentiation in the decisional processes as a function of their reliance on positive evidence (characterizing the decisions on HFs, LFs, and STRs) vs. the lack of it (characterizing the decisions on NWs and PWs).

An Extension of Sequential Sampling Models to Delayed Decision Reports

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Sequential sampling models, such as the popular diffusion model, have been successful in accounting for response time (RT) distributions and response accuracy in choice RT tasks. According to these models, evidence from perception or memory accumulates from a starting point to a threshold (one for each choice). However, it is unclear whether and how this framework can be extended to situations that impose a short delay between a commitment to a choice and the expression of this choice through actions. In such situations, subjects should maintain the chosen response in working memory, and wait for the signal to respond. Hence, mean RT should not be affected by stimulus properties such as discriminability and duration. We tested this hypothesis using a variant of the random dot motion task in which a 7s delay was imposed between the offset of the stimulus and the onset of the response signal. Empirical results from two experiments revealed a significant modulation of mean RT by the discriminability and duration of the stimulus. To account for these findings, we propose an extension of the sequential sampling model framework that integrates recent developments in decision-making, motor control and working memory research.

Neural Mechanisms of Motor and Auditory Predictive Signals to Visual Cortex

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Sensory evoked responses are reduced for stimuli triggered by actions relative to identical stimuli triggered externally (sensory attenuation). This is assumed to be due to prediction signals sent from motor to sensory regions. However, predictions can also be associated with sensory events. Here we examined whether motor and auditory predictive signals share common mechanisms. In an EEG study (n=30) participants learned the coupling between button-presses (BP)/sounds and pictures. Visual evoked response (P100) was smaller for pictures cued by BP vs. sound even before outcome predictions were formed. We found no interaction between cue-type and learning stage, suggesting experience influences P100 magnitude similarly across cues. Next, we examined the anatomical distribution of motor and auditory predictive cues using fMRI (n=14; ongoing). Visual cortex was sensitive to the presence of predictive cues, as well as cue type. Furthermore, BP, but not sounds, influence visual cortex even in the absence of visual stimulation. Together these studies suggest that both motor and sensory predictive cues affect sensory regions, in addition to a global influence unique to actions that is irrespective of coupled visual outcome.

Saccade Metrics During Perceptual Decision-Making Are Modulated by the Quality of Sensory Evidence

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Eye movements express our decisions of what to look at. There is a vast literature showing that saccadic response time reflects the output of a decision process that accumulates sensory evidence over time

until an action-triggering threshold. According to this processing scheme, saccade metrics such as duration and vigor should not be modulated by the quality of sensory evidence. To test this hypothesis, participants (n=27) viewed a random-dot kinematogram presented at the center of an ultra-wide computer screen, and were instructed to report the direction of motion (leftward vs. rightward) by making an eye movement to one of two peripheral choice targets. The quality of sensory evidence was manipulated by randomly varying motion coherence (0, 4, 13, and 50 %) within blocks of trials. We also manipulated the eccentricity between the stimulus and the lateral targets (8, 16, 24 degrees) in separate blocks. Contrary to the above hypothesis, saccade duration and vigor were modulated by the quality of sensory evidence, and the magnitude of this modulation increased as target eccentricity increased. We discuss these results in light of recent integrated decision and action models developed for the musculoskeletal motor system.

Attention & Cognitive Control I

Cognitive and Affective Outcomes of a 4-Week Controlled Breathing Intervention: A Pilot Study

Serge Onyper, St. Lawrence University; **Joseph Mocerine**, St. Lawrence University; **Mark Oakes**, St. Lawrence University

Meditation and controlled breathing improve health and cognition. This study examined cyclic sighing, a breathing technique involving a deep inhale followed by a second shorter inhale and a prolonged exhale. Participants were randomly assigned to daily cyclic sighing (5 min/day) or an inactive control group for 4 weeks. Cognitive tests assessed sustained attention and working memory (Bakan Rapid Visual Information Processing Task; RVIP), processing speed (Digit Symbol Substitution Task; DSST), cognitive control and visual learning (One Card Learning Task; OCL), and recognition memory. Physiological stress/health markers were also recorded. No overall cognitive differences emerged, but the treatment group had lower heart rate, blood pressure, and electrodermal responses to an auditory stressor. Importantly, higher adherence to cyclic sighing was linked to better OCL performance along with faster responses and fewer false positives on RVIP. DSST and recognition memory remained unchanged. Improved mood was also

observed in high-adherence participants. These findings suggest consistent cyclic breathing may enhance cognition and mood, with future studies exploring longer interventions and more effective adherence strategies.

Balancing Menopause and Multiple Roles: Exploring Their Impact on Cognitive Flexibility

Chhanda Karmaker, University of Nottingham; Karen Barnor, University of Nottingham; Prerita Chawla, University of Nottingham; Lucy Cragg, University of Nottingham; Harriet Allen, University of Nottingham

Menopause involves hormonal changes that affect cognition, yet cognitive flexibility—vital for decision-making and adaptation—remains underexplored. Also, midlife women often experience role overload, balancing multiple responsibilities, which may impact cognition. We examined menopausal stage effects on cognitive flexibility, considering role overload. Preliminary results from 173 women aged 35–65 (without HRT) showed a significant interaction between menopause, switch task, and congruency ($p = .004$). None of the groups showed a switch cost on congruent trials. The pre- and perimenopause groups exhibited a switch cost on incongruent trials, with a larger effect in the pre-menopause group. The post-menopause group showed no significant switch cost on incongruent trials. This result appears to be driven by worsening performance on non-switch incongruent trials as menopause progressed. It suggests resolving conflicting information is challenging, and peri and post groups benefit less from task context. Role overload did not predict cognitive flexibility (switch cost: $r = .054$). One possible explanation is that women who perceived themselves as overloaded may stay cognitively active, compensating for negative effects on cognition.

Obstructive Sleep Apnea Syndrome: Preliminary Insight on Social Cognition Recovery With Continuous Positive Airway Pressure

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Obstructive sleep apnea syndrome (OSAS) is marked by intermittent airway obstruction during sleep,

disrupting sleep architecture, causing hypoxemia, impairing cognitive and social functioning, as well as quality of life. Continuous positive airway pressure (CPAP) is the gold standard treatment, yet its impact on cognitive recovery, especially in social processes (e.g. theory of mind, emotion recognition), remains debated. This study aims to examine CPAP's effect on global cognitive recovery in OSAS patients. To date, 22 patients with severe OSAS and 7 age- and sex-matched controls have been recruited. Neuropsychological assessments were performed at baseline and after 4 months of CPAP therapy. Preliminary results show pretreatment deficits and posttreatment normalization in social faux-pas ($F = 5.50$, $p = 0.028$) and quality of life ($F = 4.33$, $p = 0.047$). CPAP adherence is positively correlated to social recovery ($r = 0.47$, $p = 0.047$). No significant correlations were found with sleep parameters, socio-demographic, or clinical variables. These findings imply CPAP adherence is key to cognitive and social recovery, urging further investigation into factors affecting CPAP efficacy beyond traditional sleep metrics.

Congruent Sound Occurrences Influence the Visual Boundary Extension Effect in Dynamic Scenes

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Boundary Extension (BE) is a memory distortion phenomenon in which individuals recall a visual scene with a larger view than was presented. While most research on BE has used static visual stimuli, our perception frequently involves dynamic, multisensory experiences. This study aimed to determine the influence of auditory occurrences on visual BE. In each trial, participants ($n = 42$) had to memorize either a close-up or a wide-angle video clip of an everyday situation. In addition to a visual-only control condition, video clips were paired with semantically congruent sounds presented before, during, or after visual encoding. After each encoding, the video clip was presented again, in the same or an opposite view size, and participants had to compare this second presentation to their memory. Results showed that BE occurred both in the control condition and when sound was presented after encoding.

However, this effect was significantly reduced when sound was presented before or during the video clip. We propose that selective attention, source monitoring, and an adaptive need for predictions could explain our results while highlighting the importance of considering multisensory interactions in studying memory distortions.

The Impact of Dynamic Range Compression on the Intelligibility and Short-Term Memory of Speech

William Campbell, Anglia Ruskin University; Stephen Oxnard, Maridian; Ian vander Linde, Anglia Ruskin University

Hearing aids, cochlear implants and other assistive devices use Dynamic Range Compression (DRC) to enable sounds over a wide range of volumes to be perceived. To examine the impact of DRC on speech interpretability and recall, we conducted an experiment using sentences constructed from the Coordinate Response Measure corpus subject to different levels of DRC. Stimuli had two simultaneous talkers, producing an ecologically valid scenario in which distractor sounds compete for attention. Specifically, 256 sentences per talker with DRC configurations: (1) Mixed with No DRC (MN), (2) Limited then Mixed (LM), and (3) Mixed then Limited (ML). Stimuli were presented binaurally after loudness normalisation. Neurologically healthy participants (N=32, Mage=31.09, SD=13.40; 17 male) with normal hearing were recruited using opportunity sampling. Participants completed 96 trials under different DRC conditions, in which they were asked to attend to a target voice and repeat the sentence. A total of 288 responses per participant were recorded. DRC was found to significantly impact recall accuracy, $F(2)=3.52$, $p<.05$. Post-hoc tests showed MN elicited significantly lower error rates than LM and ML (both $p<.05$), with no difference between LM and ML.

Feature Binding and Error Commission

Anna Foerster, Trier University; Birte Moeller, Trier University; Maria Nemeth, Trier University; Christian Frings, Trier University; Roland Pfister, Trier University

Binding and retrieval shape action control. Features of responses and surrounding perceptual events are bound, retrieving each other upon repetition. For errors, separate data suggest binding of perceptual features (1) before responding with the not executed correct response and (2) after responding with the

erroneous response. We propose that response execution serves as an anchor for binding. A perceptual feature should bind the correct or erroneous response, depending on whether it is presented before or after responding. Participants categorized letters with three responses while an irrelevant low- or high-pitched sound was played before or after responding. Then the same or the other sound played, signaling participants to choose a second response freely and spontaneously. After an erroneous first response, sound repetitions compared to changes increased the choice for this response as the second response. Surprisingly, the timing of the sound did not matter. The data therefore unanimously support binding and retrieval of the erroneous response. Speculatively, binding with the correct response is absent when an erroneous action is planned but present when motor errors occur alongside correct action plans.

Can We Try Harder to Become More Accurate? Evidence From Dart Performance

Lynn Huestegge, University of Wuerzburg; Isabel Stein, University of Wuerzburg

Mobilizing effort via "try harder" instructions is known to improve performance in a variety of basic cognitive and motor tasks. A signature finding is a reduction of response times, sometimes (but not always) at the expense of overall accuracy. Such try harder effects are typically conceptualized in terms of a transient recruitment of spare cognitive capacity. Here, we test whether try harder instructions may also improve accuracy in a situation without any strong time constraints. To overcome limitations of accuracy measures derived from dichotomous right/wrong tasks, we resorted to assessing dart throwing performance. Participants were instructed to target the bull's eye throughout the experiment. In some mini-blocks, they were asked to try harder. Additionally, we assessed a control group without any try harder instructions. In another experiment, we implemented a within-subject design involving dart experts with an additional "try harder + reward" condition. Overall, results revealed a lack of try harder effects on accuracy, suggesting that while spare mental capacity can be recruited to improve temporal aspects of task processing, a corresponding increase of task focus does not in the same way help to improve motor precision.

Error Cancellation

Roland Pfister, Trier University; **Anna Foerster**, Trier University; **Jan Derrfuss**, University of Nottingham; **Claudia Danielmeier**, University of Nottingham; **Denis Cousineau**, University of Ottawa; **Katharina Schwarz**, Trier University

Cognitive research on error commission has traditionally focused on causes and consequences of error commission as evident in such prevalent markers as pre-error speeding and post-error slowing. In this agenda, errors are extraneous events that the cognitive system reacts to. However, recent findings indicate that human agents act remarkably fast upon errors in that they cancel erroneous actions within only about 100 milliseconds after initiating a movement. Evidence for this cancellation stems from analyses of response durations – i.e., the time between onset and offset of a keypress response – as well as event-related potentials that we analyzed time-locked to the offset of an erroneous response. These observations challenge common models of how errors affect cognition and action, and they shift our focus from initiating an action towards the termination of ongoing behavior.

Effect of Mental Fatigue on Visuomotor Adaptation in a Visually-Guided Pointing Task

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Operations relying on cognitive control, such as motor planning and preparation, are susceptible to mental fatigue. Since cognitive control is crucial for motor learning, fatigue likely impacts tasks requiring adaptation. This study examined a mouse-pointing task with a visuomotor adaptation paradigm. Participants (N = 38) performed rapid mouse movements to reach the target stimulus. Adaptation trials were presented in two blocks: one before and one after a prolonged pointing task used to induce mental fatigue. In the adaptation trials, mouse movement was perturbed by +60°, +30°, 0°, -60°, -30°. Such perturbations typically skew the direction of movement away from the optimal path requiring adaptation. In the fatigue-induction task, no such perturbations were used. Performance was analysed using several time and spatial indices, alongside subjective fatigue and Heart Rate Variability as a

physiological marker of fatigue. The results indicated motor learning effect: performance in rotation trials improved gradually. Fatigue was also enhanced based on the subjective and objective fatigue measures. However, no evidence suggested fatigue impaired visuomotor adaptation, indicating its resilience to fatigue.

The Influence of Temporal Expectancy During Cognitive Dual Tasking on Balance Control

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Cognitive-motor interference research suggests that balance control adapts dynamically to cognitive demands. Using a hybrid Psychological Refractory Period paradigm, we investigate how temporal expectancy, induced through manipulations of stimulus-onset asynchrony (SOA: 100 vs. 1000 ms), influences balance adjustments assessed as sway variability when standing on a force plate. Participants perform a visual-vocal short-term memory task and an auditory-manual reaction time task, while SOA and task load (report vs. ignore a visual object) are varied blockwise. We additionally analyze sequential SOA effects in previously submitted data, where SOA was varied trialwise. Based on the dynamic cognitive-motor interference framework, we predict that balance adjustments occur strategically before task onset and after task completion. Consequently, sway variability should be increased before and after the task with greater temporal precision when SOA is blocked or when SOA sequences allow for expectancy-based preparation. These findings will contribute to a better understanding of how predictability modulates the interaction between cognitive and motor control in dual-task contexts in the range of sub seconds.

The Impact of If-Then Plans on the Cognitive Representation of Food Stimuli

Rabia Dilawar, University of Tuebingen; **caterina gowrilow**, University of Tuebingen; **Jona Massinger**, University of Tuebingen; **Ulrike Schwarz**, University of Tuebingen

Understanding food cue responses is essential in regulating eating behavior. If-then plans to enhance impulse control by linking situational cues with

responses (Gollwitzer, 1999). This study investigates whether modal (concrete) or amodal (abstract) if-then plans influence inhibitory control over goal intentions in a stop-signal task (SST). Ninety-four participants were randomly allocated to different goal intention vs. if-then plan conditions. If-then plans either inhibited, transformed, or distanced from food stimuli (amodal) or imagined food in a consumable form (modal). Stop signal response time (SSRT) was measured through the SSRT task. Results yielded longer SSRTs on amodal plans, implying worse inhibitory control due to added cognitive effort. Modal plans generated shorter SSRTs, strengthening control. If-then plans generally yielded longer SSRTs than goal intentions, showing less effectiveness. Hunger negatively predicted SSRT, $B = -2.40$, $p < .001$, i.e., quicker stopping, in line with findings on food-cued attention (Meule et al., 2014) and motor responses (Bertonatti & Vagnoni, 2021). Findings show that modal if-then plans enhance inhibitory control and support the self-regulation of food intake and impulsive eating.

Learning Behaviors Through Verbal Versus Nonverbal Instructions – The Power of Language in Overcoming Conflict

Francois Foerster, Royal Military Academy; Salvatore Lo Bue, Royal Military Academy; Nicolas Bourguignon, Royal Military Academy

Language plays a key role in learning new behaviors with minimal practice. The instruction-based congruency (IBC) effect demonstrate how verbally instructed task rules can automatically influence how participants perform a task by showing how incongruency between rules can immediately decrease performance accuracy and latency even when these rules have never been practiced before. While several models posit that language is crucial for mapping abstract task rules onto motor programs, language is by no means the only driver of instructed behaviors. Many everyday behaviors rely on pictograms, traffic signs, or graphical assembly instructions. Here, we evaluated how pictorial versus written instructions lead to IBC effects in a congruency task. Our results show that while incongruent task-rules decrease performance accuracy in both written and pictorial formats, performance latencies in successful trials are still affected by conflict with pictorial instructions, indicating that conflict is never fully resolved when behaviors are instructed nonverbally. These findings

underpin important specificities in the way language influences learning and behavior, notably its superior utility in integrating and managing conflicting task rules.

Hierarchical Instantiation of Inhibitory Control

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Current models of inhibitory control typically see it as resulting from a race between processes generating the preponderant act and those stopping it. They typically predict better inhibition when reaction times are slow. All control processes (including inhibition) occur in the context of extended task episodes (e.g., cooking, driving, executing a block of trials). Since such episodes are controlled as one unit, their component control processes are likely to be instantiated via a common program. These programs are well-known to be instantiated at the beginning of episodes and slow down step 1 execution. If inhibitory control during task episodes is also instantiated via such programs, response inhibition would be poorer at step 1, even though its execution is slower than subsequent steps. In contrast, current accounts of inhibitory control would predict better inhibition on these slowly executed step 1s. Participants executed go/nogo trials that were organized into 8-trial-long episodes. Even though step 1 execution times were a lot slower than subsequent steps, nogo error rates were up to 50% higher ($BF_{10} = 109$). This was the case even when participants could slow down as much as they wanted before making a go response.

Unraveling Partisan Misinformation: EEG Insights Into Cognitive Bias and Flexibility

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In today's digital era, misinformation shapes political landscapes and public discourse. Research suggests that far-right individuals are less sensitive to false claims and more likely to share misinformation than moderates and liberals, but the cognitive mechanisms behind this remain unclear. This study examines whether cognitive flexibility—the ability to adapt to new information—explains differences in

misinformation sharing across the political spectrum. Ongoing EEG data collection consists of conservatives and liberals in Spain (N=100). Participants also complete a Stroop task, a cognitive conflict task assessing cognitive flexibility, and we will extract the difference in amplitude of fronto-medial Theta oscillations between conflict and congruent trials. Additionally, we will measure participants' likelihood of sharing partisan misinformation and their response to fact-checking interventions. Finally, we will compare EEG correlates of cognitive conflict across groups and examine whether these neural markers predict misinformation susceptibility. This research could provide key insights into the cognitive mechanisms shaping our interaction with political misinformation and inform more effective mitigation strategies

Effect of Eco-Anxiety on Behavioral Adaptation in the Context of the Climate Crisis

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Few studies have examined the impact of eco-anxiety on pro-environmental behaviors (PEB) and adaptation. We conducted three studies to test this relationship. In the first study, 1463 French participants completed questionnaires assessing eco-anxiety and PEB. In the second study, participants complete the same questionnaires and an AX-CPT task evaluating their preferred cognitive control strategy. In the last study, a Simon task will be performed in neutral, ecological, or personal motivational contexts. We expect both eco-motivated and eco-paralyzed participants to exhibit slower RTs in the ecological compared to the neutral context, with eco-paralyzed participants showing greater post-error slowing. Results of the first study showed that PEB correlated with eco-anxiety with a negative quadratic relationship, suggesting that high eco-anxiety levels lead to eco-paralysis. Preliminary results of the 2nd study (n = 12) show that proactive control strategy correlates negatively with PEB, and positively with eco-anxiety and trait anxiety. A negative correlation also emerges between time-on-task adaptation and eco-anxiety. Overall, these findings

may guide interventions promoting PEB while considering diverse eco-anxiety profiles.

Language & Bilingualism I

Using Fixated-Related Potentials to Investigate Prediction Error During Natural Reading

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Current theories emphasise the importance of prediction as a mechanism for facilitating efficient word recognition during reading (Pickering & Gambi, 2018). A key assumption of such theories is that readers should experience a processing cost when they predict a word incorrectly (Cevoli et al., 2022). While this effect is claimed to occur in post-N400 ERP components (Federmeir et al., 2007), evidence for such effects in eye movement studies is lacking (Frisson et al., 2017; Luke & Christianson, 2016). We investigated this issue further, using a larger item set and EEG-eyetracking co-registration to establish if a prediction error cost appears in either fixation times or fixation-related potentials (FRPs) for words during reading. Participants read sentences containing either a high or low predictable word in either strongly constraining or neutral contexts. Eye movement data show clear effects of sentential constraint and word predictability, but no evidence of a prediction error cost. FRP data are currently being analysed to determine whether they are in line with these eye movement data or similar to previous ERP data. We will also report data from older adult readers (60-80 y.o.) who participated in the same experiment.

Linguistic Synchrony and Collaboration: Exploring the Role of Games in Educational Contexts

Ayano Tsuda, Yamanashi Gakuin University

Games, when designed appropriately, are known to enhance learning (Shute & Ke, 2012). In this current study, we aimed to measure collaboration through linguistic synchrony (LS) while playing a cooperative board game. LS has been positively correlated with students' learning outcomes and collaboration (Duran et al., 2024); therefore, LS was used to explore the possible educational implications of games and

understand how games may enhance collaboration between two individuals. In this study we analyzed recorded conversation of dyads when playing a cooperative board game, along with self-reports about collaboration and emotions, to examine the relationship between perceived quality of collaboration and LS. We used cross-recurrence quantification analysis, a method for quantifying synchrony in collaborative tasks, to assess LS and examine collaborative dyadic patterns. Results from 14 pairs confirmed the presence of a leader-follower dynamic that facilitated collaboration. Additionally, LS was positively correlated with perceived collaboration and positive emotions. These findings suggest that LS can be a valuable tool for understanding effective collaboration in educational contexts using games.

Are Meanings of the Same Word Competing With Each Other In-The-Moment During Statistical Word Learning?

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Cross-situational word learning (CSWL) is a form of statistical learning where learners gradually learn word-object associations based on the co-occurrence of word and referent only. Theories disagree on how multiple meanings for words are acquired and compete during acquisition. Thus, we investigated real-time competition for multiple simultaneously acquired overlapping mappings during CSWL via eye-tracking. Participants (N = 40) acquired six 1:1 (one word to one object) and six 1:2 (one word to two objects) mappings. In each trial, they saw one word and three objects while being eye-tracked, and their task was to select the target. Notably, for 1:2 mappings, the two correct referents never appeared on the same trial. Eye movements to targets were fit to a four-point (upper and lower asymptote, slope and cross-over point) logistic, allowing us to estimate how competition impacts specific timing components of referent activation for different mapping types. In line with our predictions, preliminary results show that 1:2 mappings are harder to learn and have a lower upper asymptote than 1:1 ones, indicating that multiple referents compete across trials. In a second experiment, we will explore these learning differences in detail.

Language Proficiency Effects on Word Recognition Memory in Spanish-English Bilinguals

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Previous findings suggest that prior knowledge benefits item and extrinsic source recognition memory by freeing attentional resources at the cost of intra-item details (Bellana et al., 2021), but it is unclear whether this effect extends to word stimuli and whether language proficiency constitutes a comparable form of prior knowledge. Bilingual Spanish-English speakers completed a recognition memory task for words in their native (L1; Spanish) and second (L2; English) language. In the study phase, participants saw words surrounded by a purple or orange color frame. At test, they indicated if the words were “old” or “new”. “Old” judgments were followed by an extrinsic source test asking participants to remember the word’s frame color at study. Additionally, some of the words shown at test were synonyms of the words from the learning phase. False alarms on these synonyms trials served as a memory indicator for intra-item details. First, item and source memory were better for L2, contrary to resource-based observations. Second, false alarm rates were increased for synonyms of studied words, an effect that was smaller and proficiency-dependent in L2. The results point at more accurate and more detailed recognition memory for L2 words.

Does Prosody Enable Children to Improve Their Emotional Inference Skills When It Comes to Understanding Oral Narratives?

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Comprehension is a crucial skill, but there are disparities between students. This study examines the role of prosody in the development of the ability to infer emotions when listening to a story among Grade 3 students. Previous research suggests that prosodic elements such as intonation, rhythm and stress contribute to narrative comprehension (Blanc & Quenette, 2017). Our study examines whether marked prosody improves students' ability to infer emotions from heard texts. In this experiment, we

divided the students (N=25) into two groups, each of which was exposed to four stories in two conditions: neutral prosody and marked prosody. The students had to answer an online comprehension questionnaire as the story progressed, focusing on emotional inferences. The results indicate a significant improvement in inference scores in the marked prosody condition, particularly for emotions with positive valence. These results corroborate studies indicating that prosody facilitates the understanding and recognition of emotions (e.g., Veenendaal et al., 2014) and highlight the pedagogical value of prosodic variation in oral reading.

Systematic Linguistic Regularities Shape Geographical Knowledge

Daniele Gatti, University of Pavia; Arne Ekstrom, University of Arizona; Giorgia Anceresi, University of Pavia; Francesca Rodio, University of Pavia; Tomaso Vecchi, University of Pavia; Marco Marelli, University of Milano-Bicocca; Luca Rinaldi, University of Pavia

Geographical knowledge requires a tight binding between spatial and linguistic information. Here, we probed whether this binding can be traced back to systematic language-to-space statistical mapping. Results from two computational experiments based on more than 40.000 cities across 5 European countries revealed systematic language-to-space regularities as indexed by both basic surface-level (i.e., letters and bigrams composing the city name) and deeper (i.e., as extracted from a language model) linguistic information. Next, to test whether these statistical regularities influence geographical judgements, we asked human participants to guess the geographical location of never attested but linguistically plausible strings of letters (pseudocities). Results from three behavioral experiments indicate that participants' performance align with the prior language-to-space binding. Results were fully replicated across a computational experiment involving USA and Mexican cities as well as across a behavioral experiment involving US pseudocities. These findings not only attest the presence of systematic regularities between language and space, but also indicate that humans rely on these prior regularities when exploring new spaces.

Structure Dependent Differences in the Persistence of Syntactic Priming

Salma Gilani, University of Birmingham; Evelien Heyselaar, Radboud University; Linda Wheeldon, University of Agder; Katrien Segaert, University of Birmingham

Syntactic priming, the tendency to repeat syntactic structures across utterances, is a tool for understanding sentence production mechanisms. Syntactic priming is shown to be cumulative and long-lasting (e.g. Heyselaar & Segaert, 2022), key features that align with implicit learning. This has been shown for transitives but only in part for ditransitives. We investigated cumulative and long-term syntactic priming for both transitives (Exp 1) and ditransitives (Exp 2) in a picture-description task. In Exp 1, a mixed effects model assessed baseline passive production across both sessions, revealing a significant decrease over a week. In contrast, a generalised additive mixed model (GAMM) of cumulative passive proportions revealed that the use of dispreferred structures increased in Session B; which aligns with previous findings. Exp 2 found that priming effects did not persist nor accumulate across sessions for ditransitives. In fact, it decreased which is not in line with previous research and challenges priming expectations. Our results challenge existing assumptions about the persistence and accumulation of syntactic priming, suggesting that implicit learning effects may be structure dependent.

Neural Responses to Voice Predict Second Language Word Reading Ability

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Voice processing ability can predict reading ability in the native language. However, it remains unclear whether second language voice processing ability can predict second language reading ability and especially what the neural mechanisms underlying. Using fNIRS techniques, this study aimed to investigate the neural activation of voice recognition in both native and second languages and how these neural representations predict second language word reading ability. We recruited 30 bilinguals who speak Chinese as their native language and English as their second language and asked them to complete two voice recognition tasks (Chinese and English) while measuring frontotemporal activity. Results showed increased activation in the left inferior frontal gyrus during the second language task, indicating that more

resources are needed. Furthermore, the differences in the activation positively predict second language word reading ability. Also, participants performed better in the voice recognition task when using their first language, replicating the language familiarity effect. This study filled in the gap by providing cortical evidence regarding the relationship between second language voice processing and reading ability.

The Role of Proficiency in False Recognition With Ad Hoc Categorical, Associative, and Taxonomic Lists of Words

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The DRM paradigm, used to study memory distortions, presents word lists semantically related to a non-presented critical word, often leading to high false recognition rates. This study examines false recognition in ad hoc, associative, and taxonomic lists among Portuguese students with different English proficiency levels. A sample of 160 participants studied 12 lists, half in Portuguese and half in English. In the recognition test, half of the studied words and critical words appeared in the same language as in the study phase, while the other half were in the alternate language. Participants were divided into three English proficiency groups (A low, B intermediate and C high). Associative lists triggered more false recognition than ad hoc lists across all groups. Taxonomic lists led to higher false recognition than ad hoc lists in Group B. Associative lists also caused more false recognition than taxonomic lists in Group C. Additionally, Group A showed more false recognition when studying in Portuguese, while Group B did so when tested in Portuguese. No language effects were found in Group C. These findings suggest that list type and proficiency influence false recognition, highlighting the complexity of bilingual memory.

The Lifetime of Sequential Memory Traces in the Absence of Language

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Marseille Univ, CNRS, CRPN; Jonathan Grainger, Aix Marseille Univ, CNRS, CRPN; Arnaud Rey, Aix Marseille Univ, CNRS, CRPN

Repetition plays a fundamental role in the formation of memory traces during the learning of statistical regularities in the environment. While repetition in humans often involves verbal rehearsal to reinforce a memory trace, it remains unclear whether this process is as effective without language. Here, we investigated the dynamics of memory trace creation in the absence of language. To control for the use of verbal rehearsal strategies in learning that may influence the learning process, we tested a group of Guinea baboons in a visuo-motor pointing task, in which a target sequence was repeated with random sequences interspersed between repetitions. In this study, we systematically manipulated the interval between two repetitions of a target sequence by varying the number of random sequences inserted between repetitions (i.e. the repetition spacing). We found that baboons can learn repeated visuo-motor sequences, even when the repetitions are separated by six random sequences. Our results also suggest that the learning curve best fits a logarithmic function. The present study provides a quantified estimate of the lifetime of a sequential memory trace without the benefit of language-related refreshing and recoding strategies.

What Predicts Adult Word Learning During Face-To-Face Interaction?

Christopher Edwards, UCL; Francesco Cabiddu, Nottingham Trent University; Harriet Hill-Payne, UCL; Ed Donnellan, University of Warwick; Yan Gu, University of Essex; Gabriella Vigliocco, UCL

Research into multimodal communication and adult word learning is sparse and limited to controlled experiments that do not investigate multiple cues (e.g., gesture, prosody, gaze) together. Here we use ECOLANG, a new naturalistic multimodal corpus, to examine whether speakers' use of multimodal cues (pitch, speaking rate, representational gestures, points, object manipulations, gaze) predict their partners' learning of object names, beyond individual differences (vocabulary, working memory) and linguistic predictors (label repetitions, lexical diversity, utterance length, utterance concreteness). 33 pairs discussed 12 novel objects across 4 categories. Discussion was led by a participant who already knew about the objects (Teacher); their speech and multimodal cues were transcribed and

annotated. The second participant (Learner) was then shown images of the objects and asked to name them. Only points to the object showed a main beneficial effect on learning, but there were three interactions: representational gestures led to improved learning either when Learners' working memory was lower, or when Teachers' speaking rate was slower, while object manipulations hindered learning when Teachers named the object relatively less often.

Reading & Writing

Stability of Reading and Spelling Difficulties

Claudia Laskay-Horváth, *Doctoral School of Psychology ELTE Eötvös Loránd University; Ferenc Kemény, Department of Psychology, University of Graz*

Aim. Reading and spelling can be impaired selectively or combined. Our study examines the stability of literacy impairments and their cognitive underpinnings in Hungarian elementary school children. **Methods.** We categorized 189 children (grades 2-6) into four groups based on prior reading fluency and spelling measures: combined reading and spelling deficit (RSD), reading deficit (RD), spelling deficit (SD), and typically developing (TD) groups. Good performance was within 0.5 SD of average, while poor was below 0.9 SD. After 1-3 semesters, we reassessed literacy and reading-related skills: phonological and morphological awareness and rapid automatized naming. **Results.** The RSD group was most stable (69%), followed by the TD group (64%). Stability was low in the isolated deficit groups, with 36% of children in the RD, and 42% in the SD group remaining. SD children who improved their spelling demonstrated better phonological awareness than their peers who did not. Many RD children have changed groups but no clear pattern emerged as with SD. **Implications.** Our results support the double deficit hypothesis of dyslexia (Wolf & Bowers, 1999): The most persistent form of literacy difficulties is when both reading and spelling are impaired.

Exploring Decoding Skills in Children With Developmental Language Disorder (DLD) Using a Single-Case Experimental Design (SCED)

Samantha Ruvoletto, *University of Lorraine and ATILF (CNRS); Manon Heim, University of Lorraine; Maria Vazeux, University of Aix-Marseille and LPC; Teng Guo, Royal Holloway, University of London; Hélène Maire, University of*

Lorraine and 2LPN; Nadège Doignon-Camus, University of Strasbourg and LISEC; Lucie Macchi, University of Lille and STL; Daniel Zagar, University of Lorraine and ATILF (CNRS)

In this exploratory study, we tested two curricula for children with Developmental Language Disorder (DLD) who struggle with reading, particularly decoding. Both curricula combined two mechanisms: Statistical Learning (SL) enhanced by training on letter-syllable pairs (Vazeux et al., 2023; Guo et al., 2023); phonics Explicit Instruction (EI) on letter-phoneme pairs coupled with segmentation and fusion teaching. They differed in the mechanisms sequence: in the 'SL->EI' curriculum, 4 SL training sessions preceded 4 EI training sessions; in the 'EI->SL' curriculum, 4 EI training sessions were followed by 4 SL training sessions. A Single-Case Experimental Design (SCED; Krasny-Pacini & Evans, 2018) was employed with two French-speaking children (Mage = 9;8), one assigned to the 'EI->SL' curriculum and the other to the 'SL->EI' curriculum. We measured literacy skills (phonemic awareness and letter knowledge) and reading ability (accuracy and speed). Results were mixed regarding the optimal curriculum and progress appeared to depend on cognitive background abilities (e.g., working memory) and initial literacy skills. Further research is needed to better understand reading difficulties and response to intervention in this population.

Does Learning to Write Allographs on a Touchscreen Tablet Stimulate the Development of the Abstract Identity of Letters in 5-Year-Old Pre-Readers?

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The aim is to study the effect of a visual-motor exploration of allographs on a touch tablet to develop the abstract identity of letters in 5-year-old pre-readers. The scores in visual allograph recognition are compared between a pre- and post-test according to the exploration of the allographs on the tablet

(visuomotor: writing with a stylus; and visual: seeing the writing of a trace). In this task, we manipulated allographic variability (low -e.g. c-, high -e.g. b-) and calligraphy (uppercase script, lowercase script, lowercase cursive). While writing letters on the tablet, static and dynamic parameters are recorded (e.g. total time). Repeated measures ANOVA shows superior progression with visual exploration, particularly for allographs with high variability. These results are discussed in light of environment-subject interactions. No correlation is shown between the gain in visual recognition of allographs and the three motor components identified by principal component analysis, which suggests that motor processes do not contribute to visual processes when the shapes of letters are learned on a tablet.

The Impact of Handwriting and Typing on the Reading Acquisition Process: A Study Using an Unfamiliar Orthography

Gorka Ibaibarriaga, University of the Basque Country; Joana Acha, University of the Basque Country; Manuel Perea, Universitat de València

Although there is evidence of a negative impact of typing on letter learning in prereaders, it remains unclear how writing—by hand or typing—affects reading acquisition. One possibility is that typing provides less support for phonological recoding processes involved in writing. To examine this hypothesis, 50 kindergarteners were randomly assigned to two groups: one group learned novel letters and words by copying them by hand while listening to their pronunciations and the other group learned the same letters and words by typing them on a computer. Both groups were paired in phonological awareness skills. After the training session children performed three post-test tasks: (a) naming learned letters, (b) decoding novel words, and (c) visually identifying words. The handwriting group outperformed the typing group in all post test-tasks, and only in this group were phonological skills linked to learning outcomes. Additionally, novel word decoding accuracy predicted word identification in the handwriting group, but not in the typing group. These findings suggest that writing by hand supports phonological recoding, crucial for forming accurate word representations in memory.

Letter Position Processing Effect in Children Aged 7-11 Years' Reading of French Words Aged: Cross-Sectional Study

Céline Billot, Laboratoire de Cognitions Humaine et Artificielle, CY Cergy Paris Université; Carine Royer, Laboratoire de Cognitions Humaine et Artificielle, CY Cergy Paris Université; Mélanie Eban, Laboratoire de Cognitions Humaine et Artificielle, CY Cergy Paris Université; Hélène Labat, Laboratoire de Cognitions Humaine et Artificielle, CY Cergy Paris Université

Letter position processing difficulties have been studied in dyslexic children in transparent languages (Friedmann & Rahamim, 2007), and more recently in more opaque languages such as French (Potier Watkins et al., 2023). The aim of this research was to provide evidence for the existence of a letter position encoding module in typically developing French children, and to study the effect of this module on the reading of migratable words (e.g. /aime/ read /amie/) and migratable pseudowords (e.g. /fulte/ read /flute/) between grades 2 and 6. The scores of 180 children were also measured in standardized tasks. We hypothesize a decrease in Migration Errors (ME) between grades 2 and 6. The gap between ME producing a high-frequency or low-frequency word, with more ME for the high frequency, would increase with expertise. Preliminary analyses support the existence of ME as indicators of difficulties in the functioning of this module. Furthermore, ME differ according to school level, and can be explained by a top-down effect of the lexicon. The results will be discussed within the framework of the computational Spatial Coding Model (Davis, 2010).

Stability of Deficits in Reading Fluency and/or Spelling

Heike Mehlhase, Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich; Jan Luis Sigmund, Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich; Gerd Schulte-Körne, Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich; Kristina Moll, Department of Child and Adolescent Psychiatry, Psychosomatics, and Psychotherapy, University Hospital, Ludwig-Maximilians-University Munich

Purpose Reading and spelling deficits (RSD) do not always cooccur, but can dissociate, resulting in reading deficit only (RD) and spelling deficit only (SD). We investigated the stability of these groups, and whether dissociations already occur early in literacy

development. Method Based on their reading and spelling skills, 227 German-speaking 2nd Graders were assigned to one of four groups: RD, SD, RSD, or typical development (TD). A year later, we assessed whether children were still allocated to the same group. Cognitive profiles (phoneme awareness (PA), rapid automatized naming (RAN), verbal memory, and IQ) were compared between the four groups and between children with stable and instable profiles. Results In line with previous findings, the RSD group showed high stability, while the SD group was less stable, and many SD-children improved their spelling skills. RD-children showed less stability compared to previous research, with some children improving their reading skills and others developing spelling deficits. The groups were associated with different cognitive profiles. Conclusion Stability of isolated deficit groups (i.e., RD) is lower in younger than in older samples, and depends on the cognitive profile of the child.

Automatic Activation and Selection of Words in Early Readers: Frequency and Word Neighbourhood Effects Revisited

Gorka Vergara, University of the Basque Country (UPV/EHU); **Gorka Ibaibarriaga**, University of the Basque Country (UPV/EHU); **Joana Acha**, University of the Basque Country (UPV/EHU)

The effects of word frequency and word neighbourhood give account of whether automatic activation of lexical representations takes place in children who are learning to read. This study examined these effects on word and pseudoword lexical decision performance beginning readers. Participants were 60 Spanish first graders who had to identify high and low frequency words. Orthographic neighbourhood was manipulated orthogonally across frequency conditions. Children were also assessed on verbal working memory, phonological awareness and receptive vocabulary. Converging with previous developmental studies, frequent words were identified faster and with fewer errors than infrequent ones, and words with neighbours led to more identification errors than words without neighbours. Interestingly, while PA was related with children's identification accuracy in all types of words, WM was related to the neighbourhood effect. These results confirm the importance of PA in the formation of accurate orthographic representations and suggest that WM has a key role in the activation and selection

of lexical candidates when these are not well specified. Implications for reading efficiency during the early years of reading development are discussed.

Influence of Rhythmic Background on Graphomotor Skills in Children With and Without Dysgraphia

Margaux Lê, Université de Strasbourg; **Aline Frey**, Centre de Recherche en Psychologie et Neurosciences – Aix Marseille University; **Jérémy Danna**, CLLE – University of Toulouse Jean-Jaurès; **Jean-François Connan**, Institut Supérieur de Rééducation Psychomotrice; **Fanny Gardette**, Centre de Référence des Troubles de l'Apprentissage; **Marianne Jover**, Centre PsyClé – Aix Marseille University

Handwriting is a complex motor activity involving rhythmic organization (Nutt, 1917). Two studies were conducted to better understand how listening to rhythmic cues influence handwriting in children with various expertise levels. In a first study, we compared four conditions – silent, melodic, with a slow and fast rhythm – in 2nd and 5th graders. Results showed that music modulated writing processes differently according to grade level and tempo. Younger children increased writing fluency with slow-paced music, while both rhythmic conditions affected graphic movement in the older group. This suggests that children with lower writing expertise benefit from rhythm, opening interesting perspective for dysgraphia rehabilitation. To further explore this, we conducted a second study in children with dysgraphia using a similar procedure. The study aims to: 1) quantify the loss of rhythmic structure in writing in dysgraphia, and 2) determine if an external rhythmic cue can improve motor control of handwriting. Data collection is ongoing, but preliminary results suggest that dysgraphia impacts the rhythmic organization of handwriting. The extent to which the external rhythm helps to better control handwriting remains unanswered for now.

Development of Inferential Processes in Children: The Role of Information Accessibility in Reading Comprehension Situation

Hélène Guinet, CY Cergy Paris Université; **Carine Royer**, CY Cergy Paris Université; **Hélène Labat**, CY Cergy Paris Université; **Sabine Guéraud**, Université Paris 8

The aim of this study was to investigate the development of inferential processes in children during a reading situation, and more specifically to

study the involvement of the speed of access to information in memory in the activation of an inference (e.g. O'Brien & Cook, 2016). Activation of an inference was measured using a lexical decision task. Speed of access to information in memory was assessed by manipulating context strength (i.e. weakly/strongly constraining). We expected a different effect of the context factor according to age. 205 children in grades 3 to 5 from schools in the Paris region were included in our study. Measures of language skills were taken to characterize the sample. Data were analyzed using mixed effects modeling. The results show a significant effect of speed of access for 4th grade children. A cluster analysis was carried out among these children by taking language skills into account: it reveals a context effect among children with a more fragile vocabulary level. The results highlight a strong relationship between the construction of the semantic network and the speed of access to this information. This factor could therefore be of interest in explaining developmental differences.

Revisiting the Word Superiority Effect in Adults and in Children During Learning to Read

Bernard Lété, Université Lumière Lyon 2, Laboratoire d'Etude des Mécanismes Cognitifs; Jonathan Grainger, Centre de Recherche en Psychologie et Neurosciences, CNRS & Aix-Marseille University; Hugo Fabrizi, Université Lumière Lyon 2, Laboratoire d'Etude des Mécanismes Cognitifs; Joana Acha, Departamento de Procesos Psicológicos básicos y su Desarrollo, Universidad del País Vasco; Marta Vergara-Martinez, ERI-LECTURA y Departamento de Psicología Evolutiva y de la Educación, Universitat de Valencia; Stéphanie Massol, Université Lumière Lyon 2, Laboratoire d'Etude des Mécanismes Cognitifs

Visual word recognition implies both bottom-up processing (i.e., perceptual-onto-abstract representations) and top-down (i.e., word-to-letter) processing. Increased reading experience leads to enhanced use of lexical information in order to disambiguate perceptual signals. Here we explored how these bottom-up and top-down processes evolve during learning to read. Adults and children from Grade 1 to Grade 5 performed two target-in-string identification tasks. In Experiment 1, stimuli were words, pseudowords and nonwords. The emergence of a pseudoword superiority effect in the absence of a word superiority effect was found to arise in Grade 4, whereas classical word and pseudoword superiority

effects were found with adults. Experiment 2 aimed at exploring the top-down influence and the sensitivity of letter combinations (e.g., bigram frequencies). We manipulated bigram frequency and orthographic neighborhood size in nonwords. Results showed that, while in adults the word superiority effect is mainly driven by top-down influences from activated lexical representations, this effect seems to be mainly driven by letter combination frequencies in children.

Individual Differences in Predictability Effects During Reading: Measurement Reliability and Reading Proficiency

Erez Milstien, Hebrew University of Jerusalem; Kobi Raz, Hebrew University of Jerusalem; Noam Siegelman, Hebrew University of Jerusalem

Word predictability has a robust influence on reading behavior, with predictable words processed more efficiently than unpredictable ones. Despite much work on this effect at the group-level, we know little about individual variation in predictability effects. The current study thus asks: (1) How to reliably quantify individual differences in predictability effects, and (2) whether they relate to reading skill. Using the Multilingual Eye-Movement Corpus (MECO-L2; N=1109), we compared methods for estimating word predictability from cloze task to language models (GPT-2, XGLM). The impact of these quantifications on each reader's eye-movement behavior (i.e., fixation durations, skipping, rereading) was examined using hierarchical Bayesian models. We assessed both the split-half reliability of individual-level estimates and their correlation with measures of reading skill. We found that predictability effects had medium to low reliability, which varied across estimation methods. For metrics that were reliable, readers who showed larger predictability effects mostly had lower reading skills. These findings advance our understanding of how readers differ in utilizing contextual information and how to reliably quantify these differences.

Enhancing Reading Skills via Individualized Psycholinguistic Models

Tal Koren, Hebrew University of Jerusalem; Noam Siegelman, Hebrew University of Jerusalem; Nadav Weisler, Hebrew University of Jerusalem

Most reading instruction strategies target the average reader, but not all students respond well to canonical

methods. Those students may benefit from additional individually tailored reading interventions. We explore a novel approach grounded in findings that individual differences in sensitivity to statistical properties (e.g., print-sound and print-meaning consistency) predict reading ability. We developed data-driven, individualized statistical profiles capturing readers' sensitivity to a range of linguistic features, and used these profiles to predict which words are most likely to improve individual performance. Practically, we conducted simulations on lexical decision data from the British Lexicon Project (N=78). We first fitted statistical models that predict each reader's item-level accuracy from word properties. Then, we used the models to simulate individualized instruction and identify the words that would yield the greatest gains for each reader. Simulation results showed this method outperformed a non-individualized control intervention. We are now conducting an online study to validate our approach. If successful, this method could clarify what makes a good reader and guide personalized assessments and interventions.

Reconceptualizing the Grapheme: How Does Alphabetic Writing Work?

Daniel Zagar, Université de Lorraine; Teng Guo, Royal Holloway, University of London

For literate people, alphabetic writing consists of letters that correspond to the basic sounds of speech. This intuitive description has been conceptualized through the notion of grapheme-phoneme correspondences (e.g., Pulgram, 1951; Venezky, 1967; 1999). However, although central to the description of writing systems, the concept of the grapheme remains imprecise and debated (Coulmas, 1996; Meletis, 2019). This ambiguity arises because graphemes can serve multiple functional roles. For example, they sometimes correspond to a phoneme (e.g., N in KNOT), while at other times they provide semantic information (e.g., K in KNOT). In this study, we propose a general conception of the grapheme concept that tracks back to the invention of full writing approximately 5000 years ago. This conception explains how graphemes are used to transcribe speech and offers new insights into the deep structure of the alphabet. Finally, we will discuss the implications of this conception for understanding the mechanisms that underline the acquisition of alphabetic writing.

Does Emotional Valence Modulate Orthographic Processing?

Ana Baciero, Universidad Complutense de Madrid; Celia Martínez-Tomás, Universidad Complutense de Madrid; Manuel Perea, Universitat de València; José Antonio Hinojosa, Universidad Complutense de Madrid

Research suggest that emotional properties of words can influence visual word recognition. Emotional words are often processed faster than neutral words, and pseudowords derived from emotional words are categorized more slowly in lexical decision tasks. The present study investigates whether emotional valence affects the encoding of letter positions and identities within a word (i.e., orthographic processing) in two lexical decision experiments. Experiment 1 examines whether emotional valence modulates the transposed-letter effect, where pseudowords were created by either transposing (e.g., loteria [lotería] or replacing (e.g., crueftad [crueldad]) two internal letters of emotional words (positive, negative, or neutral). Experiment 2 examines whether valence influences the visual letter similarity effect, where misspellings of emotional words were created by replacing one letter with a similar or dissimilar one (e.g., forfuna vs. forfuna [fortuna]). Both experiments show that emotional pseudowords are more difficult to classify as non-words than neutral pseudowords, suggesting that they might elicit more top-down semantic feedback activation to orthographic processing than neutral words.

Direct vs. Indirect Assessment of Print Exposure and Its Relationship With Reading Skills in French Elementary School Children

Brice Brossette, Aix-Marseille Université, CNRS, LPL, Pôle Pilote AMPIRIC; Mee-Jin Chalbos, Aix-Marseille Université, CNRS, LPL; Chloé Prugnières, Aix-Marseille Université, CNRS, LPL; Stéphanie Ducrot, Aix-Marseille Université, CNRS, LPL, Pôle Pilote AMPIRIC

Print exposure (PE) is crucial for literacy development, yet its assessment often relies on indirect self-reports prone to bias. This study examines the feasibility and validity of a direct digital PE assessment via a mobile app in 120 French elementary school children (G1–G5). Each child used the app to time their reading activities at home over six weeks, providing an objective measure of PE. Prior to this, caregivers completed a questionnaire on home literacy practices, serving as an indirect PE measure. Children

were assessed on visuo-attentional and phonological skills, reading fluency, and vocabulary. Results show that direct PE aligns with questionnaire-based measures but systematically exhibits lower predictive power for reading outcomes. This finding is consistent with prior research (Mol & Bus, 2011), suggesting that indirect PE measures better predict reading performance than direct ones. While predictive power is often prioritized (Engzell, 2021), we argue that direct PE assessments should be favored to preserve construct validity and gain a more precise understanding of relation between PE and reading outcomes.

14:00 – 15:40: Regular Talks

T-01: Learning & Memory I

Supporting Consolidation of Recent Event Memory in Healthy Older Adults and People With MCI

Ali Mair, University of Leeds; George Georgiou, University of Hertfordshire; Mike Page, University of Hertfordshire

This study investigated the extent to which wearable cameras can support the consolidation of recent event memory in people with Mild Cognitive Impairment (MCI, $n=8$) and healthy older adults ($n=17$). Participants wore chest-mounted cameras to record 3 different experimenter-led tours of local attractions (Day 0). Memory consolidation was tracked across Days 1-4, and again on Day 11. Each day, free recall was immediately followed by event review in one of 3 conditions: photos, video clips, or brief text. Each participant reviewed one event in each condition. Half of the material from each event was presented during review, and half remained unseen throughout, allowing us to determine whether the procedure supported memory for material that was not re-encountered. The results showed striking evidence of consolidation of specific event details in both groups, and in all 3 conditions, which was maintained at one-week follow-up and extended to non-reviewed material. For reviewed material, the effect was largest in the photo condition and was driven by increased recall of episodic information rather than facts presented on the tours. The implications for designing more efficient wearable cameras for memory support will be discussed.

Does Working Memory in Childhood Predict Long-Term Academic and Employment Outcomes?

Amy Atkinson, Lancaster University; Katie Allen, Lancaster University; Brian Francis, Lancaster University; John Towse, Lancaster University

Existing studies have demonstrated a strong relationship between working memory and academic achievement in childhood. However, it is not usually feasible to explore whether working memory in childhood predicts much longer-term academic attainment (e.g. at the end of compulsory schooling in adolescence) or outcomes in adulthood (e.g. unemployment). In this project, we are using existing data from the Avon Longitudinal Study of Parents and Children (ALSPAC) to examine these relationships. ALSPAC is a UK-based large-scale birth cohort study, which has followed the lives of approximately 14,500 individuals for over 30 years. Our analyses will examine whether working memory in childhood (measured using a counting span task at 10 years) predicts outcomes such as: (i) academic achievement in childhood (10-11 years); (ii) academic achievement in adolescence (15-16 years); and (iii) Not in Employment, Education, or Training Status (24 years). Our analyses are pre-registered, and will control for important covariates (e.g. sex, socioeconomic status). The analyses are in progress at the time of abstract submission, and the outcomes will be presented as part of this talk. Implications of the findings will also be discussed.

The Role of Adulthood Working Memory in Real World Outcomes: Evidence From the Avon Longitudinal Study of Parents and Children Cohort

Katie Allen, Lancaster University; Brian Francis, Lancaster University; John Towse, Lancaster University; Amy Atkinson, Lancaster University

Many studies have demonstrated that working memory (WM) difficulties are often associated with other cognitive difficulties (e.g. reasoning, decision making). However, it is unclear whether WM measured in adulthood relates to real-world outcomes (e.g. employment, education, inattentive behaviours). We addressed these knowledge gaps using the Avon Longitudinal Study of Parents and Children dataset of around 14,500 participants, followed for over 30 years. We examined whether WM, measured using N-back at 24 years of age, could

predict adulthood life outcomes. Our findings show WM is predictive of inattentive behaviours (age 25 years), Not in Education, Employment or Training status (age 24 years), receipt of means tested benefits (age 25 years), and degree completion (age 29 years). However, after controlling for demographic variables (e.g., sex, ethnicity, drug and alcohol use), WM only remained predictive of inattentive behaviours and degree completion. Further, these relationships were no longer observed after IQ was added into the model. Our results indicate that WM is predictive of adulthood outcomes but it is not a unique predictor. We explore possible reasons for this and implications.

Reducing False Memories in Older Adults: Behavioral and Neural Mechanisms of Corrective Feedback

María J. Maraver, Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada; Raquel Lezama, Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada; María García de Viedma, Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada; Nuria Montoro-Membila, Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada; Teresa Bajo, Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada; Alejandra Marful, Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada

When compared to younger people, older adults are more vulnerable to false memories partly due to age-related declines in executive functions. Behavioral results show that corrective feedback can reduce false memories in younger and older adults. Our previous studies suggest that metacognitive guidance after feedback improves correct recall but doesn't enhance error correction. Thus, corrective feedback alone effectively reduced false memories across all ages. However, much is still unknown about the neural basis of memory errors correction in the elderly. Evidence from EEG recordings helps identify the neural dynamics of error detection (e.g., N400 or Error-Related Negativity), feedback processing (e.g., Feedback-Related potentials), and memory updating. We will present preliminary data on memory performance across retrieval tests before, during, and after corrective feedback in healthy younger (n=72) and older adults (n=70), as a function of the type of feedback received (simple corrective feedback, feedback with metacognitive guidance, or no feedback). By examining cognitive and neural evidence of learning from errors, we will reflect on how

feedback mechanisms can be optimized to promote better memory functioning in aging.

Cognitive Changes During Menopause Transition: Investigating Verbal Working Memory

Prerita Chawla, University of Nottingham; Chhanda Karmaker, University of Nottingham; Karen Barnor, University of Nottingham; Harriet Allen, University of Nottingham; Lucy Cragg, University of Nottingham

Background: Working memory is a key component of cognition and executive function. A decline in estrogen and progesterone during menopause has been associated with reduced cognitive performance. This study examines verbal working memory across menopause stages—pre-, peri-, and post-menopause. Methods: A preliminary analysis (N=177) assessed verbal working memory using the Backward Digit Span and Letter-Number Sequence tasks and revealed no significant differences between menopause stages ($p > 0.05$). UK Biobank data (N=8,786) categorised participants by menopause status to compare Numeric Memory performance and showed no significant differences ($p > 0.05$). Results: No significant differences were observed in verbal working memory performance across menopause stages. Conclusion: Findings suggest that working memory is relatively resilient to hormonal fluctuations during menopause. Another explanation is that cognitive strategies are used to mask potential performance declines. Future studies leveraging UK Biobank neuroimaging data may help identify structural brain biomarkers linked to verbal working memory during menopause transition.

T-02: Memory & Metacognition

How Does Semantic Elaboration Affect Retrieval of Episodic Memory?

Joscha Dutli, University of Zurich; Klaus Oberauer, University of Zurich; Lea M. Bartsch, University of Zurich

The semantic elaboration effect refers to the finding that words are better remembered when processed together with semantically matching, rather than mismatching, orienting questions. We conducted a series of experiments to uncover the mechanism underlying this effect. Across experiments, we found consistent elaboration effects in recognition tests of

target words, as well as in cued recall of target words (cued with the questions) and of questions (cued with the target words). In free recall, however, we found either absent or small and inconsistent effects. We propose that elaboration benefits memory because it establishes retrieval cues, and that this mechanism can explain the inconsistency across memory tests: In cued recall and recognition, the information provided at test activates the established retrieval cues. In free recall, retrieval of congruently processed words can occur either directly, or indirectly through first retrieving the orienting question as a cue. Using the recall probabilities we found in free recall of questions and cued recall of words, we apply a simple model based on this assumption, which accounts for the free recall data across our experiments and predicts a small but stable elaboration effect.

Metacognition of Varied Retrieval

Katarzyna Zawadzka, Adam Mickiewicz University; Ewa Butowska-Buczyńska, SWPS University; Maciej Hanczakowski, Adam Mickiewicz University

When presented with some information multiple times, people learn it more effectively when engaging in retrieval practice in a variable rather than constant manner. However, they believe constant learning to be more beneficial. We thus aimed at helping participants appreciate the benefits of varied learning. Using foreign word translations as study materials, we had participants complete a series of study-test blocks with half of the translations presented in a varied manner, and half in a constant manner. We asked for global predictions of performance before each test, and for global postdictions after each test. Study and test experience did not alleviate the preference for constant learning, and neither did instructions explaining the benefits of varied learning inserted in between the blocks. Item-by-item performance feedback on the first test managed to help participants correctly appraise their own performance, but not make accurate predictions of their future performance. Our results help narrow down the underpinnings of people's preference for constant learning and offer suggestions for more potent interventions aimed at mending this illusion.

Assessing Response Confidence Reduces the Benefits of Response Revisions in Perceptual and Memory Tasks

Marta Siedlecka, Jagiellonian University; Piotr Litwin, Jagiellonian University; Borysław Paulewicz, Jagiellonian University

In a series of five experiments, we investigated how assessing one's response confidence during simple decisional tasks affects metacognitive regulation and response accuracy. Participants solved perceptual-decision, memory, and general knowledge tests. They provided initial responses but were allowed to revise them while giving their final answers. Depending on the condition, they also either: reported their confidence simultaneously with or after the initial response, performed an additional (not metacognitive) task, or watched a blank screen or a visual mask between the two responses. We used a variety of measures of metacognitive regulation, including response revision number and quality. Contrary to our expectations, we found no evidence that assessing confidence induces more efficient regulatory activity and leads to higher accuracy. Rather, when participants reported their confidence, their final response improvement was smaller compared to conditions with no additional task, and revisions were less frequent and less corrective. The results suggest that assessing one's confidence is a resource-demanding task that might interfere with metacognitive regulation and reduce the potential benefits of response revisions.

The Role of the Working Memory Storage Component in a Random-Like Series Generation

Mikołaj Biesaga, Robert Zajonc Institute for Social Studies, University of Warsaw; Andrzej Nowak, Robert Zajonc Institute for Social Studies, University of Warsaw

People are not equipped with an internal random series generator. When asked to produce a random series they simply try to reproduce an output of known random process. Here, we investigated the model of random-like series generation that accounted for the involvement of storage and processing components of working memory. In Study 1, we tested whether decreasing cognitive load on working memory would mitigate the decay in the level of randomness of the generated series. Results showed that when people did not have to solely rely on their working memory storage component to maintain active past choices they were able to prolongate their high-quality performance. Moreover, people who were able to

better distinguish more complex patterns at the same time generated more random series. In Study 2, we examined the relationship between working memory capacity and the ability to produce random-like series. Results revealed that individuals with longer working memory capacity also were to produce more complex series. These findings highlight the importance of working memory in generating random-like series and provide insights into the underlying mechanisms of this cognitive process.

Do Prospective Memory and Working Memory Share Common Processes? Evidence From a Color Matching Task

Tobias K hlwein, UniDistance Suisse; Chhavi Sachdeva, UniDistance Suisse; Jan Rummel, Heidelberg University; Nicolas Rothen, UniDistance Suisse

Prospective memory is the ability to remember and execute intended actions at the appropriate moment in the future. These tasks are embedded in unrelated ongoing tasks and can be missed without noticing. Working memory is used to temporarily hold and manipulate information. While indirect evidence suggests that prospective and working memory might share common cognitive processes, direct evidence is largely missing. Thus, we aimed to investigate this link more directly using a dual-task approach with a working memory task as ongoing task, requiring participants to memorize and recall object colors. After conducting a baseline measurement of the ongoing task, participants received prospective memory instructions: to override a displayed color with a pre-specified one for objects in a certain category (e.g., animals). After an unrelated retention interval, participants repeated the ongoing task with embedded prospective memory cues. We tested three conditions with varying working memory loads (1, 3, and 5 items per trial). Preliminary results show decreasing ongoing task performance with higher load, supporting the notion of shared cognitive processes between prospective memory and working memory.

T-03: Cognitive Enhancement & Plasticity

No Far Transfer From Relation Processing Training to Fluid Reasoning: A Latent Growth Model

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Evidence for enhancing cognition via training remains mixed. We tested if 40 sessions of relation processing training (graph mapping, 93 healthy adults) could improve fluid reasoning, as compared to the active (n-back task, N = 98) and passive control group (N = 85). Both reasoning and working memory were assessed in the lab before, midway, and after training using three benchmark tests. Our online training was adaptive. Unsurprisingly, participants greatly improved on the task trained, but not on the other task. Latent Growth Model yielded no significant difference between the two training groups in the slope of their growth curves for both reasoning and working memory tests. Gains were comparable to the test-retest effect observed in the passive control group. Mean and Covariance Structure model revealed no significant difference between the groups in both specific abilities (visuospatial, verbal, numerical) and general ability, using eight reasoning tests administered post-training. The findings suggest that training of even core cognitive functions, such as relation processing, results in neither near nor far transfer beyond the task trained, highlighting the limitations in generalizability of cognitive training in adults.

Does Music Training Improve Emotion Recognition and Cognitive Abilities? Longitudinal and Correlational Evidence From Children

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In two studies, we asked whether music training improves emotion recognition in voices and faces among school-aged children. We also examined music-training effects on musical abilities, motor skills, socioemotional functioning, and cognitive abilities (nonverbal reasoning, executive functions, and auditory memory). Study 1 (N = 110) was a 2-year longitudinal intervention, comparing music to basketball training and no training. Music training improved fine-motor skills and auditory memory

relative to controls, but not emotion recognition or other cognitive and socioemotional abilities. Study 2 (N = 192) compared children with and without music training. Although music training correlated with better vocal emotion recognition, this association disappeared after controlling for socioeconomic status or musical abilities. In contrast, musical abilities correlated with emotion recognition independently of training or other variables. These findings suggest that music training enhances fine-motor skills and auditory memory, but not emotion recognition, other cognitive abilities, or socioemotional functioning. Advantages in emotion recognition likely stem from preexisting musical abilities and other factors such as socioeconomic status.

If Music Training Improves Cognitive Abilities, Are Professional Musicians Smarter Than Amateurs?

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Musical proficiency, developed through years of training and practice, provides an ideal model for investigating the correlates of expertise. In this study, we analysed a sample of highly trained musicians (N = 641) from the multilab project Music Ensemble, distinguishing between amateurs and professionals based on self-reports. Using logistic regression, we examined how music-related, personality, and cognitive variables predict professional versus amateur status. As expected, professionals outperformed amateurs on music-related variables. In terms of personality, professionals had higher levels of open-mindedness and lower levels of agreeableness. For cognitive variables, professionals and amateurs performed similarly on tests of vocabulary, executive function (updating), and short-term visual and visuospatial memory. While professionals had better short-term memory for tonal stimuli (melodies), they scored lower than amateurs on Raven's Advanced Progressive Matrices, a measure of nonverbal reasoning and a proxy for g. These findings challenge the assumption that musical expertise is linearly associated with enhanced cognitive abilities, with implications for debates on plasticity, far transfer, and the correlates of expertise.

Does Studying Latin Make You Smarter? Three Large-Scale Studies Into the Cognitive and Linguistic Benefits of Latin Instruction

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Over 8 million European secondary education pupils still study Latin, often motivated by the assumption that doing so will yield cognitive and linguistic benefits. However, whether these benefits actually exist, and whether they stem from preselection or cognitive transfer effects, remains unclear. To examine this, we conducted 3 studies. First, we explored the link between studying Latin in secondary education and academic achievement in 12 university programs (N = 1,898). Second, we assessed 1,731 secondary school students across three grades to determine if, when, and for which subjects a Latin advantage emerges, and how it evolves throughout secondary education. Third, we performed a 3-year longitudinal study on 352 secondary education students to examine whether studying Latin can produce true (non-)linguistic transfer effects. We found that Latin students consistently outperform their non-Latin peers. However, this advantage is already present at the onset of Latin education, without additional gains throughout secondary education. We conclude that the cognitive and linguistic advantages associated with studying Latin are inherent to the student population, rather than cognitive transfer effects elicited by Latin itself.

The Role of Sports Experience in Audiovisual Integration: A Comparison Between Rackets Players and Swimmers

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Sports performance requires rapid and accurate reactions to several sensory information. Recent evidence has highlighted the informative role of auditory cues, such as the sound of racket-ball contact in tennis, additionally to visual ones. However, research on audiovisual integration in sports remains limited. Here, we focus on the multisensory integration of auditory and visual information, investigating whether prolonged engagement in sport

modulates audiovisual abilities depending on the sport-specific requests. Three groups are compared: racket sport athletes (e.g., tennis players), who consistently make rapid decisions based on combined auditory and visual cues; swimmers, who train in an environment where sensory stimuli are attenuated by water; and a control group of non-athletes. The study employs two psychophysical tasks: the Temporal order judgment task and the Sound-induced double-flash illusion. We expect that racket sport athletes will exhibit enhanced audiovisual integration, resulting in a more refined point of subjective simultaneity and a narrower temporal binding window compared to both swimmers and non-athletes. These findings would suggest that sport-specific perceptual demands may refine multisensory abilities

T-04: Attention & Cognitive Control I

Partially Masking Task-Irrelevant Speech Induces Particularly Pronounced Metacognitive Illusions in Judgments of Distraction

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We tested the hypothesis that partially masking speech has opposite effects on judgments of distraction and objective distraction effects, inducing particularly pronounced metacognitive illusions. Separate validation studies have shown that masked speech is experienced as being disfluent relative to pure speech. If people rely on a (dis)fluency heuristic, they should predict masked speech to be more distracting than pure speech. However, given that the auditory changes that drive distraction are masked, people should objectively be less distracted by masked speech than by pure speech in a serial-recall task. The results support this hypothesis. Speech masked with pink noise (Experiment 1) or speech babble (Experiment 2) evoked a subjective experience of relative disfluency and was predicted to be more distracting than pure speech, but participants were less distracted by masked speech than by pure speech. Even after having ignored masked and pure speech firsthand, participants judged masked speech to have been more distracting than pure speech. Partially masking speech thus had opposite effects on judgments of distraction and objective distraction

effects, inducing particularly pronounced metacognitive illusions.

Speaking a Second Language Is Not a Conflict Task: Implications for Hypotheses of Bilingual Advantages and Other Language-Control Associations

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The debate on whether bilingualism positively affects control abilities has reached a stalemate. We propose that this is partly because research has focused on whether bilingual-monolingual differences exist rather than why they should. Focusing on the latter, we present an alternative approach to test the assumption that bilingualism, particularly bilingual language production, is adaptively controlled. From this assumption follows that manipulations demonstrating adaptive control in conflict tasks (e.g., Stroop) should show parallel patterns in a bilingual analog of those tasks. We report results from three studies with such a task, an L2 picture naming task involving cognate and noncognate stimuli, presented to Italian-English unbalanced bilinguals (N = 144). Across different manipulations (proportion of cognate/noncognate stimuli, concurrent task load, and foreknowledge of stimulus's cognate/noncognate status), we found no evidence that managing two languages, as indexed by the cognate effect, is adaptively controlled. As these results challenge a fundamental assumption made by theories of language-control associations, they suggest that those associations are more likely to emerge in abilities other than adaptive control.

Attentional Capture vs. Attentional Bias: New Evidence for the Priority Accumulation Framework

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Most visual search theories assume that attention is automatically allocated to the location with the highest current priority. The Priority Accumulation Framework (PAF) instead proposes that priority weights accumulate over time until action-relevant signals trigger attention deployment to the location with the highest accumulated priority. Thus, PAF distinguishes between attentional capture, whereby

attention is deployed at the wrong moment, and attentional-priority bias, whereby the locus of attention is biased by previous and current events. In three spatial-cueing experiments, we found that a minority of first saccades were triggered by the irrelevant onset precue (attention capture), with most first saccades being delayed until after processing of the search display had begun. Crucially, these late first saccades were biased toward the cue, a bias that increased with target-nontarget similarity and cue size (salience). Replicating these findings when the cue-target interval was longer invalidated alternative accounts. Our findings support the integration between spatial and temporal attention suggested by PAF and challenge traditional models' view that spatial attention tracks priority changes in the visual field online.

Assessing Hazard Prediction and Risk Calibration Skills in Experienced and Novice E-Scooter Riders

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E-scooters were introduced as a sustainable transport alternative but face safety concerns due to frequent collisions often linked to user error and risky behaviour. Despite their importance in reducing collision risk in other transport modes, cognitive factors such as hazard prediction and risk calibration remain underexplored in e-scooter research. Hazard prediction involves anticipating hazards through experience-driven attentional biases, while risk calibration entails accurately assessing and adjusting to situational risks. This study employed bespoke video-based tests featuring real e-scooter footage to assess these skills. The first experiment examined riders' ability to predict hazardous scenarios, while the second evaluated their proneness to risky decision-making. The results revealed that increased experience did not enhance hazard prediction or reduce risky behaviour; higher riding frequency was linked to greater risk-taking in some scenarios. The perception of e-scooters as low-risk transport mode and the typically short duration of e-scooter trips may limit riders' exposure to a variety of hazards, hindering their ability to develop effective vigilant strategies and risk calibration skills.

What Modulates the Alertness-Executive Control Interaction?

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Alertness, executive control and orienting are basic components of the human attention systems. Many studies showed an interaction between alertness (e.g., a tone that precedes the target stimulus) and executive control (measured by a congruency effect). Specifically, it has been demonstrated that the congruency effect is significantly larger when the alerting tone precedes the target. A study by Han & Proctor (2023) did not obtain the alertness-congruency interaction. We examine whether this lack of interaction was due to speed of responding. To this end we manipulated speed of responding by asking participants to focus on speed or accuracy. When participants focused on speed we replicated the alertness-congruency interaction in the local condition but not in the global condition. When participants focused on accuracy no such interaction was found, regardless of global-local condition. Importantly, slowing down responding rather than speeding it up eliminates the effect of alertness on congruency. It is possible that focusing on accuracy enhances caution, thus reducing the tone effect

T-05: Cognitive Control & Neuroscience

Modulating Medial Prefrontal Cortex Activity and Inhibitory Control Using Transcranial Random Stimulation

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Everyday decision-making requires the ability to modify flexibly and sometimes terminate our actions, such as hitting the brakes in an emergency. Neural oscillations, such as beta-band rhythms observed over the medial prefrontal cortex, help regulate these context-dependent behaviours. However, how random noise stimulation (tRNS) would modulate neural rhythms and inhibitory behaviors remain understudied. Using a single-blinded within-subject design, fifteen participants received random noise or sham stimulation in a pseudo-randomized order while performing a Go/Conflict/No-Go task. We show that tRNS significantly improved inhibitory behaviors by reducing the number of errors in No-Go trials. This improvement was a function of participants'

impulsivity levels and baseline performance, i.e., impulsive individuals who made more baseline errors improved more after receiving stimulation. At the neural level, we show that random noise stimulation increases low-beta power at the stimulation site, mediated by an increase in the duration of intermittent beta bursts. We show for the first time that tRNS improves the ability to withhold response to unexpected inhibitory cues as a function of an individual's impulsivity level.

The Word-Color Interference Effect: John Ridley Stroop's Big Misstep

Céline Lemerrier, CLLE

If everyone knows what attention is, all psychologists know what the Stroop effect is : it is the interference of the automatic reading of an incongruent (i.e., BLUE in red) word on the more controlled process of color naming. This overlap would also explain why congruent (i.e., BLUE in blue) color naming items are faster. Twenty years before, Brown (1915) showed that congruent color naming times are slower than for neutral ones, rejecting the reading overlap hypothesis. In order to disentangle these opposing theoretical approaches, we analysed the Stroop protocol and highlighted an original violation of its internal validity. It manipulates three variables: the type of support (a string vs. a word), and two parasitic variables (the size of the item set (from 4 to 12), and the familiarity of the color-support association). After restoring the internal validity of the Stroop protocol, we conducted two studies. The analyses showed that color-naming response times are longer for unfamiliar items and when the support is a word, regardless of the quality of the word (incongruent and congruent). These results are consistent with those published by Brown in 1915, suggesting that the Stroop effect is finally not an interference effect.

Exploring Individual Differences in Cognitive Flexibility: A Data-Driven Time-Frequency Analysis Combined With Latent Change Modeling

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Cognitive flexibility, the ability to adapt to changing task demands by switching between mental sets, is a

key element of human behavior. It is discussed to contribute to individual differences in higher-order cognitive abilities. Studying individual differences in neural correlates of flexibility can help us unravel the mechanisms underlying flexibility. The present study investigates individual differences in event-related spectral perturbations via data-driven time-frequency analysis in three distinct cued task-switching paradigms (N = 148). Using a latent change model, we show that an enhanced frontal theta increase and parietal alpha decrease in switch compared to repeat trials in response to the cue, but not the target, loads onto a common flexibility factor across tasks. We find no correlations between the latent flexibility factors and intelligence or working memory capacity. The findings underscore the importance of distinguishing between preparatory processes in response to the cue and target-related processes. Our analyses contribute to the broader understanding of cognitive flexibility by confirming the generalizability of the results across three distinct tasks and the specificity of the contributing frequency bands.

Studying Individual Patterns in Attentional Shifts Using Steady-State Evoked Potentials and Their Relations to Mental Health

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The ability to flexibly focus and shift attention plays a crucial role in adaptive and maladaptive psychological functioning. Accordingly, there is a growing need for methods that precisely track the temporal dynamics of attentional engagement, disengagement, and reengagement at the individual level. In two studies (N = 72; N = 49), we used steady-state visual evoked potentials (ssVEPs) to examine attentional switching and its relation to mental health measures. Participants viewed overlapping flickering stimuli at distinct frequencies and shifted attention between them upon a cue. Time-varying ssVEP amplitude envelopes revealed three attentional profiles: Cue-driven pattern, where attention shifted as instructed; Inverse pattern, where attention

remained on the distractor instead of shifting to the cued target, showing the exact opposite shift pattern; and minimal-shift pattern, with no amplification or suppression of targets. Stronger cue-driven adherence indicating higher attentional control was linked to lower anxiety, emotion suppression, and depression, and higher trait mindfulness. These findings highlight ssVEPs as a useful tool for studying individual differences in attentional control and their links to mental health.

Enhancing Inhibitory Control Through Regular Physical Exercise: Behavioral and Neuroelectric Evidence

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Regular exercise benefits cognitive function, particularly inhibitory control, yet its effects in sedentary young adults remain underexplored. This study examined the impact of a 12-week cardiovascular exercise program on behavioral and neuroelectric markers of inhibitory control. Sedentary young adults were randomized into an exercise group ($n = 32$) or a passive control group ($n = 30$). The intervention included 6 weeks of moderate-intensity continuous exercise followed by 6 weeks of moderate-to high-intensity interval exercise on a cycling ergometer. Inhibitory control was assessed at baseline, mid-intervention, and post-intervention using a modified flanker task with EEG recordings. The exercise group exhibited progressive response time reductions on incongruent trials at all time points without accuracy loss, whereas the control group improved only from pre- to post-test but with reduced accuracy, indicating enhanced behavioral performance in the exercise group. EEG data showed decreased N2 amplitudes and faster P3b latencies in the exercise group, reflecting improved neural efficiency. These findings suggest that structured exercise enhances inhibitory control and may mitigate sedentary-related cognitive decline.

T-06: Social Cognition

From Private to Communal Imagination: The Influence of Joint Imagination on Emotional Experiences

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Although imagination is inherently personal, throughout history, human cultures have developed complex practices (e.g., campfire storytelling) to stimulate the imagination in a social context. Inspired by these cultural phenomena, we theorized that collective imagination would lead to the reinforcement and alignment of emotional experiences. To test these hypotheses, we generated an imagination task (Exp 1) which involved imagining 180 scripts of nine words, describing a range of situations (pleasant, unpleasant, and neutral). We further found significant differences in pupil dilation between pleasant and unpleasant imagination (Exp 2). Finally, in Exp 3 forty romantic dyad performed the imagination task in privacy and jointly. Results indicate a gender difference in pupil dilation only during private condition and strong tendency for the two partners to synchronize their pupil dilation only during joint imagination. Amplification effect was found in the joint imagination condition, for males in the positive condition. These findings indicate that social alignment, which is influenced by subtle, vocal, and physical cues, may also be observed when individuals engage in private activities like imagining in a social setting.

Neural Signatures of Gender Stereotype Asymmetry in Word-Face and Face-Word Priming: An ERP Study

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Implicit and automatic gender stereotyping in language is well studied, but its role in face processing remains largely unexplored. We recorded Event-Related Potentials (ERPs) to a male and a female target face preceded by stereotypically associated words (e.g., conducente “driver,” badante “caregiver”) and to stereotypically associated target words preceded by a male or a female face. Participants performed a gender categorization task for faces and a lexical decision task for words/non-words. ERPs revealed a gender stereotype asymmetry: female-related stereotype violations by a male face elicited an N400 effect (in men for target faces, in women at midline sites for target words); male-related

stereotype violations by a female face elicited a P300 effect (for target words and, at anterior sites, for target faces). Female target faces also evoked an N200 effect in stereotypically congruent and an LPP effect in stereotypically incongruent context. Complementary data-driven analyses confirmed this asymmetrical N400/P300 pattern, with the N400 effect being observed only for target faces. Results suggest that faces are potent triggers of gender stereotyping, and that male- and female-related stereotyping rely on distinct mechanisms.

Affective Types and Functions of Digital Game Interlocutors

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The theoretical background of the presented study is a socio-constructivist perspective (Gergen, 2008; Hermans, 2003). According to this perspective, characters from digital games can enter the domain of the player's self and become interlocutors in their intrapersonal communication. The study aims to identify affective types of in-game interlocutors and their psychological functions. From a group of 244 players, 69 were selected for engaging in dialogues with 158 characters. The participants completed three measures: the Dialogical Activity Form (DAF), the Figure's Emotional Climate Inventory (FECI), based on a list of 24 affective states, and the Functions of Dialogues-Revised Questionnaire (FUND-R). Four affective types of in-game interlocutors were identified: Proud Rival, Faithful Friend, Ambivalent Parent, and Hesitant Doer. The first three profiles align with previously established types, while the fourth is characteristic of the digital game context. In-game interlocutors predominantly served the functions of analyzing, fantasizing, and testing. The results highlight the significant contribution of affectively laden in-game interlocutors to the personal development of players.

Cognitive Processes of Implicit Weight Bias: A Diffusion Model Analysis

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Weight bias, a negative attitude towards overweight individuals, is a growing concern with rising obesity rates, highlighting the need to understand its underlying mechanisms. To investigate this, we leveraged a Bayesian hierarchical diffusion model as this model can disentangle cognitive processes, including potential perceptual and judgmental biases. Specifically, in two empirical studies (N1 = 164, N2 = 226), we used an affective priming task, in which participants were primed with images of various body types (underweight to obese), followed by positive or negative adjectives which they had to classify. Although instructed to ignore primes, participants' response times are typically influenced by them, serving as a measure of implicit attitudes. The modeling results of the first study suggest a judgmental bias (starting point) for overweight compared to normal- and underweight primes, with lower expectations of seeing a positive word after exposure to the overweight prime. However, our second study failed to replicate this effect, as no weight bias emerged, not even in response times, possibly due to the sample being on average overweight. Future research should examine the link between one's own weight and weight bias.

Leveraging Self-Prioritization to Enhance Performance in Dynamic Working Memory Tasks

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This study builds on the Self-Prioritization Effect (SPE) framework, which suggests that self-associated stimuli are processed more efficiently than others. In the context of MOT, the SPE suggests that self-associated stimuli can capture attention more effectively, leading to improved tracking performance under certain conditions. In a multiple object tracking (MOT) task, participants associated social labels with different stimuli (colored discs, abstract shapes, colored shapes) and tracked them under varying cognitive loads. Two conditions were tested: homogeneous (same-type stimuli) and heterogeneous (different-type stimuli). Results showed that SPE emerged at set sizes 6 and 8, enhancing tracking accuracy for self-associated stimuli in heterogeneous conditions. However, this advantage disappeared at set size 10 and reversed in

homogeneous conditions. Accuracy decreased with increasing set size, reflecting visual working memory limits. The findings demonstrate that self-salience enhances attentional resource allocation in dynamic tasks, particularly under cognitive limits. This research extends SPE to real-time working memory paradigms, highlighting the potential of self-referential cues to improve monitoring performance.

T-07: Language & Learning

A Consonantal Bias in the Process of Learning Artificial Words by Hebrew Speakers: Evidence From the Visual World Paradigm

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The prominent role of consonants over vowels ("C-bias") in auditory lexical processing is a documented phenomenon. The C-bias has been demonstrated in various languages, including Hebrew, and taps various aspects of lexical processing, raising the question of its locus and scope. This study investigates the manifestation of the C-bias in learning the meanings of artificial words. Participants learned to map artificial words to meaningless shapes. The Visual World Paradigm was employed, where eye movements are recorded while participants choose a target shape denoted by a spoken name. The target is presented along with a competitor shape, whose name shares with the target's name its consonants or vowels. Performance was better for targets that differed from competitors in their consonantal rather than in their vocalic structure, suggesting that the consonantal structure is more important than vowels in acquiring new words' meaning. These results extend previous research in Hebrew that revealed a C-bias in other aspects of auditory word processing, and supports our claim for a robust C-bias in Hebrew stemming from its morphological structure, which partially overlaps with the phonological distinction between consonants and vowels.

Who Will Speak? Speaker Identity Shapes Phonological Predictions

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Prediction models usually assume that highly constraining contexts allow the pre-activation of phonological information, though supporting evidence is mixed. We examined whether speaker identity (native vs foreign) shapes phonological predictions, exploiting the phonological errors made by foreign-accented speakers. We conducted a behavioral study with 52 participants and an ERP study with 42 participants. In both studies, participants read sentence frames followed by a final word spoken by a native- or foreign-accented speaker. The spoken word could be predictable or not based on sentence context. The speaker's identity was either cued or not by an image of the face of the speaker. In the behavioral study, participants performed a lexical decision task on the spoken word, while in the EEG study, on some proportion of trials, they indicated whether the word matched their expectations. Cueing the speaker's identity was associated with faster reaction times and a smaller negative amplitude (300-500 ms) after word onset for predictable words but not for unpredictable words. Speech prediction takes into account the phonological variability across speakers, suggesting that lexical information is preactivated at the phonological level.

The Impact of Context on Incidental Word Learning via Reading in Adults and Children

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Previous research in adults has shown that words learnt in different contexts are acquired more slowly but learnt better than words seen in identical contexts (Pagán & Nation, 2019), indicating that contextual diversity facilitates the storage of context-independent semantic representations (Bolger et al., 2008). However, it is unclear if this advantage exists when adults and children learn new words in semantically diverse contexts. In this study, 180 adults and 132 children learnt 30 unknown English words in a word-learning paradigm. During learning, unknown words were presented in either the same

repeated sentence, different sentences with the same topic (contextually diverse) or different sentences with different topics (semantically diverse). Learning was measured by comparing sentence reading times before and after learning, and via comprehension tasks. Sentence reading time results showed that adults benefitted most from words learnt in contextually diverse sentences while children benefitted most from words learnt in semantically diverse contexts. This suggests that the type of context influences adults' and children's incidental word learning differently, providing novel insights into processes underlying word learning.

Discovering Affixes Through Statistical Learning: Does Explicit Instruction Matter?

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During visual word processing, readers identify recurring letter chunks and encode their typical position within words. Using a paradigm adapted from LeLonkiewicz et al. (2020), we examined whether this ability arises from learning visual regularities and how explicit instruction influences this process. Participants were familiarized with pseudoletter strings in which affix-like chunks preceded (prefix) or followed (suffix) a random character sequence. One group received explicit instructions about the presence, number, length, and position of these chunks, while the other group was simply asked to pay attention to the strings. In the testing phase, participants categorized new pseudoletter strings as either belonging to the familiarization lexicon or not. Participants in the group without explicit instruction showed no preference for strings with affix-like chunks in their typical or reversed positions. In contrast, those who received explicit instruction were more likely to attribute new strings with a prefix in its typical position to the familiarization lexicon. These findings suggest that while statistical learning alone may be insufficient to extract positional letter patterns, explicit instruction can enhance this process.

Lexical Feedback in Perceptual Closure: How Word Frequency Shapes the Recognition of Incomplete Words; an ERP Study

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Perceptual Closure, the ability to recognize incomplete stimuli by integrating prior knowledge, has been well-studied in object perception but remains largely unexplored in language research. We examine how lexical feedback (word frequency) interacts with bottom-up visual processing when word stimuli are incomplete. Using event-related potentials (ERPs), participants performed a lexical decision task with high- and low-frequency words in complete or incomplete (top-only) formats. Behavioral results showed additive effects of word frequency and completeness. ERP analyses revealed that completeness affected early perceptual components (P100, N170) and closure related responses (VAN, P300), while word frequency modulated later lexical-semantic processing (N400). Crucially, word frequency effects emerged earlier for incomplete (350–400 ms) than complete words (400–525 ms), suggesting lexical feedback helps disambiguate perceptually difficult stimuli. Overall, these findings provide insights into the interplay between visual and linguistic information, linking models of word recognition and reading with broader cognitive and neural mechanisms of perception.

T-08: Motor Cognition

Event-Related Analysis of Balance Control While Performing a Flanker Task

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Cognitive-motor interference has been extensively studied, yet our understanding on a process level is scarce. Here, we examined whether the requirement to perform a Flanker Task impacts on balance control. To assess balance control, we measured sway variability when standing on a force plate. In two experiments (N = 69 and N = 65), participants responded faster for congruent compared to incongruent Flanker trials, and Exp. 2 revealed a larger congruency effect in a condition with 75% congruent trials than with 25% congruent trials. We analyzed

balance sway variability with an event-related approach and considered the interval after stimulus presentation and around response execution. Sway variability was analyzed within a “running integration period” and statistically compared by cluster-based permutation tests. Sway variability did not differ for congruent and incongruent trials but it generally decreased prior to response execution. This is in line with the dynamic cognitive-motor interference framework, i.e., capacity-limited cognitive processes influence balance control by temporarily putting motor adjustments “on hold” during cognitive load, followed by an “ease up” phase, reflecting that balance adjustments are postponed.

Do Self-Generated Movement Sounds Influence Hurdle Sprint Performance? The Role of Auditory Reafferences in Motor Learning

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Motor learning is shaped by sensory feedback, with auditory reafferences playing a crucial role in movement optimization. This study examines the immediate and long-term effects of incidentally generated movement sounds and their deprivation on hurdle sprint performance. Over six-weeks, 68 participants (Mage = 22 years, SD = 2.3; 60% female) trained under three auditory conditions (normal = 22, focus = 23, and deprivation = 23). Performance was assessed pre-, post-, and retention using hurdle sprint time (HSP), technique index (TI; sprint time/HSP), and takeoff-touchdown ratio (TTR) across three sprint distances (short, medium, normal hurdle spacing). Linear mixed-effects models revealed significant improvements over time for HSP, TI, and partly for TTR, but no significant interaction effects of time and training condition. Our results indicate that while hurdle sprint performance improves with practice, auditory reafferences do not significantly influence these improvements. These findings challenge previous assumptions about the role of auditory

reafferences in motor learning and provide insights for sports training.

Dissociating Explicit and Implicit Memory Contributions to the Learning of Action-Effect Relations

Marcel R. Schreiner, University of Würzburg; Wilfried Kunde, University of Würzburg

Goal-directed interactions with our environment and the acquisition of skills require learning how our actions relate to perceptual changes in the environment. There is an ongoing debate regarding the representation of such action-effect relations in memory. In four experiments we investigated the contribution of explicit and implicit memory processes to the learning of action-effect relations. Participants produced object images by pressing one of two keys. Learning was incidental or intentional and occurred under full or divided attention. In a later test phase, participants were shown the images previously produced as action effects and were asked to either reproduce the corresponding action or alternate it. Results based on multinomial modeling suggested the learning of action-effect relations to be primarily supported by explicit memory, memory to be better given intentional than incidental learning, and memory to be worse under divided than full attention during encoding. These factors affected explicit memory processes to a much stronger extent than implicit memory processes, the contribution of the latter being minimal. These findings shed light on the representational nature of action-effect relations in memory.

How Does Flow Relate to Performance: Using Mobile EEG and Eye-Tracking in Basketball Free-Throw Shooting

Paul Bejjani, Goldsmiths University of London; Guido Orgs, University College London; Karina Linnell, Goldsmiths University of London

Recent accounts have characterized flow as an optimal psychophysiological state associated with enhanced performance in sports (Harris et al. 2023) and involving three core experiential dimensions: absorption, effortless control, and intrinsic reward (Norsworthy et al., 2021). We first tested a novel experimental paradigm designed to differentiate flow from non-flow states in basketball shooting tasks

through dominant/non-dominant hand manipulation, with the primary objective of investigating the relationship between each of the three core experiential dimensions of flow and performance. Results showed that basketball players reported significantly more flow and effortless control but not absorption or intrinsic reward in dominant hand compared to non-dominant hand conditions. Furthermore, differences in effortless control were significantly and positively correlated with differences in performance between dominant hand and non-dominant hand conditions. In an ongoing study, we attempt to replicate these results while implementing mobile EEG and eye-tracking in order to investigate the mechanisms underlying the relationship between flow and performance, with the ultimate aim of developing a causal model of flow.

Prevention Actions and What They Teach Us About Ideomotor Action-Effect Linkages

Solveig Tonn, Trier University

The human action repertoire houses two complementary action types: event-producing and event-preventing actions. Goal-centered action control theories have traditionally emphasized production and neglected prevention actions. However, integrating prevention actions into these theories is crucial as they fundamentally differ in the structure of their goals: While production actions result in the presence of observable events, prevention actions result in the absence of observable events. In different series of experiments using eye-tracking, mouse-tracking, and keypress responses, we showed that despite this different structure, both action types are represented in a surprisingly similar manner. I will give an overview of these results and describe how prevented events can become represented. Based on these results, I suggest that prevention actions can be used as a novel tool to disentangle instruction-based and experience-based influences and apply this tool to advance current debates on associative and propositional linkages in ideomotor paradigms.

T-09: Statistical & Computational Modelling

All the Same? Comparing Sequential Effects on Response Time Distributions Across Paradigms Using a Within-Subject Design

Anne Voormann, University of Freiburg; Andrea Kiesel, University of Freiburg; Jeff Miller, University of Otago

Sequential modulations are a very robust observation in cognitive tasks. Sequential effects commonly reflect performance gains—faster mean response times (RTs) and higher accuracy—in case of a repetition between two consecutive trials, compared to an alternation. They occur, for example, in visual search, two-choice RT tasks, interference tasks, and task-switching. An initial study showed that both commonalities, hinting towards a common mechanism, and differences, highlighting task-specific influences, exist in sequential effects on RT distributions across these paradigms. This study, however, used a between-subject design. In the present study (N = 64), we manipulated paradigm within-subjects and used methods designed to maximize the similarity of stimuli and responses across paradigms. To allow a thorough comparison of sequential effects across paradigms, we relied on both descriptive (e.g., Ex-Gaussian) and process-oriented analysis of RT distributions (e.g., diffusion model) rather than focusing on mean RTs. Overall the results reveal similarities, especially for the two-choice RT task, visual search, and task-switching, while also showing differences in sequential effects on RT distributions across paradigms.

When You Should and Should Not Use Mixed Models

Henrik Singmann, UCL

Mixed-effects models are among the most important and influential statistical developments of the last decades. One key for their success are software tools that make it easy for users to apply them to their data. Because of the availability of these tools and pressure from reviewers and editors, many researchers feel the need to incorporate mixed models into their methodological arsenal. In my talk I provide recommendations of when and when not to use these tools. In short, I recommend that mixed models should only be used when they provide a clear benefit over well-established procedures such as repeated-measures ANOVA. The list of cases in which they provide a benefit are: Continuous within-subjects

independent variables; Crossed random effect (i.e., simultaneously accounting for effect of participants and items); Nested random effects (e.g., participants tested in groups/classes); Mixed between-within factors (each participant sees subset of factor levels, but not all levels); Missing values in within-subjects factors; Within-subjects factors with many levels, multiple observations per participant and level, and large violations of sphericity.

A Multilayer Model of Automatization: Core Processes Driving the Emergence of Automatic Action Control

Hermann Müller, Justus Liebig University; Rouwen Canal-Bruland, Friedrich Schiller University; Stefan Kuenzell, University of Augsburg; Torsten Schubert, Martin Luther University Halle-Wittenberg

The final stage of a learning process is often described as automatic. Yet, over the past decades various theories offered different concepts of what automatic means and how automatic and non-automatic processes relate to each other. We propose a model that is capable of specifying how automatization emerges by means of practice. The basic proposition is that cognitive control occurs at hierarchically different processing levels involving signs of both, being controlled and automatic. The superordinate level controls the behaviour of the subordinate levels by specifying tasks, determining the control policy, and monitoring the output, thus leading to additional costs in terms of time and effort. The control units in the MMA are adaptive and can learn to recognize regularities, anticipate tasks, and generate goal-directed outputs. During learning, lower level units become more and more independent from intervening control signals by upper levels, which frees higher-level processing capacities. In the model, we specify the necessary and sufficient prerequisites and mechanisms for automatization. We explain and discuss how the properties of the MMA transfer to human automation processes.

Intra-Individual Variability in Cognitive Control: Insights From Dynamic Structural Equation Modeling

Jean-Paul Snijder, RWTH Aachen

Cognitive control is a central construct in cognitive psychology, yet its validity has been questioned due to

consistent reports of low correlations between its tasks. Traditional methodological approaches typically only rely on mean reaction time (RT) as a proxy for performance, potentially overlooking the dynamic and fluctuating nature of attention. In this presentation, I propose that Dynamic Structural Equation Modeling (DSEM) offers a more nuanced and valid approach to modeling cognitive control. DSEM captures intra-individual variability, temporal trends, and change over time—potential key features of attentional processes not addressed by the use of summary statistics. I present results from cognitive control tasks demonstrating how DSEM reveals meaningful within-person patterns that are missed by conventional methods, and how those patterns correlate between persons. These findings support the integration of dynamic modeling approaches to enhance the modeling of cognitive control and offer new avenues for understanding its temporal structure.

As Short as Possible? Experimentally Comparing Verbal and Pictorial Single-Item Scales of Perceived Usability and Their 10-Item Counterparts

Elisa Gräve, Heinrich-Heine University; Raoul Bell, Heinrich-Heine University; Axel Buchner, Heinrich-Heine University

Perceived usability is typically investigated using verbal multi-item questionnaires since measurements based on many items are often considered more reliable than measurements based on a few items. However, in time-critical studies single-item measurements may be advantageous due to their efficiency. Furthermore, non-verbal scales are attractive for collecting data from individuals with limited language proficiency. In this study, it was investigated whether verbal and pictorial single-item scales reflect the difference in perceived usability between a well-designed and a poorly designed web-based mobile phone contract system better than their 10-item counterparts. Across two experiments, both single-item scales, the verbal Adjective Rating Scale and the Pictorial Single-Item Usability Scale, reflected the perceived-usability difference at least as well as their 10-item counterparts, the System Usability Scale and the Pictorial System Usability Scale. Moreover, the pictorial scales reflected the perceived-usability difference nearly as well as their verbal counterparts. In summary, both single-item

measurements can thus be regarded as efficient and valid alternatives to their 10-item counterparts.

T-10: Individual Differences

Domain-General Processing Speed and Linguistic Experience Differentially Affect Lexical Retrieval and Structural Assembly During Language Production

Florian Hintz, Philipps University; Mohammad Momenian, Hong Kong Polytechnic University

Producing words and sentences relies on lexical retrieval and structural assembly processes, which are supported by domain-general skills. Here, we used an individual differences approach to test how task complexity affects the involvement of domain-general skills and domain-specific moderators in language production. 169 participants completed three production tasks that capitalized on lexical retrieval (picture naming) and structural assembly (phrase and sentence generation). In addition, they completed 15 tests measuring linguistic experience, processing speed, working memory, and nonverbal reasoning. Our analysis showed that extensive linguistic experience reduced onset latencies. However, its effect interacted with task, suggesting that it benefited lexical retrieval more than structural assembly. Complementary to this interaction, processing speed selectively predicted phrase and sentence generation but not picture naming. Nonverbal reasoning affected production speed in all three tasks, suggesting a non-selective influence. Working memory only had a weak effect. These results provide novel insights into the cognitive architecture supporting production and highlight the value of a holistic individual differences approach.

Does Plain Language Result in Clear Communication? Findings From a Systematic Scoping Review and From a Series of Observational Studies

Rob Davies, Lancaster University; Mathew Gillings, Vienna University of Economics and Business; Sarah Chadwick, Lancashire Public Health; Michael Ratajczak, Lancaster University

Will audiences better understand us if we use plain language? In health communication, producers of text

for public consumption worry that what they write will be too difficult. Policy responses have comprised guidance that writers must use plain language -- short common words and short simple sentences -- to close the gap between predicted reading levels of texts versus estimated reading skills of audiences. Cognitive accounts assume that comprehension will be predicted not just by sentence- or word-level properties but also by text-level cohesion. What works? To answer this question, we report (1.) a systematic evidence review of two relevant research traditions: studies that either assess the readability of many texts but rarely test reader responses, or studies examining responses to few texts among many participants. Simulation-based design analyses suggest prior research lacks adequate sampling. We report (2.) Bayesian multilevel models of data from 24 studies, wherein 1304 participants responded to 105 health texts. We show comprehension accuracy is predicted by participant vocabulary, reading strategy, and health literacy, text readability, and interactions where cohesion effects are amplified given higher health literacy.

The Individual Differences in German Language Skills (IDLaS-DE) Test Battery

Sandra Bethke, Max Planck Institute for Psycholinguistics; Antje S. Meyer, Max Planck Institute for Psycholinguistics; Florian Hintz, Philipps University

Humans differ greatly in their ability to use language. However, systematic examinations of individual differences in language skills are scarce, as they require large numbers of participants and the assessment of multiple constructs (each assessed in multiple tests). Recently, the Individual Differences in Language Skills test battery was developed for Dutch (IDLaS-NL, Hintz et al., 2025) – a tool to comprehensively assess language and domain-general skills implicated in language. Here, we introduce the German adaptation, IDLaS-DE, which consists of 30 tests capturing eight constructs: (1) Linguistic knowledge, (2) Nonverbal processing speed, (3) Working memory, (4) Nonverbal reasoning, (5) Word production, (6) Sentence production, (7) Word comprehension, (8) Sentence comprehension. We present the overall architecture of IDLaS-DE and data from an online study where we evaluated its factor structure in 181 adult German speakers using confirmatory factor analyses. The analyses demonstrated that, as an adaptation of IDLaS-NL, IDLaS-DE has good construct validity and

provides a standardised approach to cross-linguistic studies on individual differences in language skills. IDLaS-DE is freely available to the research community.

How Sensitivity to Cognitive Rewards Changes Throughout Development

Tal Nahari, University College London; India Pinhorn, University College London; Tali Sharot, University College London

Humans find many cognitive activities pleasurable. We hypothesize that this pleasure stems from specific mental outcomes associated with these activities such as the expansion of knowledge, reduction of uncertainty, experience of novelty and agency. Here, we explore how sensitivity to such ‘cognitive rewards’ develops with age. Participants (N = 322, ages 4-12) rated their enjoyment of tasks that provided different cognitive rewards, as well as their non-rewarding, matched, counterparts. Ratings revealed that sensitivity to cognitive rewards followed an inverse U-shaped curve, peaking around age 9. Clustering analysis revealed two groups of participants: those with a domain-general high sensitivity to cognitive rewards and those with domain-general low sensitivity. Interestingly, children become more prototypical of their group with age. Together, these findings suggest that the development of sensitivity to cognitive rewards is domain-general, with a heightened sensitivity window around 9Y, which is also the peak of anatomical changes within the frontal lobes. This developmental window may be important for fostering long-term positive attitudes toward learning.

From One Emotion to Another: Why ADHD Makes It Difficult?

Tehila Nadav, Ben-Gurion University of the Negev; Avishai Henik, Ben-Gurion University of the Negev

Emotional dysregulation (ED), is a core feature of ADHD, affecting functioning and well-being. Individuals with ADHD exhibit enhanced reactivity to emotional stimuli, which may make it harder for them to flexibly transition between emotional states in daily situations. These difficulties likely stem from deficits in emotional and attentional processing, making emotional regulation more effortful. To examine these processes, we conducted

two studies using a Picture-Picture Priming Task. Study 1 included 30 adults with ADHD and 30 neurotypical controls who evaluated the valence of a target picture preceded by a prime (100 ms). Primes varied in valence (positive/negative/neutral), creating congruent, incongruent, and neutral conditions. Results showed that ADHD participants had greater difficulty transitioning between emotions, particularly when a negative prime preceded a positive target. Study 2 (N=70, 35 ADHD) replicated these findings and examined the role of attentional functioning. Attentional abilities were assessed via self-reports and an attention task. our findings highlight the interplay between emotional and attentional processes in ADHD and highlight the need to consider both domains when developing interventions for ED.

16:10 – 17:50: Symposia

KSVM-02: The Role of Mental Simulation in Thinking

Chair(s): Isabel Orenes, Universidad Nacional de Educación a Distancia

Symposium Abstract

Mental simulation is crucial in thinking. People represent possibilities to draw conclusions. Ruth Byrne has been interested in how individuals reason, especially by counterfactuals, in which people represent both what actually happened and what might have happened but did not. Her studies reveal that imagining alternatives to reality is core to cognition and rationality. This symposium will bring together researchers examining the role of mental simulation in thinking from multiple perspectives, aiming to uncover its complexities and deepen our understanding of key aspects and mechanisms of mental simulation relevant for cognition. The first talk presents a new theoretical proposal suggesting that human verifications depend on counterfactual scenarios. The second talk examines whether general cognitive mechanisms, such as inhibition, underlie counterfactual processing. The third talk focuses on the effects of counterfactual thinking and participants’ age on blame attributions. The final two talks broaden the scope by including the impact of kinematic mental simulation on false memories of actions and naive programming.

Inhibition Effects on Affirmative and Negative Factual and Wish-Counterfactual Sentences: Evidence From Two Eye-Tracking Studies.

Isabel Orenes, Universidad Nacional de Educación a Distancia; Yurena Morera, Universidad de La Laguna; David Beltrán, Universidad Nacional de Educación a Distancia; Manuel de Vega, Universidad de La Laguna

This study explores whether inhibition process interplay with linguistic negation by tracking the ocular fixations. To test this, we used a cognitive inhibition task, the Hayling task, in which participants were asked to complete a sentence, such as ‘Manuel pulled out the corkscrew to open the...,’ with a highly predictive word (e.g., bottle; Automatic condition) or with an unpredictable word (e.g., barricade; Inhibition condition). This task was combined with the visual world paradigm, in which affirmative and negative factual sentences (e.g., Experiment 1: He (did not) put ham) or counterfactuals (Experiment 2: He wishes he had (not) put ham) were heard while two images, such as a ham and a cheese, were shown on the screen and eye movements time course were monitored. We found that the Inhibition condition decreased fixations compared to the Automatic condition, but this suppression was lower for negative than affirmative factual sentences. This pattern is reversed for counterfactuals. These results support the involvement of inhibitory mechanisms during negation and counterfactual processing.

The Effect of Counterfactual Thinking and Age on Victim Blaming.

Stefania Pighin, University of Trento; Alessandro Bogani, University of Trento; Benjamin Timberlake, University of Trento; Katya Tentori, University of Trento

Victim blaming, the tendency to attribute fault to individuals for their misfortunes, has often been studied in contexts where assumptions about individuals’ culpability might arise. In four online experiments (N = 1,157), we examined victim blaming in accident scenarios where victims bore no responsibility, focusing on the effects of counterfactual thinking and participants’ age on blame attributions. Younger adults (18–40) and older adults (≥ 65) read hypothetical scenarios in which victims either engaged in or avoided a legitimate but non-routine action prior to the misfortune—a manipulation intended to evoke counterfactual thoughts—and rated the degree of blame assigned to

victims. The results showed that older adults attributed less blame to victims than younger adults, while counterfactual thinking only minimally increased victim blaming. These findings remained consistent across variations in working memory load (Experiment 1), accident severity (Experiment 2), and scenarios where accidents caused victims to miss significant opportunities (Experiments 3– 4). The mechanisms underlying age differences and potential moderators of counterfactual thinking’s effects are discussed.

The Role of Kinematic Mental Simulation in False Memories of Actions

Monica Bucciarelli, Università di Torino; Francesco Iani, Università di Torino; Teresa Limata, Università di Torino; Ivan Nabil Ras, Università di Torino

Action observation triggers a kinematic mental simulation of the action unfolding in time, hereafter forward simulation: studies have shown that when participants saw a photo representing actions unfolding in time, they were faster in the evaluation of photos showing the forward phases of the actions compared to photos showing the backward phases. In a series of experiments we investigated whether participants are more likely to spontaneously develop false memories for the later phases of a seen action than for the earlier. Participants watched a series of still photos of unfolding actions on objects, and 15 minutes later they were asked to complete a recognition task. At recognition, participants viewed photos representing temporally distant moments, backward or forward in time compared to the original, along with the same photos seen at encoding. Results showed that participants tended to accept as seen at encoding forward photos more than backward photo; they believe they saw moments of the action subsequent to the moment observed. These studies on the perception and memory of observed actions have important implications for investigative and forensic practice.

The Role of Mental Simulations in Naive Programming

Robert Mackiewicz, SWPS University Warsaw

Individuals with no prior experience in programming can design algorithms to solve everyday tasks. The theory of mental models suggests that the ability to

formulate programs is an extension of everyday thinking. It proposes that people can devise algorithms through kinematic mental simulations of processes that transform inputs into desired outputs. This concept has been tested in research using various experimental environments that facilitate visualizing the steps of such processes. Studies involving toy trains moving along tracks with sidings examined how mental simulations assist in designing algorithms to rearrange the order of train cars. Similarly, experiments with pebbles being transferred between containers explored how mental simulations aid in creating simple programs for arithmetic calculations. Both types of studies demonstrate that individuals without programming experience can develop functions incorporating while loops. The difficulty of forming such functions depends not on the number of steps in the simulated process but on the complexity of the algorithm required to execute it. The results of these experiments show how the concept of mental simulations can be used in the pedagogy of computational thinking.

SYM-08: Cognitive Mastery in Play: From Board to Digital Games as Models of Expertise

Chair(s): Nemanja Vaci, University of Sheffield

Symposium Abstract

This symposium explores ways to advance understanding of expertise development by focusing on board and digital games as frameworks for understanding cognitive processes. Chess and similar board games were used extensively to study how abilities and training intersect and offer insight into specific cognitive processes, such as memory chunking and pattern recognition. Digital games offer new platforms to test these factors with larger and more varied player datasets and flexible environments where responses to complex environments can give us insights into learning speed, adaptation to changes, and error correction. Combining these perspectives opens opportunities to develop new understanding and models of cognition that reflect both the structured learning of board games and the dynamic adaptation required in digital games. The symposium will explore various topics, including causal models that explain the interaction between deliberate practice and cognitive abilities in shaping expertise, the influence of AI advancements on

decision-making quality in chess, and how the intrinsic motivation inherent in digital games sheds light on diverse strategies for skill acquisition. Additionally, it will examine how these skills relate to processing speed and other individual differences.

Causal Modelling of Interplay Between Abilities and Practice in Expertise

Nemanja Vaci, University of Sheffield; Merim Bilalić, Northumbria University; Roland Grabner, University of Graz

The development of human skills is influenced by a complex interplay of factors, yet their causal relationships remain underexplored. While prior research on expertise emphasizes the role of deliberate practice as a primary driver of skill acquisition, intelligence research highlights the importance of cognitive abilities. A growing body of evidence suggests that both factors, along with other individual differences, contribute to skill acquisition and retention. In this study, we will test a comprehensive causal framework to model the interplay between deliberate practice and numerical ability, when controlling for measures of motivation and types of emotional processing. Through the application of structural equation modelling and causal machine learning models we will evaluate several directed acyclic diagrams, i.e. causal models, that illustrate how numerical abilities and deliberate practice interplay to influence expertise development. The models will be tested on data from 256 chess players, which combines measures of cognitive abilities, chess-related motivation, types of emotional processing and career-long changes in measures of chess rating. Our findings will discuss the structure of the causal model for expertise acquisition in chess.

Understanding Fun: Using Video Games to Study Intrinsic Motivation

Franziska Brändle, University of Oxford

In our daily lives, we engage in many activities not for extrinsic rewards, but because we enjoy them. Why do we do this, and what makes an activity intrinsically rewarding? Researchers have explored these questions for decades, but their reliance on simple paradigms and extrinsic incentives has potentially obscured the dynamics of intrinsic motivation. We propose a novel approach: using video games. Their

intuitive and engaging nature makes them ideal paradigms for studying not only intrinsic motivation but also cognition more broadly. In this talk, I will present insights into using video games as experimental paradigms and discuss two projects on intrinsic motivation. In the first, we analyzed the behavior of 30,000 players of the game “Little Alchemy”, and found the previously unexplored strategy of empowerment. In the second, we examined players’ preferences across three large-scale video game data sets, revealing signatures of learning progress alongside two additional factors. Together, these studies demonstrate the potential of video games as tools for studying intrinsic motivation in ecological and engaging settings.

The Role of AI in Transforming Elite Human Performance

Merim Bilalić, Northumbria University; Mario Graf, Klagenfurt University; Nemanja Vaci, University of Sheffield

Advances in Artificial Intelligence (AI) have made significant strides in recent years, often supplementing rather than replacing human performance. The extent of their assistance at the highest levels of human performance remains unclear. We analyse over 11.6 million decisions of elite chess players, a domain commonly used as a testbed for AI and psychology due to its complexity and objective assessment. We investigated the impact of two AI chess revolutions: the first in the late 1990s with the rise of powerful PCs and internet access, and the second in the late 2010s with deep learning-powered chess engines. The rate of human improvement mirrored AI advancements, but contrary to expectations, the quality of decisions mostly improved steadily over four decades, irrespective of age, with no distinct periods of rapid improvement. Only the youngest top players saw marked gains in the late 1990s, likely due to better access to knowledge and computers. Surprisingly, the recent wave of neural network-powered engines has not significantly impacted the best players –at least, not yet. Our research highlights AI’s potential to enhance human capability in complex tasks, given the right conditions, even among the most elite performers.

Cognitive Correlates of Expertise in Video Game Players

Eleanor R. A. Hyde, University of Sheffield; Robert Schmidt, Ruhr-University Bochum; Daniel J. Carroll, University of Sheffield; Claudia C. von Bastian, University of Sheffield

Abstract: Fast-paced, complex and dynamic video games, such as First-person Shooter (FPS) games, demand diverse cognitive abilities. Existing research suggests that FPS players outperform non-video game players in domains such as perception, attention and spatial cognition (Bediou et al., 2023; 2018, but see Sala et al., 2018). Furthermore, video game players have been shown to outperform board game players in cross-sectional studies (Martinez et al., 2023). While video game intervention studies are limited, preliminary evidence suggests potential cognitive benefits (Smith & Basak, 2023; Bediou et al., 2023; 2018). Importantly, cognitive outcomes appear to vary by game genre due to differences in mechanics and gameplay, requiring distinct evaluation of their cognitive correlates. This research investigates the relationship between cognitive performance and video game expertise in players of the FPS game Counter-Strike and multiplayer online battle arena (MOBA) game League of Legends. Specifically, it examines how expertise in video games relates to performance in processing speed, multitasking, Hebb-repetition learning, and preliminary findings from a comparative analysis of professional Counter-Strike and League of Legends players.

Modelling the Acquisition of Expertise in Board Games

Fernand Gobet, London School of Economics and Political Science

CHREST (Chunk Hierarchy and Retrieval Structures; e.g., Gobet & Lane, 2017) is a cognitive architecture that has been used for simulating cognitive tasks (e. g. concept formation), the acquisition of language and the acquisition of expertise in board games, music and literature. CHREST models learning through chunking – storing patterns of meaningful information – and the development of templates, which allow flexible application of knowledge in novel situations. The talk will provide an overview of computer simulations of board-game expertise acquisition. With chess, CHREST has accounted for phenomena like expert pattern recognition and rapid decision-making. It predicts the acquisition of a large number of chunks (half a million) for reaching grandmaster

level. It has simulated in detail expert chess players' behaviour in memory recall experiments, including the reconstruction of different types of board positions and eye-movement patterns. CHREST's computational implementation enables precise testing of hypotheses about cognitive processes in expertise. Gobet, F. & Lane, P. C. R. (2017). Constructing a Standard Model: Lessons from CHREST. Proceedings of the 2017 AAI Fall Symposium Series.

SYM-09: How Does Long-Term Memory Knowledge Support Working Memory? The Effects of Meaningfulness, Levels of Processing and Elaboration

Chair(s): Alessandra S. Souza, University of Porto; Nuno D. Sobrinho, University of Porto

Symposium Abstract

It is well established that working memory (WM) capacity is limited. This strict capacity limit has been observed under conditions minimizing the use of strategies and long-term memory (LTM) knowledge. Yet, in daily life, we use WM to store information rich in semantic associations such as images or words, which can substantially reduce the demands on WM's limited capacity. This symposium provides a roadmap to understand when LTM knowledge supports WM by examining different dimensions of this relationship. The first two talks address visual materials, focusing on manipulations of (a) meaningfulness, and (b) levels of processing. The third talk focuses on (c) elaboration – a maintenance strategy based on prior knowledge – with verbal stimuli. Finally, prior knowledge and elaboration effects are (d) compared across the visual and verbal domains and (e) examined considering cognitive aging. In sum, this symposium clarifies and summarizes how existing knowledge can facilitate new learning in WM, buffering against reduced capacity.

Meaningful and Familiar Stimuli Support Visual Working Memory for Simple Features

Yong Hoon Chung, Dartmouth College; Viola Störmer, Dartmouth College

Prominent theories of visual working memory postulate that its limited capacity to actively maintain

visual information is fixed. Recent studies have challenged this view, demonstrating that capacity is increased for meaningful stimuli, such as images of real-world objects, over simple and abstract visual stimuli. In this talk, we show that real-world objects (and shapes of meaningful stimuli) can also enhance visual working memory capacity for their colors – simple visual features that are not meaningful themselves – by serving as an effective memory scaffold. We further investigate the roles of perceptual and conceptual distinctiveness of the objects in supporting feature working memory, as well as electrophysiological markers of such increases in memory capacity. Overall, we propose that prior semantic knowledge can support visual working memory for simple features by expanding their representational dimensionality, underscoring the essential role of meaningfulness in visual working memory.

Levels of Processing Effects on Visual Associative Memory for Basic Perceptual Features

Nicolas Rothen, UniDistance Suisse; Mirela Dubravac, UniDistance Suisse; Chhavi Sachdeva, UniDistance Suisse; Rebecca Ovalle-Fresa, UniDistance Suisse

The levels of processing (LOP) framework, extensively studied with verbal materials, suggests that deeper semantic encoding enhances memory compared to shallow perceptual encoding. While prior research has explored this effect using nameable images, little is known about LOP effects on basic visual features like color. We investigated LOP effects on color recall in visual associative memory. In a first laboratory-based study (N=187), we examined memory for object-color and fractal-color associations using recognition and cued recall paradigms. Results revealed robust LOP effects. In a second online study (N=307), we replicated and extended the cued recall paradigm for object-color associations with a size judgment condition to minimize potential confounding factors like self-reference and task relevance. Memory performance was consistently superior under deep encoding conditions (e.g., real-life size judgments) compared to shallow encoding (e.g., perceptual size judgments). Together, these findings demonstrate the impact of LOP beyond verbal materials to basic visual features and highlight the importance of elaborative processes in visual associative memory.

How Does Prior Knowledge Buffer Against Age

Deficits in Working Memory?

Vanessa M. Loaiza, University of Sheffield

Age differences in the ability to temporarily maintain a limited amount of information in working memory (WM) are well documented, with extensive work devoted to understanding the mechanisms that contribute to the deficit as well as methods to ameliorate it. One promising avenue of research concerns how prior knowledge in long-term memory mitigates age deficits in memory performance overall, especially WM, given that limits in its capacity constrain a great deal of other related cognitive variables. The purpose of this talk is to provide a synthesis of the evidence concerning this question, particularly as it relates to the theoretical traction gained from addressing it. For example, that age deficits tend to be disproportionately larger for visual versus verbal information is often taken as evidence in favor of models that posit separate domain-specific subsystems in WM. However, given the research showing that older adults are particularly sensitive to semantic meaningfulness that visual information typically lacks, the source of this age asymmetry could at least partially reflect the broader impacts of prior knowledge on memory ability. Implications for the relationship between WM and long-term memory are also discussed.

Elaboration Effects in Verbal and Visual Working Memory: Same or Different Processes?

Nuno D. Sobrinho, University of Porto; São Luís Castro, University of Porto; Alessandra S. Souza, University of Porto

Elaboration is the memory strategy of associating prior knowledge with new to-be-remembered information to boost its retention. Here, we present a series of experiments examining the role of elaboration in visual and verbal working memory (WM). We contrasted two types of elaboration: Passive elaboration refers to the presentation of stimuli that align with prior knowledge (e.g., typical object-color bindings or semantically related word pairs); whereas proactive elaboration requires the active application of prior knowledge, usually facilitated by instruction (e.g., autonomously generating sentences or mental images). Presenting stimuli that trigger prior knowledge associations (aka passive elaboration) benefited visual and verbal WM. Regarding proactive elaboration, visual WM was

facilitated by sentence generation, but this benefit was constrained to trials in which there was a long time to implement the strategy. In verbal WM, we observed a modest tendency for a benefit of visual imagery, but not sentence generation, compared to a free-strategy control condition. These results show how time, proactivity, and the domain of the created associations (visual vs. verbal codes) differently impact elaboration benefits on WM.

Symposium Discussion

Alessandra S. Souza, University of Porto
Symposium Discussion

SYM-10: Individual Differences in Visual Attention

Chair(s): Alon Zivony, University of Sheffield

Symposium Abstract

Visual attention is a set of mechanisms that limit visual processing to a subset of stimuli, shaping what we see and what we can act upon. Differences in this fundamental cognitive function can have a substantial impact on people's ability to navigate the world. Yet many gaps remain in our understanding of how such differences come about, and what impact they might have on people's lives. In this symposium, we will present new research into individual differences in visual attention, their antecedents, and their outcomes. Alon Zivony will present a new method to study the speed of attention, which overcomes past methodological challenges. Anna Grubert will show evidence that working memory capacity is associated with one's ability to employ multiple attentional templates, which guide visual attention. Dominique Lamy will examine whether attentional suppression of visual distractors underlies distractibility in ADHD. Carmel Mevorach will explore the links between the control of visual attention on one hand, and autistic traits and psychotic tendencies on the other. Finally, we will reflect on the challenges that come with studying individual differences in visual attention and discuss avenues for future research.

A New Method for Studying Individual Differences in the Speed of Attention

Alon Zivony, University of Sheffield; Claudia C. von Bastian, University of Sheffield; Rachel Pye, University of Reading

How quickly we attend to objects plays an important role in navigating the world, especially in dynamic and rapidly changing environments (e.g., a busy street). Reaction times (RTs) in visual search tasks have often been used as an intuitive proxy of this ability. However, such measures are limited by inconsistent levels of reliability and the multitude of non-attentional factors that can affect an individual's RT. Here, we present an alternative method of studying individual differences in the speed of attention. Specifically, we employ rapid serial visual presentation (RSVP) tasks, where a target is presented for brief durations and embedded among multiple distractors. We review experimental and EEG evidence that slower attentional deployment increases the likelihood to report the identity of a distractor instead of the target—a distractor intrusion. Intrusions emerge independently from measures of attentional control and a well-known limitation in temporal attention (the attentional blink). We also present findings that an individual's intrusion rate can be measured reliably within a short (5-minute) session, making the distractor intrusion paradigm a useful tool for research into the temporal dynamics of attention.

Individual Capacity Differences in Memory-Guided Visual Search

Anna Grubert, Durham University; Ziyi Wang, Durham University; Courtney Turner, Durham University

Visual search is guided by attentional templates, i.e., target representations held in visual working memory (vWM). vWM is known to be limited to 3-4 items. Similar capacity limitations have been observed in visual search, but it is unknown whether they are directly linked to individual vWM capacity. We tested this by correlating behavioural and electrophysiological markers of individual vWM capacity (Cowan's k , CDA components) measured in one, two, and three colour change detection tasks with behavioural and electrophysiological markers of search efficiency (accuracy rates, N2pc components) measured in one, two, and three colour search tasks. Results revealed load effects both in the memory and search tasks with larger k values and CDA amplitudes and lower accuracy rates and N2pc amplitudes in high- as compared to low-load trials, respectively. Critically, vWM indices predicted search performance: Individuals with larger k values and CDA amplitudes produced greater search accuracy and

N2pc amplitudes, and smaller load costs both in terms of search accuracy and N2pc amplitudes. These results suggest that individual search performance in multiple as compared to single colour search directly depends on individual vWM limitations.

Visual Distraction and Experience-Based Suppression in ADHD

Dominique Lamy, Tel-Aviv University; Mor Sasi, Tel-Aviv University; Tair Vziel, Tel-Aviv University; Nitzan Shahar, Tel-Aviv University;

Although "easily distracted" is a core diagnostic criterion for attention-deficit/hyperactivity disorder (ADHD), its underlying mechanisms are poorly understood. The few studies on ADHD that relied on experimental tasks specially designed to study visual distraction in the general population reported mixed findings. Here, we suggest that failure to consider experience-based suppression, that is, suppression of irrelevant information after repeated exposures, may explain the inconsistent findings. Therefore, we investigated distraction in ADHD while disentangling distraction by novel salient distractors and experience-based suppression of these distractors. Participants searched for a target shape and a salient-color distractor was either present or absent. Its color changed at the beginning of each block. We compared baseline distraction (performance cost on distractor-present versus -absent trials in the first block halves), and feature-based suppression efficiency (reduction of this cost from the first to the second block halves) in participants with ADHD and their controls.

Individual Differences in Visual Attention as Drivers of Autistic and Psychotic Tendencies

Carmel Mevorach, The University of Birmingham

Attention control and specifically distractor suppression is a fundamental process called upon in a variety of scenarios. However, we are not all equally able to efficiently suppress irrelevant information. Similarly, the way we utilise attention control processes to achieve our goal can also differ between individuals. Given the fundamental nature of these processes, it is likely they are linked to more profound differences and difficulties we may experience in our daily life. In a series of studies, we used a combination of methodologies, including both behavioural

measures and brain imaging and brain stimulation, to elucidate the link between visual attention control and more complex behaviour manifestations. We identify different individual tendencies in attention control processes (and their underlying brain mechanisms) that map directly onto complex trait expressions such as autistic and psychotic tendencies, and even the bias towards autistic or psychotic tendency within the same individual. These findings point to the central role attention plays in our individual experiences and highlight individual strengths and difficulties that may drive intervention avenues.

Symposium Discussion

Alon Zivony, University of Sheffield
Symposium Discussion

SYM-11: On the Functional Relation Between Cognitive and Motor Processes: Current Perspectives for an Integrated View.

Chair(s): Michele Scaltritti, Università degli Studi di Trento; Simone Sulpizio, Università degli Studi di Milano Bicocca

Symposium Abstract

Everyday experience suggests that thoughts and actions are tightly intertwined and continuously interact. Differently, the dominant view in cognitive science has traditionally assumed a temporal and functional priority of cognition over action, with motor behaviors serially following the conclusion of upstream cognitive computations. This perspective has possibly contributed to the separation between cognitive and motor-control research traditions. Recent evidence from different research lines, however, strongly challenges this serial assumption and converges in showing a clear propagation of cognitive dynamics beyond the onset of the behavioral response. The symposium will present some current perspectives on the functional characterization of motor responses and of their cognitive components. The contributions will thus theoretically and empirically tackle the relation between cognitive and motor processing across multiple domains (i.e., perception, language, and decision making) and via different methodologies (i.e., behavioral and neurophysiological data,

computational modelling), with the aim to discuss new perspective and advance our understanding of the continuous interactions between cognition and action.

An Integrated Theory of Decision-Making, Motor Preparation and Motor Execution

Mathieu Servant, Université de Franche-Comté; Edouard Dendauw, Université de Franche-Comté; Gordon D. Logan, Vanderbilt University; Jeffrey D. Schall, York University; Thibault Gajdos, Aix-Marseille Université

Goal-directed behavior requires a translation of our choices into actions through muscle contractions. Research in cognitive psychology and neuroscience has focused on the decision-making process during the past fifty years, but the articulation between decision and motor systems remains poorly understood. Progressing on this issue is important for several reasons. From the perspective of decision sciences, it is unclear whether the motor system simply executes our choices or actively contributes to deliberation. From the perspective of motor sciences, understanding movements requires an understanding of neural inputs to muscles and upstream processes that determine them. I will present a novel theoretical framework linking decision and motor processes, the gated cascade diffusion model, which provides insight into the questions raised above. The model captures a variety of decision and motor phenomena in choice tasks that tap into different cognitive domains.

Perceptual Decision Correlates in the Peripheral Motor System

Luc Selen, Radboud University Nijmegen; Pieter Medendorp, Radboud University Nijmegen; Yvonne Visser, Radboud University Nijmegen

The evaluation of sensory information plays a pivotal role in the selection, preparation and execution of goal-directed action. Although Donders advocated a serial nature of these events, contemporary theories of sensorimotor control and decision making propose a continuous interaction between the different stages at all levels of the sensorimotor hierarchy. In this talk we will provide experimental evidence for continuous interactions between central perceptuomotor- and peripheral motor systems, based on EMG and EEG signals. First, we show that the initial peripheral motor state of the upper limb differs between trials that do or

do not result in a revision of a reach. Second, we show that cortico-muscular coherence between motor cortex and upper limb musculature tracks the evidence accumulation of the perceptual decision process. Finally, we provide evidence that express visuomotor responses can serve as a readout of the competition between two action opportunities, between which participants are free to choose. We will discuss how those findings should shape future research in more naturalistic conditions, where the different stages of reach control will become even more intertwined.

Independent Decisional Components in Motor-Response Execution

Michele Scaltritti, Università degli Studi di Trento; Saman Kamari Songhorabadi, Università degli Studi di Trento; Elisa Fiora, University of Milano Bicocca; Simone Sulpizio, University of Milano Bicocca

Response times (RTs) capture the summed duration of multiple task-related processes, including the motor-activity required to perform the response. The present research assessed the functional specificity of the decisional components unfolding during response execution. Over a series of lexical decision experiments, single-trial electromyographic (EMG) traces of the manual responses were used to partition RTs into premotor (PMTs; from stimulus onset until the onset of the EMG burst) and motor times (MTs; from EMG onset until the button-press). The results revealed that a) lexuality effects (slower latencies for pseudowords compared to words) affect PMTs as well as MTs, whereas lexical frequency remains bounded to PMTs, b) lexuality effects on MTs (but not on PMTs) are independent from speed-accuracy tradeoff manipulations, and c) lexuality effects on MTs (but not on PMTs) are independent from decision biases. Taken together, the results points to a dissociation of the decisional components shaping RTs before and after the onset of a motor behavior. The discussion will focus on the resulting functional interpretation of motor-decisional components, also informed by data from an ongoing experiment measuring response confidence.

The Missing Link Between Response Selection and Execution in Language Production

Svetlana Pinet, BCBL Basque Center for Cognition, Brain and Language, and Ikerbasque, Basque Foundation for Science

Language production models are very informative for predicting response times (RT, i.e., the time from stimulus presentation to the onset of speech), but much less for predicting response durations (i.e., the time from the onset of speech to the end of production). In this talk, I will outline the challenges related to the measurement of word durations in language production, highlighting gaps in current theoretical frameworks and the resulting difficulty in interpreting available evidence whether in spoken or written language. To compensate for limited theoretical predictions regarding response durations, I will turn to the field of motor control to provide informative analogies. In particular, recent theoretical proposals have suggested that planning and execution stages overlap in time, with response planning continuing even after the initiation of the motor response, and that a gating mechanism can control the launch of response initiation. Similar dynamics could easily be assumed in language production, which could help bridge the gap from response selection to response execution and extend current models of language production to account for motor execution.

A Kinematic Analysis of Interoceptive Grounding of Conceptual Knowledge

Laura Barca, Institute of Cognitive Sciences and Technologies - Italian National Research Council

Interoception, the sense of one's own bodily state, has recently emerged as a critical factor shaping cognitive processes. In this presentation, I will discuss studies that, by integrating movement-based measures with traditional cognitive paradigms, sheds light on the dynamic interplay between bodily states, cognitive processes, and behavior. Study 1 highlight the malleability of the boundaries between emotional concepts, and how their conceptual representation is influenced by individual characteristics of affectivity, and psychological stressor. Two-dimensional (i.e., affective valence and physiological arousal) topographical maps of emotional concepts, gathered from a similarity judgement task, offers a graphical representation of affective knowledge revealing gender and age-related difference along the arousal dimensions. In study 2, movement trajectories revealed the implicit activation of interoceptive features during the categorization of concrete-natural concepts, thus beyond the abstract-emotional ones.

Overall, our results highlight the multiplicity of dimensions involved in conceptual knowledge, including the interoceptive ones.

SYM-12: Exploring Cognitive and Linguistic Mechanisms in Word Processing Across Diverse Languages and Contexts

Chair(s): Anna Yi Leung, Ludwig-Maximilians-University of Munich

Symposium Abstract

This symposium brings together five talks examining different cognitive, linguistic, and contextual factors shaping word processing. Focusing on the interplay between visual processing, orthography, phonology, semantics, and task context, our talks address key processes in reading aloud, word recognition, and word acquisition. Drawing on data from diverse languages and methodologies—including Urdu, Hindi, Persian, Chinese, Japanese, Norwegian, and pseudowords of German, French, and Estonian—in monolingual, bilingual, and foreign-language reading contexts, our talks showcase cutting-edge insights into universal and language-specific mechanisms underlying word processing. By expanding the discussion beyond the English language, this symposium fosters in-depth discussions on the cognitive and linguistic factors driving word processing in multilingual landscapes.

What Language Is This? How Expectations Shape Pronunciations

Ding Yan, University of Lille; Paolo Mairano, University of Lille; Séverine Casalis, University of Lille

However naïve an L2 learner might be, it is difficult to rule out at least some familiarity with a given L2 if it is represented on a global stage. Living in Europe, one, for example, needs not to have any formal instruction in the German language in order to have a conception of its phoneme inventory and phonotactic structure, as exposure through popular media provides ample input. A factor that might have undesirable consequences whenever naïve L2 learners are expected to not have any knowledge of L2 grapho-phonemic conventions, which can be the case when studying orthographic congruence, for instance. In order to investigate how the indication of an L2 might

be sufficient to shape L2 phonological representations, a reading-aloud task was administered. Naïve learners of German (N=170) were given three lists of 10 German words, each with a different indicated L2. Words were presented as being either French pseudowords (L1), German words (familiar L2 in France) or Estonian words (unfamiliar L2 in France). Productions were then compared to official pronunciations by measuring the phonological Levenshtein distance. Results reveal that language expectations might indeed have an unexpected influence on L2 productions that is seldom considered.

Reading Cognates in Urdu, Hindi, and Persian

Xenia Schmalz, Ludwig-Maximilians-University of Munich; Sara Chilson, Ludwig-Maximilians-University of Munich; Elmira Esmaeelpour, Alzahra University; Azizuddin Khan, Indian Institute of Technology Bombay

Models of reading have mostly been developed to explain reading in English. To overcome this limitation, the current study presents data from three understudied languages: Persian, Hindi, and Urdu. All three are Indo-European languages with inflectional morphology; Persian and Urdu are written in the Arabic script, where vowels are sometimes not represented, while Hindi is written in the Devangari script, where all sounds are represented. Importantly, due to the relatively close relation between the languages, we can compare reading processes for cognate words: words which have similar phonological forms and meanings. We collect lexical decision data for 250 words and 250 pseudowords from 50 speakers in each language. This allows us to explore any differences between the languages, such as differences in the frequency or length effect, as well as predictors that are unique to the languages, such as the effects of ligaturing. The study thus sheds light on the extent to which results from reading in English apply universally, and on language-specific features that affect universal cognitive processing in the context of reading.

Revisiting the Influence of Phonological Similarity on Cognate Processing: Evidence From Cantonese-Japanese Bilinguals

Brian W. L. Wong, The Chinese University of Hong Kong, and BCBL, Basque Center on Brain, Language and Cognition; Shawn Hemelstrand, The Chinese University of

Hong Kong; Tomohiro Inoue, The Chinese University of Hong Kong

Extensive research has investigated how shared orthography, semantics, and phonology influence bilingual cognate processing. However, the effects of phonological similarity on L2 cognate processing remain inconclusive, particularly since most studies focus on alphabetic scripts where phonology and orthography are intertwined. To address this gap, we recruited bilinguals who use two logographic scripts—traditional Chinese and Japanese Kanji—to examine the influence of phonological similarity on L2 (Japanese) cognate lexical decision. These scripts uniquely allow manipulation of phonological similarity using identical characters across both languages. We also examined how word frequency and L2 proficiency modulate cognate processing. Our results indicated that while word frequency and L2 proficiency affect cognate processing, phonological similarity had minimal overall effect on L2 lexical decision. This finding suggests that theoretical models of bilingual word recognition should be refined to better account for the role of phonology in diverse bilingual populations.

Can Phonology Help CFL Novice Learners Learn Chinese Characters' Meanings?

Anna Yi Leung, Ludwig-Maximilians-University of Munich; Kristina Moll, Ludwig-Maximilians-University of Munich; Xenia Schmalz, Ludwig-Maximilians-University of Munich

Empirical evidence for the role of phonology in learning characters' meanings has been inconsistent. The present study examines whether phonology facilitates or inhibits semantic learning in novice Chinese-as-a-foreign-language (CFL) learners with limited knowledge of Chinese phonology, especially when semantic and homophone interferences are present. In two web-based experiments, 140 adult novice CFL learners who had no prior knowledge of the Chinese or Japanese orthographies were randomised into the Orthography-Semantic (OS) or Orthography-Semantic-Phonology (OSP) groups to learn a set of Chinese pseudocharacters in lexical choice tasks. Only the OSP group was exposed to the pronunciations of the pseudocharacters. We found no evidence of a group effect in any task. However, we found a group $\times$ semantic interference effect when multiple characters with the same semantic radical were displayed side-by-side, where the OSP group

outperformed the OS group. Our results show that CFL novice learners generally rely on semantic and orthographic information when learning characters' meanings rather than phonology, yet phonology can facilitate character differentiation when semantic interference is substantial.

Interference From Adjacent Words: Is It Symmetric? Is It Lexical?

Athanassios Protopapas, University of Oslo; Laoura Ziaka, Oslo University Hospital; Dzan Zelihic, University of Oslo; Bob McMurray, University of Iowa

In text reading, words appear in sentences, surrounded by other words. Single-word reading studies cannot reveal whether the presence of adjacent words affects visual word recognition. Studies using flanker tasks suggest that flankers are orthographically processed in parallel with the target. Previous experiments from our group have demonstrated that flankers interfere with recognition of the target word, increasingly as they afford additional processing (visual, orthographic, phonological, lexical). Here, we examine whether this interference is spatially symmetric and whether lexical activation of the flankers is involved. We used the visual world paradigm with masked (75-ms) flanked printed word targets. 61 Norwegian adults selected the picture (among four displayed) that corresponded to the centrally presented target word. In the first experiment, targets were flanked by words on one or both sides, with strings of symbols replacing absent words. Preliminary analysis indicates that word flankers on both sides contribute to the total interference, but the contribution from the right side is stronger. In the second experiment, one of the pictures corresponds to a flanker to probe lexical competition; data collection is underway.

SYM-13: Current Perspectives on Mentalizing: Social Cognition Across Contexts

Chair(s): Elisabeth Bradford, University of St Andrews

Symposium Abstract

This symposium brings together leading researchers to explore recent advancements in mentalizing – the ability to understand and attribute mental states to oneself and others. A key component of social

cognition, mentalizing influences how we navigate social environments, interpret behaviour, and form relationships. This symposium will consider new insights in our understanding of active mentalizing processes across contexts. Tobias Schuerk will present longitudinal data on Theory of Mind development in early childhood and pre-adolescence, linking it to psychopathology. Andrew Surtees will discuss the impact of mood on children's mentalizing processes, whilst Heather Ferguson will discuss mechanisms of social-cognitive decline in older age. Jelena Ristic will explore the role of eye-movements in determining mental states, and Elisabeth Bradford will examine how in-group biases may influence mentalizing processes. This symposium offers a comprehensive overview of recent developments in mentalizing research, fostering interdisciplinary dialogue on its flexibility, limitations, and relevance across contexts.

A Longitudinal Investigation of the Link Between Developmental Trajectories of Theory of Mind and Psychopathology From Early Childhood to Preadolescence

Tobias Schuerk, Ludwig-Maximilians University of Munich; Nora Fenske, Ludwig-Maximilians University of Munich; Nathalie Christner, Ludwig-Maximilians University of Munich; Beate Sodan, Ludwig-Maximilians University of Munich; Markus Paulus, Ludwig-Maximilians University of Munich

Theory of Mind (ToM), the ability to infer beliefs and emotions in oneself and others, is crucial for social interactions and psychological well-being. While typically emerging around age 4, ToM development varies and may influence psychopathological trajectories. Despite its recognized clinical significance, the relationship between ToM and the onset of psychopathological symptoms in childhood and early adolescence remains underexplored due to limited longitudinal research. This talk presents a study that leveraged data from a rare longitudinal project on social cognitive development, assessing ToM through validated developmental measures alongside psychological well-being and mental health difficulties (Strengths and Difficulties Questionnaire) at ages 4, 5, 6, 8, and 12. Using mixed models for longitudinal data, we confirmed the hypothesis that better ToM abilities are associated with less mental health issues over time, even after controlling for verbal intelligence and inhibitory control. This work

offers new insights into ToM's role in mental health development.

Reading the Minds of Others: What's in a Look?

Jelena Ristic, McGill University; Florence Mayrand, McGill University; Jessica Savoie, McGill University

Eye gaze provides a rich source of social information. Recent work shows that observers can discern differences in gazers' mental states just by observing their naturalistic eye movements. What is the source of this mental state information? Our data suggests that the amount of overall motion available within the eye region prior to a gaze shift occurring may be critical to mental state communication. Here, we examine and report on the more fine-grained physical properties of gazers eye movements, such as velocity, speed, and trajectory of eye movements associated with different types of mental states. The results will demonstrate kinematic properties of eye motion associated with mental state communication as well as naïve observers' ability to detect and distinguish different types of mental state information from eye motion alone.

The Impact of Mood on Children's Mentalizing

Andrew Surtees, University of Birmingham

Relying on one's own egocentric knowledge to predict others' behavior can impair social interaction and lead to conflict. In adults, incidental happiness increases egocentric biases; this study was the first investigation of whether this is true for children. Younger children (aged three to four-and-a-half), and older children (aged six to seven) watched short videos to induce a happy or neutral mood. They then completed an age-appropriate false belief task. Younger children in the happiness condition were more likely to fail the task, consistent with acting more egocentrically. The induction video did not affect older children's performance, however, those who self-reported a happier mood showed more egocentric bias. Consistent with adults, when in a happy mood, children appear more egocentric in their mentalizing. I will discuss how best to understand these findings alongside our recent meta-analysis on executive function in children with depression.

Identifying Mechanisms for Social-Cognitive Decline in Older Age

Heather Ferguson, University of Kent

Successful social interaction relies upon the ability to detect and respond appropriately to social information in one's environment (i.e. social attention) and to infer other people's perspectives and mental states (i.e. their beliefs and intentions, known as Theory of Mind). These abilities in turn enable us to engage in prosocial behaviours, such as helping and cooperating with others. In this talk I will present data from a series of studies that have explored these social-cognitive skills in older adults. I will discuss what these studies have revealed about the mechanisms that underlie social-cognitive success in general, and the specific developmental influences that underlie patterns of decline in older age.

Biases in Mentalizing Across the Lifespan: More Efficient Perspective-Taking for Same-Age Versus Other-Age Others

Elisabeth Bradford, University of St Andrews; Sofia Villoria, University of St Andrews

Despite possessing the ability to understand other people's perspectives from around 4-years old (and perhaps even younger), adults continue to make errors when considering other people's perspectives. In this talk, we will consider factors that can influence successful mentalizing, with particular focus on the role of who the 'other' is in an interactive scenario. Here, we focused on the role of age, with children (7-13 years), young adult (18-30 years), and older adult (60-80 years) participants completing a mentalizing task in which a protagonist was described as either in the same-age category as the participant or a different-age category. Results revealed a broad bias (improved accuracy and response speed) for same-age protagonist stories compared to other-age, although group categorization and prioritization differed across the age groups. We will discuss the role of age-related biases

SYM-37: Perception of Artificial Agents as Social or Self-Aware Others

Chair(s): Agnieszka Wykowska, Italian Institute of Technology; Tony Prescott, University of Sheffield

Symposium Abstract

Our world is increasingly populated with artificial agents— including in the form of chatbots, avatars, smart devices, and robots—that can interact with us socially and that may come to be viewed by their users as significant others. In this symposium we ask: To what extent do people perceive these artificial systems as social agents or as similar to ourselves in terms of capacities such as self- and other-awareness? Do these perceptions engage the same mechanisms (psychological and neural) that apply when we interact with human others? Does perceiving an entity as social or aware also imply other attributions such as sentience? What can we learn about human psychology from our willingness to attribute sociality or awareness to artefacts? Finally, what are the implications of an increasing prevalence of social engagement with these kinds of artificial entities for human psychological health and well-being? The symposium includes contributions from researchers who would study the psychology and neuroscience of human sociality along with those working to create artefacts, such as robots, that integrate mechanisms modelled on human sociality and self-awareness.

Adopting the Intentional Stance Towards Humanoid Robots – Conditions and Implications

Agnieszka Wykowska, Italian Institute of Technology; Serena Marchesi, Italian Institute of Technology

When predicting and explaining behavior of other humans, we adopt the intentional stance (Dennett, 1987) towards them, and refer to their mental states. However, it is not clear whether or when we adopt the intentional stance also towards artificial agents, such as humanoid robots. This talk will provide our empirical research addressing this question. We will present a tool that we developed for measuring adoption of the intentional stance - the Intentional Stance Test (IST) and findings showing that humans are, to some extent, prone to attributions of mental states to robots. More specifically, in a series of studies, we demonstrated that interactive scenarios elicit adoption of the intentional stance more than mere observation of subtle human-like robot behavior. We also measured – with the use of EEG – participants' neural activity at rest and we showed that the likelihood of adopting the intentional stance is related to patterns of neural activity in the beta frequency band. Overall, our results elucidate factors that are crucial for evoking the intentional stance. The

talk will conclude with the discussion on the role of intentional stance for other mechanisms of social cognition, such as sense of joint agency with a robot.

Perception of Artificial Agents as Self-Aware

Marina Sarda Gou, University of Sheffield; Tony Prescott, University of Sheffield

There is an urgent need to better understand how people will see and relate to new AI-based technologies such as robots. An important capacity that people may attribute to robots is awareness—that is, seeing the robot as having some understanding of the world, or of themselves, or taking the view that there is “something that it is like” to be a robot. There is currently a lack of effective means for measuring when people attribute forms of awareness to robots. We propose a novel Awareness Attribution Scale (AAS) to measure when and why people attribute awareness to robots. This 14-item scale is grounded in philosophy of mind and is currently being validated through psychometric testing, including ease-of-understanding, construct consolidation (via factor analysis), and construct validation (ask participants to rate awareness of different entities) studies. By combining the AAS with neurophysiological measures, we aim to identify the neural correlates of awareness attribution. This research will contribute to a deeper understanding of human-robot interaction and inform the ethical design of future AI technologies.

Collaboration in Human-Robot Interaction Depends on the Perceived Social Nature of Robots

Eva Wiese, Technische Universität Berlin; Jairo Perez-Osorio, Technische Universität Berlin; Patrick P. Weis, Julius Maximilians University Würzburg, and George Mason University

Robots are more available for workplace collaboration, which raises the question of which tasks would people assign to robots and how this is influenced by their perceived social nature? We investigated, in several experiments, how humans assign tasks to robots as a function of their perceived agency and experience. Participants performed an arithmetic task (i.e., calculating differences) and a social task (i.e., judging emotions), and were allowed to outsource the task to a robot at any time. We expected participants to generally outsource the

arithmetic task more often to robots than the social task, and to outsource the social task more often and the arithmetic task less often to robots described as emotionally-capable versus incapable (i.e., experience low). In line with our hypotheses, participants collaborated significantly more often with robots for the arithmetic than the social task, and collaborated more with the emotionally-capable robot for the social task and the emotionally-incapable robot for the arithmetic task, despite that both robots were equally proficient with both tasks. These findings are in line with theories on social biases and mind perception.

A Cognitive Robotics Approach to Theory of Mind

Angelo Cangelosi, University of Manchester

Cognitive Robotics is a field that combines insights and methods from AI, as well as cognitive and biological sciences, to robotics (Cangelosi & Asada 2022). This interdisciplinary approach sees computer scientists and roboticists collaborating closely with psychologists and neuroscientists. This contribution will present a novel developmental robotics model, and human-robot interaction experiments, on Theory of Mind in relation to trust. This considers both people’s Theory of Mind of robots’ capabilities, and robot’s own ‘Artificial Theory of Mind’ as generated by embodied computer modelling. Results show that trust and collaboration is enhanced when we can understand the intention of the other agents and when robots can explain to people their decision making strategies. The implications for the use of such cognitive robotics approaches for embodied cognition in AI and cognitive sciences, and for robot companion applications as will ethical issues of trustworthy AI and robots.

Investigating Interactions With Humanoids From a Social Cognitive Neuroscience Perspective

Theirry Chaminade, Institut de Neurosciences de la Timone

For decades now, it has been claimed that humanoid robots are due to become part of our everyday lives. While progress is still being made regarding technical practicalities, design and affordability, that these agents will be accepted as social partners is largely taken for granted as their human shape and behaviour are considered sufficient to elicit the same

mechanisms as social behaviours with fellow humans. Yet one can doubt these premises. Not only is their artificial nature largely visible, and may be sufficient to elicit a design stance instead of an intentional stance (in the framework of Daniel Dennett), but human history is full of examples in which some human groups de-humanized others as a consequence of their distinctiveness. This talk will describe recent experiments exploring the neural bases of complex interactive behaviours, from observation of emotional expressions to natural conversations. Our results allow a better understanding of cognitive phenomenon, preserved or impaired, and could also progress our understanding of how humans react to artificial agents and of the neural bases of human complex social behaviours.

18:00 – 19:00: Blitz Talks

B-01: Learning & Memory I

Both Semantically and Episodically Elicited False Memories Enhance Prospective Memory Performance

Damla Dayan, The University of Manchester; Alex Kafkas, The University of Manchester; Jason Taylor, The University of Manchester

This study examines how false memories (FMs) impact prospective memory (PM). Two online (Pavlovia.org, Prolific.co) experiments were conducted with healthy participants (E1: DRM, N=31, Mage=27.61; E2: misinformation, N=30, Mage=30.73). Experiment 1: FMs were elicited semantically via Deese-Roediger-McDermott paradigm. Participants encoded lists based on critical lure (CL) words and made recognition memory decisions. This was followed by a PM task: during a lexical decision task, a separate response was required to special word cues selected from DRM and control words. Experiment 2: FMs were elicited through a misinformation paradigm. Participants watched muted videos of events, then received misleading information via written testimonials (details were either changed or implanted), followed by a multiple-choice test. This was again followed by the lexical-decision PM task, with special cues taken from the misinformation task. PM task performance was analysed by item FM task condition: changed/implanted x FM, hit, foil, and

control. In Experiment 1, CLs led to more false recognitions in DRM and better PM performance. In Experiment 2, changed and implanted memories enhanced PM, with implanted memories yielding the highest accuracy.

The Impact of Representation (In-)Consistency on Memory for True and False Information: Examining Modality Changes Between Encoding and Retrieval for Event Description

Nicole Antes, Leibniz-Institut für Wissensmedien; Markus Huff, Leibniz-Institut für Wissensmedien; Stephan Schwan, Leibniz-Institut für Wissensmedien

Mental representations are mostly not unimodal but multimodal, allowing information acquired in one modality to be retrieved in another. This research investigates how modality consistency between encoding and retrieval influences memory for true and false information. In two experiments (N = 721), participants first encoded event descriptions stepwise in either text (Experiment 1) or graphical representation (Experiment 2) before retrieving them in a consistent or inconsistent modality. Results from Experiment 1 showed that modality inconsistency (text-to-graphic) impaired memory accuracy, particularly for false information, supporting a modality-veracity interaction. Experiment 2 found no accuracy difference between the conditions (graphic-to-graphic vs. graphic-to-text). However, false information had a negative influence across modalities. These findings indicate that retrieving information across different modalities is not symmetrical. While text-to-graphic transfer impaired memory for false information, graphic-to-text transfer had no effect. This asymmetry suggests that modality shifts may impact retrieval differently depending on the initial encoding format, with false information being more vulnerable to change.

Mice Utilize Previously Learned Spatiotemporal Mappings for Extrapolating Temporal Information

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Animals use magnitude representations such as time and space to capture the environmental statistics and organize their behavior, accordingly. We recently showed that mice can make interpolations based on

previously learned spatiotemporal contingencies. However, the extent of this ability is not fully understood yet. To this end, 18 male C57BL/6J mice (9 weeks old) were trained and tested to see whether they could use spatiotemporal contingencies to predict temporal aspects of novel locations with the peak interval procedure. Mice were trained to associate two locations (hopper 2 & 4) with two different delays to reward (10s & 30s) in a 5-choice serial reaction time task box. Then, we tested the time of maximum reward expectancy for trained and untrained locations; hopper 3 (H3) was between the trained locations, H1 and H5 were outside of them. If mice rely on extrapolation/interpolation, we expect the earliest reward expectancy at H1 and the latest at H5 given that H2 was associated with the shorter duration. Interestingly, we found a ‘generalization’ from H2 to the adjacent hoppers, but the difference between H4 and H5 suggested extrapolation. Possible reasons for such asymmetry will be discussed in the light of these findings.

Reconciling the Beneficial Effects of Physically Inactive Wakeful Rest and Physically Active Exercise on the Early Consolidation of New Memories

Michael Craig, Northumbria University; Roger Makepeace, Northumbria University; Phil Hayes, Northumbria University

Memory consolidation stabilises fragile new memories, especially during “offline” states such as wakeful rest and sleep. Wakeful rest is thought to enhance retention by allowing consolidation to occur uninhibited in the absence of sensory impressions and attentional demands associated with “online” states of task engagement. However, post-encoding high-intensity exercise also benefits consolidation despite its “online” nature, likely through neurophysiological stimulation, including increased cerebral blood flow. This ongoing research aims to reconcile these explanations by directly comparing the effect of these consolidation-conducive conditions relative to an “online” state. A repeated-measures design is being used to compare the impact of post-encoding wakeful rest, high-intensity exercise, and task engagement on the consolidation of non-word stimuli in young adults. Memory retention is being assessed after 30 minutes and 7 days. EEG data recorded during each post-encoding delay, alongside pre- and post-delay physiological measures (e.g., blood lactate), will examine neural and metabolic

correlates of consolidation. Data collection for this study is ongoing, and outcomes will be reported during the presentation.

Assessing Glutamate Changes in Medial Frontal Cortex During an Associative Visuospatial Working Memory Task Using FMRS

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The medial frontal cortex (mFC) is involved in many aspects of working memory (WM) and executive function, including maintenance of stimuli, responding to changes in task phase, resolving response conflict, and post-error readjustments. Prior research using magnetic resonance spectroscopy (MRS) has shown that glutamate levels increase in mFC (Jelen et al., 2019) and dorsolateral prefrontal cortex (Mohammadi et al., 2024) with increased working memory demands. However, changes in glutamate levels in mFC during specific phases of encoding and retrieval in a working memory task are yet to be explored. Here, we conducted a mixed-design functional (f)MRS study to assess changes in medial frontal glutamate levels while participants (n=21) engaged in an associative visuospatial WM task. In the task, memory trials required participants to learn the shapes, colours and locations of abstract items, and then recall an item’s colour based on its shape or location. In no-memory trials, participants simply responded to the colour of a presented shape. In this work we will explore how glutamate levels differ between memory and no-memory trials, in addition to exploring dynamic changes between the encoding, and recall phases of the task.

Effects of Maths Anxiety and Working Memory on Calculation and Arithmetic Word Problem Performance

Yun Wei Ong, Osaka Metropolitan University; Masahiko Okamoto, Osaka Metropolitan University; Kanetaka Mori, Osaka Kyoiku University

Two experiments were conducted to examine the effects of maths anxiety and working memory on calculation and word problems. Previous research has shown that maths anxiety impairs performance in both calculation (Ashcraft & Kirk, 2001) and word

problems (Morsanyi, 2014). However, the underlying mechanisms remain unclear. In particular, no studies have systematically examined the relationship between maths anxiety, the phonological loop, and the visuospatial sketchpad in mathematical tasks. In this study, participants' complex memory and visuospatial spans were measured as control variables before they completed calculation and word problems under phonological and visual suppression conditions. The key difference between Experiment 1 and Experiment 2 was the difficulty of the calculation task. LMM analyses of Experiment 1 showed an effect of phonological suppression on calculation tasks and both phonological and visual suppression on word problems. Experiment 2 replicated these findings and further revealed that phonological suppression had a greater impact when maths anxiety was high. Although the sample size was relatively small ($n = 38$ & 28), our results suggest that maths anxiety may impair the function of the phonological loop.

B-02: Metacognition

Does Secondary Motor Integration During Decision-Making Inform Confidence?

Axel Garnier-Allain, LINC, INSERM, Université Marie & Louis Pasteur; Vincent De Gardelle, Paris School of Economics & CNRS; Thibault Gajdos, Centre de Recherche en Psychologie et Neurosciences, Centre National de la Recherche Scientifique, Aix-Marseille Université; Mathieu Servant, LINC, INSERM, Université Marie & Louis Pasteur

Recent studies suggest that confidence in a decision is informed by action-related signals. Because the motor response is classically seen as an output of the decision process, these results have been interpreted as challenging first-order accounts of self-evaluation, where confidence is directly derived from the state of the decision variable. Yet, recent computational models have challenged this serial discrete view of decision and action, proposing that the decision variable is continuously transmitted to motor areas of the brain preparing the response. As it can be corrupted by noise during the transmission process, the decision variable is then recovered through a filtering process, leading to a second integration process at the motor level. In this framework, action-related effects on confidence could stem from the use of this motor variable to compute certainty. We tested this hypothesis in a perceptual decision task,

manipulating the amount of noise in the decision variable and the gain of the filter at the motor level. Combining behavioral measures and computational modelling, we show that confidence is not directly informed by the motor variable but rather supported by the unfiltered one.

The Effect of Anxiety on Metacognitive Judgements

Karolina Moutsopoulou, University of Montpellier Paul Valéry; Andrea Desantis, The French Aerospace Lab, ONERA

Theoretical models in psychopathology propose a close relationship between metacognition (the ability to assess our own cognitive states) and the emergence of anxiety symptoms. Recently, empirical studies have investigated the causal relationship between these two phenomena using confidence judgments on decisions to measure metacognition. This study aimed to contribute to this literature. Two groups of participants took part in the study: one underwent stress induction through the Trier Social Stress Test, while the other completed the control condition of this test. Following this induction phase, all participants performed a perceptual task (estimating the number of dots) and a memory task (cued word recall), while indicating their confidence level in their decision on each trial. Using two tasks allows us to measure the effect of anxiety across different modalities. The results show a positive effect of anxiety on metacognitive efficiency, with a reduction in confidence for errors, independently of the task modality (perception or memory). Therefore, certain levels of anxiety can improve evaluation of one's own performance.

Illusory Transparency of Intention Applied: Insights From Human-Computer-Interaction

Lea Marie Weber, University of Münster; Regina Jucks, University of Münster

Successful communication requires keeping track of the communication partners' (lack of) knowledge. Does this apply to communication with Large Language Models like ChatGPT? Using the experimental design reported by Keysar (1994; see also Lau et al., 2022), we conducted a study on the phenomenon "illusory transparency of intention". In a 1×2 within-subjects design, positive or negative privileged information about a student's perspective

interacting with a chatbot let their responses appear sarcastic (or not). Our hypotheses were that privileged information would significantly affect participants' judgments of addressees' (chatbots') perception of sarcasm and predictions of the chatbot's future actions. Participants (N = 248) read scenarios, rated the addressees' perception of sarcasm and later their own perception of sarcasm. They answered one open-ended question each on the chatbot's understanding and possible responses. Results confirmed the expected effect of privileged information, revealing significant differences in both sarcasm judgments. This suggests that the "illusory transparency of intention" applies to LLMs. Implications are discussed for perspective-taking in higher education and human-computer interaction.

Unskilled and Unaware: Confidence in the Accuracy of Self-Estimates Increases With Miscalibration

Mariana Coutinho, United Arab Emirates University; Justin Couchman, SUNY Fredonia; Justin Thomas, The King Abdulaziz Centre for World Culture; Imani Fredricks-Lowman, St. Thomas University

Overestimation and miscalibration increase with a decrease in performance. Researchers have attributed this finding to participants' lack of knowledge and skills about the task performed. However, whether overestimation indicates lack of awareness is debatable, and additional studies are needed. The present study examined the extent to which students at different levels of performance know that their self-estimates are biased. We asked 653 college students to estimate their performance in an exam and subsequently rate how confident they were that their self-estimates were accurate. The latter judgment is known as second-order judgments (SOJs). The findings revealed the classic unskilled and unaware effect: low performers exhibited higher levels of miscalibration, overestimating their abilities, while high performers slightly underestimated themselves. Regarding the relationship between miscalibration and SOJs, it was negative for high performers and positive for low performers. Specifically, for low performers, the less calibrated their self-estimates were, the more confident they were in their accuracy. This finding supports the claim that awareness of what one knows and does not know depends in part on how much one knows.

People Learn About Others to Dynamically Prioritize Superior Advice

Rumandeep Hayre, University of Birmingham; Arkady Kononov, University of Birmingham; Romy Froemer, University of Birmingham

When making decisions we often need to rely on others' advice, for instance when we lack access to reliable information ourselves. The quality of advice can vary between advisers, as well as within advisers and bad advice can be detrimental. Across two eye-tracking experiments (Exp 1 N = 35; Exp 2 N = 21) we investigated whether people learn adviser characteristics and prioritize advice accordingly. Before and after receiving input from two advisers, participants judged the direction of dot motion stimuli and rated their confidence. We independently manipulated the need for advice (motion coherence) and the accuracy (Exp 1, 2) and confidence (Exp 2) of advisers. We found that people sought more information when they needed it and indeed prioritized information from more accurate advisers, more confident advisers, and critically, accurate advice predicted by small, confidence-level independent performance contingent changes in advisers' trial-by-trial confidence. To conclude, people can learn characteristics of advisers to prioritize more valuable advice, and do so specifically when advice is needed.

From Perception to Decision: Emergence and Variation of Trust During Decision Making

Léa Mathieu, THALES AVS; Bertille Somon, ONERA; Patrick Mazoyer, THALES AVS; Florence De Grancey, THALES AVS; Nicolas Drougard, ISAE SUPAERO; Jean-Christophe Sarrazin, ONERA

Trust is central in human-AI collaboration. In order to understand how trust emerges towards automated systems, decisional trust at individual level needs to be deepened. While the emergence of trust can be regarded using metacognition and accumulation evidence theories, its variation can be likened to a temporal variable whose dynamics change over time and can be studied through learning theories. Here, we aim to assess the effect of learning and the impact of evaluation of confidence on trust variations for decision making. To this end, participants will perform a perceptual decision-making task of varying difficulty to account for evidence accumulation, confidence in their own decision and prediction emerging from

learning, combined with feedback on their performance. Subjective, behavioral and electroencephalographic measures will be recorded during the task to unveil dynamics and markers of trust. The data collection of 40 participants will start next month, providing preliminary results for defining and understanding the interactions between these different processes. Eventually, the identified markers and features can be transposed to the comprehension of trust towards AI decision making.

B-03: Attention & Cognitive Control I

The Impact of Multimodal Threat Distractors on Visual Search Performance

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According to previous studies, task-irrelevant threatening stimuli attract attention more readily than neutral stimuli. However, these studies typically used static images, which does not allow generalization to real threatening situations. Therefore, here, we used threatening and neutral audiovisual clips, muted videos, and pictures as distractors while participants completed a primary visual search task. In the task, they searched for numbers scattered in a matrix array in ascending order. The results showed that finding the first target (i.e., number 1) took longer with a threatening picture distractor compared to a neutral picture, and participants were faster in picture modality compared to both audiovisual and muted video stimuli (regardless of valence). Furthermore, participants completed the task (i.e., found all numbers) faster in the threatening muted video compared to neutral one but threatening distractors resulted in worse performance compared to neutral audiovisual one. These results suggest the complex interplay between valence and sensory modality in attentional processes, emphasising the differential effects of threat across visual and audiovisual contexts.

Did You See This Coming? How Age Modulates the Mechanisms for Goal-Directed Response Selection

Daniela Czernochowski, University Kaiserslautern-Landau

According to the conflict monitoring account, both relevant and irrelevant stimuli are processed until a response conflict is detected. Hence, irrelevant incongruent stimuli often (partially) initiate an incorrect motor response. On the other hand, when incongruent stimuli can be anticipated, proactive cognitive control processes can facilitate efficient response preparation. Response conflict and cognitive control processes recruited to support goal-directed behavior were assessed in several EEG studies with participants between 7 and 74 years of age. Specifically, the temporal dynamics of incompatible response activation and (un)successful response inhibition were assessed by comparing neural and behavioral correlates of interference costs and error processing. Participants' age determines how the response selection can be supported: While conflict detection is functionally mature even in young children, only young adults flexibly adjust response criteria by recruiting appropriate cognitive control processes according to task instructions and/or variable task demands. By contrast, only older adults successfully prioritize response accuracy at the expense of overall slow responses by capitalizing on reactive control processes.

The Influence of Fine Motor Skills and Executive Functions on Automated Handwriting

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We explored the understudied area of adult handwriting performance, focusing on the potential predictive roles of fine motor skills (FMS) and executive functions (EF). While the initial stages of handwriting acquisition are assumed to rely upon EF and FMS, the two components are no longer viewed as needed in automatized, expert handwriting. We tested this assumption by assessing the contributions of these components to handwriting performance in a group of 33 adult participants. Linear regressions were used to examine whether dexterity, manual praxis, working memory, inhibition and flexibility predict handwriting speed, legibility, and fluency. Results

revealed that FMS were a significant contributor to all aspects of handwriting performance. EF also predicted handwriting performance, with a significant effect of flexibility on writing speed and of working memory on legibility. These findings highlight that, even at a high level of expertise and automatization, handwriting remains a skill whose performance depends on EF and fine motor control capacities. They support a predictive coding account of graphomotor control, whereby internal forward and inverse models would support the execution and monitoring of handwriting movements.

Force Adaptation Patterns Suggest Similarity of Action Representations in Sensorimotor Synchronization and Tone Self-Generation Tasks

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Simple actions are performed with lower levels of force when actions elicit auditory or visual action-effects in comparison to conditions in which such action-effects are absent. Although the difference is attributable in part to reliance on the feedback provided by the action-effects, because such motor adaptation occurred only when action-effect delays were shorter than 300 ms, we speculated that adaptation was also driven by a primitive, possibly automatic process binding temporally contiguous actions and sensory events. To investigate the role of contiguity, in four experiments we explored force application in sensorimotor synchronization tasks. Because in such tasks participants are well aware of the absence of a causal action-tone relationship, it seems plausible that force application should be similar to that measured in conditions without action-effects. On the other hand, if action-tone contiguity contributes to motor adaptation, then force should be reduced. Our results showed that during sensorimotor synchronization force application was reduced, as if participants assumed the existence of causal action-tone relationship, thus supporting the role of contiguity in the action-effect binding reflected by motor adaptation.

Proactive Suppression: Challenging the Limits

Virginie Leclercq, UMPV; Pom Charras, UMPV

Recent theoretical considerations suggest that preparatory attention mechanisms may play a pivotal role in the anticipation of distractors by proactively suppressing spatial locations and/or specific features. However, this notion stems primarily from studies employing visual search paradigms with simultaneous displays. Emerging research involving successive displays and isolated distractors challenges this view, questioning the effectiveness of proactive suppression in such contexts and highlighting the need for further exploration. The objective of our research is to explore factors potentially influencing proactive suppression. We first investigated the impact of the interfering nature of the distractors presented in isolation, we examined the role of spatial contingencies between distractors and targets, along with spatial expectations, in shaping proactive inhibition. Finally, we focused on how the temporal dynamics between targets and distractors, as well as temporal predictability, modulate suppression mechanisms. Preliminary findings suggest that neither spatial nor temporal dimensions, as tested in these experiments, substantially influence the proactive inhibition of isolated distractors.

B-04: Language & Bilingualism I

A Unified Mechanism of Statistical Learning? Evidence From Cross-Modal Integration During Learning

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Humans extract statistical regularities from the environment, also known as statistical learning (SL). Interestingly, it is still debated whether SL is tied to the modality in which learning occurred or whether there is a domain-general mechanism at play. The present study addressed this question by testing integration over two sensory modalities during SL. Participants completed a familiarization phase in which they were presented with auditory (faputilirafe) and visual (lotemumisapo) syllable streams, allowing for the extraction of embedded triplets (e.g., A: faputi; V: lotemu). Crucially, the syllables were presented in an interleaved manner, alternating between modalities: faloputetimulimirasafepo (underlined syllables presented visually, the others auditorily). Results from a 2AFC test phase showed that participants not only learned the unimodal triplets but also showed

sensitivity to the integrated triplets; they rated cross-modally associated triplets (e.g., falopu, lopute) as more familiar than foils that did not follow the bimodal statistical structure. This suggests that SL does compute statistics cross-modally, which sheds new light on the important question of whether SL is a unified, domain-general mechanism.

The Relationship Between Statistical Learning and Different Facets of Language Ability: Evidence From Auditory and Visual Modalities

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The relationship between language and general cognition is a key question in cognitive science. Statistical learning (SL)—the ability to extract environmental regularities without supervision—is considered a key contributor to language ability. Our study comprehensively assessed adults' language abilities (grammatical sensitivity, pragmatic comprehension, semantic prediction, violation processing), auditory and visual SL, and other cognitive functions (short-term memory, working memory, perceptual speed) to control for their effects on both language and SL. We hypothesized that auditory and visual SL would predict language abilities, with a stronger relationship for auditory SL. Surprisingly, visual SL was the best predictor of grammatical sensitivity and pragmatic comprehension, while semantic prediction and violation processing were not explained by general cognitive abilities. These results align with findings supporting a SL-language relationship and demonstrate that language is intertwined with general cognition, but also point out that facets of language ability differ in their reliance on general cognitive processes.

Cross-Linguistic Semantic Integration in Bilingual Populations

Marta Almería-Morena, Universidad Autónoma de Madrid; Carlos Romero-Rivas, Universidad de Granada

Integration processes of new semantic information have been explored in the first language of monolingual participants (within language study from L1 to L1), as well as in bilingual populations, but only in within language studies (from L2 to L2). Our study is

highly innovative by investigating how new semantic information learned in L2 (English) is integrated into previous semantic memory in L1 (Spanish). For this purpose, we have designed a cross-language semantic priming experiment, in which the new pseudowords and their meanings are learned in English while the test, a lexical decision task, is carried out in Spanish. The bilingual group consists of 48 native Spanish speakers, late bilinguals in English, with a high proficiency (level B2-C2). This group will be compared with a control group, made up of individuals from the same population (n= 48), who will carry out the experiment entirely in their native language (Spanish). The control group will allow us to explore how semantic integration mechanisms from L2 to L1 are, compared to how these mechanisms are from L1 to L1. We are in the data collection phase, we expect to have the data fully collected by the end of April and processed by the end of May.

Learning Trajectories and Generalisation: Converging Markers for Rule- and Similarity-Based Processes in Grammar Learning?

Moulshree Rana, Donders Institute for Brain, Cognition, and Behaviour; Herbert Schriefers, Donders Institute for Brain, Cognition, and Behaviour; Kristin Lemhöfer, Donders Institute for Brain, Cognition, and Behaviour

In (artificial) grammar learning, judgements of the (in) correctness of an item can be based on abstract rules or on its similarity to previously encountered items. We examined learning trajectories and generalisation as markers for rule- and similarity-based processes. A rule-based process should produce a step-wise learning trajectory, and a similarity-based process should generate a gradually increasing curve. Generalisation is the difference in performance between items that were previously seen in training and new items. For a rule-based process, performance is expected to be same for both types, as an extracted rule can be applied equally well to both. We utilized data from Menks et al. (2022), where participants were given inputs following Icelandic grammar. We applied a Bayesian latent-mixture model to classify individual trajectories as step-wise or gradual. We observed individual differences in learning trajectories, and in generalization. However, we found that step-wise and gradual trajectories were unrelated with the presence or absence of generalization effects within participants, raising questions about how trajectories and generalisation

are related to rule-based and similarity-based processes in learning.

Anchors to Language: Proximity to High Frequency Words Enhances Word Recognition

Tamar Matas, The Hebrew University of Jerusalem; Noam Siegelman, The Hebrew University of Jerusalem

Across languages, word frequencies follow a Zipfian distribution, where few words are very frequent while the majority of words occur rarely. It has been suggested that this pattern is so common because of its facilitative effect on learning. Particularly, it has been argued that in Zipfian distributions frequent words are learned first and then serve as "anchors", enabling the learner to segment and extract adjacent words. However, so far this hypothesis has been tested only in lab studies using small artificial languages. Here we show that anchoring facilitates word recognition in large datasets of natural languages. First, we present a new "anchoring index", which reflects the extent to which a word tends to appear after high-frequency words. Then, we use data from mega-studies to demonstrate that the new index predicts faster RTs and higher accuracy in both visual and auditory word recognition tasks, in English, Spanish and Dutch, even when controlling for many known covariates. These findings suggest that Zipfian environments facilitate learning by providing more anchoring opportunities, which, in turn, strengthen lexical representations, as reflected in the enhanced recognition of words that often occur close to anchors.

Ship or Sheep? Mitigating Cross-Linguistic Orthographic Interference in L2 Perception and Pronunciation via Color Coding

Tiphaine Caudrelier, Laboratoire EMC, Université Lumière Lyon 2; Flore Albano, Université Lumière Lyon 2; Camille Cartiez, Université Lumière Lyon 2; Julie Coquard-Molinari, Université Lumière Lyon 2; Jessi Jacobsen, Basque Center on Cognition Brain and Language; Svetlana Pinet, Basque Center on Cognition Brain and Language

Seeing written words is beneficial for learning a second language (L2), as it can facilitate vocabulary acquisition. However, when a letter is pronounced differently in L1 and L2, written words can hinder pronunciation by generating an orthographic conflict (Bürki et al., 2019). We examined whether (1) orthographic conflict also affects sound perception

and whether (2) explicit pronunciation instruction combined with a color-code can mitigate its negative effects, improving both pronunciation and perception. Twenty-five French-speaking participants with L2 English, received English pronunciation training with color-coded cues as mnemonic aids. Their perception and pronunciation in English were assessed before and after training, as well as one week post-training. The perception task involved listening to English pseudowords (e.g., "mib"), with or without the written form displayed on the screen, and categorizing the vowel sound among French vowels. Pronunciation was assessed through picture naming and word reading combined with acoustic analyses. Results show that (1) L2 vowel perception was altered by the presence of the written form; and (2) both perception and pronunciation improved thanks to the training with the color-code.

B-05: Cognitive Ageing

The 14-Item Everyday Problems Test (EPT-14): A Revised Test for Everyday Problem Solving and Its Relation to Biographical and Basic Cognitive Domains

Alice Reinhartz, Medical School Hamburg; Eleanor Hyde, University of Sheffield; Shuangke Jiang, University of Zurich; Thomas Jacobsen, Helmut Schmidt University/University of the Federal Armed Forces Hamburg; Sylvie Belleville, Université de Montréal; Tilo Strobach, Medical School Hamburg; Claudia von Bastian, University of Sheffield

Solving problems in everyday life is a crucial ability for living independently. In research settings, the ability to solve everyday problems is often measured using time-intensive lab-based tests that present participants with problems similar to those encountered in everyday life. To assess this ability efficiently within large test batteries, we developed the EPT-14, a revised 14-item version of the Everyday Problems Test (Willis & Marsiske, 1993). The computer-based EPT-14 can be readily administered online or offline and provides a timed assessment of everyday problem solving. The EPT-14 was administered to healthy adults online (N = 178; range = 18-78 years) and in a lab setting in English, French, and German (N = 424; range = 18-85 years) as part of a cognitive training study conducted in three countries: UK, Canada, and Germany (von Bastian et al., 2022). The results showed that the EPT-14 is a time-efficient test completed in less than 15 min, with

adequate test-retest reliability ($r \geq .60$). The EPT-14 is sensitive to age and education effects and related to cognitive task performance, in particular reasoning and working memory. Hence, the EPT-14 presents a useful tool for assessing problem solving in an everyday context.

Age and Physical Activity Modulate Processing of Past- and Future-Related Words

Anastasia Malyshevskaya, University of Potsdam; Martin H Fischer, University of Potsdam; Yury Shtyrov, Aarhus University; Andriy Myachykov, University of Macau

Temporal processing is accompanied by activation of spatial attention: RTs are faster if participants classify past/future words with left/right keys, respectively (the STEARC effect). Studies also showed age-related changes in time perception, with seniors being more past-oriented than younger adults. Moreover, it was shown that past time perspective is associated with low physical activity. Here, we investigated whether the processing of time words also undergoes age- and exercise-related changes. 98 participants (19-80 y.o., with different levels of physical activity) read words (past/future/neutral) and classified them as time-related by pressing left/right keys. LMM analyses on RTs revealed that future/past words were processed faster by younger/older adults, with no difference for neutral words. Moreover, the lower the physical activity was, the larger this age effect was. Finally, an age-related decline in the STEARC effect was found among adults with lower physical activity. Based on these findings, we suggest an integrative construct of dynamic conceptual time, wherein an individual's processing of time words undergoes lifelong changes influenced by multiple factors, including age and physical activity.

Proactive Top-Down Processes and Modulation of Distractor Expectation in Healthy Ageing

Marco Petilli, University of Milano-Bicocca; Ilaria Baroni, University of Milano-Bicocca; Carlotta Lega, University of Pavia; Roberta Daini, University of Milano-Bicocca

Studies on young adults have shown that proactive top-down control processes are active in visual search tasks even when distractors are temporarily absent (Petilli et al. 2018). This study investigates whether aging impacts these processes and examines the effect of distractor expectation in healthy elderly

individuals, by the Distraction Context Manipulation (DCM) paradigm (Marini et al., 2013). 127 participants (61 young, 66 elderly) took part in the study. The DCM paradigm included three visual search blocks: 1) distractor present in 100% of trials (DP block), 2) distractor absent in 100% of trials (DA block), and 3) distractor present in 50% of trials (Mixed block). The results showed that older adults were slower than younger adults, particularly in blocks with distractors. However, no significant differences were observed between groups in the effects of activation of control processes: 1) comparable distractor expectation costs were observed in DA trials of mixed block in either groups, 2) such a cost improved in DP trials of both mixed and DP blocks. These results suggest that proactive top-down control processes are preserved in the elderly, indicating that some attentional functions remain intact with aging.

Mapping Cognitive Control in Older Age: Insights From a Longitudinal Study

Sarah De Pue, KU Leuven; Hans Stuyck, KU Leuven; Céline R. Gillebert, KU Leuven; Eva Dierckx, Vrije Universiteit Brussel; Eva Van den Bussche, KU Leuven

Cognitive control is a crucial ability for daily life, especially with aging. However, the field is currently characterized by mixed findings on age-related cognitive declines, depending on the specific cognitive control subcomponent under investigation. The literature is dominated by cross-sectional designs that often do not distinguish between or include only one cognitive control subcomponent. The current study used a longitudinal design in a sample of 113 older adults between 60 and 95 years old, who participated in the study yearly during a period of three years. Participants completed an extensive cognitive control test battery on each time point, focused on inhibition, updating, shifting and proactive and reactive control. Although cross-sectional age effects in updating and general age-related slowing were observed on T1, only inhibition seemed to decline over time. Practice effects and individual differences may have obscured group-level declines in cognitive control over time. We will explore protective and risk factors and trajectories of cognitive control in this data to uncover inter- and intra-individual changes in cognitive control subcomponents with aging.

A Systematic Review of the Effects of Sleep Duration and Daytime Alertness on Cognitive Function Across the Adult Lifespan

Séamas Farrell, University of Strathclyde; Catriona Ewart, University of Glasgow; Leanne Fleming, University of Strathclyde; Louise Brown-Nicholls, University of Strathclyde

Sleep and cognition typically change across the adult lifespan. Sleep duration and daytime alertness (DA) are two key sleep parameters that have been associated with impaired cognitive functioning during ageing. We systematically reviewed the literature on relationships between sleep and cognitive functioning. Uniquely, we took a life course approach and assess specific cognitive domains (i.e., processing speed, attention/executive function, visuospatial ability, working memory, long-term memory/learning, language, & global cognition). Included studies must have reported at least one measure of sleep duration and/or DA and at least one measure of cognition. Study samples must have included healthy human adults aged 18+. The databases searched were APA PsychInfo, CINAHL, Cochrane Central, Medline, Pubmed, and Web of science, with 519 studies included at full-text review stage. Fifty-seven studies were included within the review and quality-assessed, with results comprising a narrative synthesis. A key finding was that long sleep duration was negatively associated with executive function/attention, working memory, long-term memory, and global cognitive function. This review shows robust links between sleep and cognition in adults.

Motor Imaginary and Cognitive-Motor Interference Throughout Ageing

Tian Zhou, Department of Psychology, University of Freiburg; Elisa Straub, Department of Psychology, University of Freiburg; Andrea Kiesel, Department of Psychology, University of Freiburg; Dominic Gehring, Department of Sport and Sport Science, University of Freiburg; Urs Granacher, Department of Sport and Sport Science, University of Freiburg; Aaron Haslbauer, University Department of Geriatric Medicine Felix Platter; Reto W. Kressig, University Department of Geriatric Medicine Felix Platter; Roland Rössler, University Department of Geriatric Medicine Felix Platter

The Timed "Up and Go" (TUG) test assesses mobility as individuals rise from a chair, walk three meters to a

pylon, and return. When paired with the imagined version (iTUG), these tests provide insight into actual and perceived gait abilities in older adults and serve as screening tools for higher-level motor disorders. A strong correlation exists between TUG-iTUG discrepancies and walking speed decline during dual-tasking, such as walking while counting backward (Bridenbaugh et al., 2013). To further explore the relationship between motor imagery and dual-tasking, we analyzed Basel Mobility Center data ($n = 2,524$, mean age = 76.02 ± 7.28), where participants completed separate TUG, iTUG, and dual-task cost assessments, comparing single-task walking and backward counting with dual-task performance (simultaneous walking and counting). We confirmed a positive correlation between TUG-iTUG discrepancy and dual-task costs. To extend these findings, we combined dual-tasking with TUG/iTUG in a younger adult pilot study ($n = 30$, mean age = 21.77 ± 3.01), incorporating backward counting directly into the test. Results mirrored older adults but showed less TUG-iTUG discrepancy, suggesting age-related differences in motor imagery accuracy.

B-06: Sensation & Perception

Where Do We Draw the Line? How Mental Perspectives Shape Our Body's Boundaries

Celia R Blaise, University of Sheffield; Hannes P Saal, University of Sheffield

The ability to distinguish between our body and the external world is crucial for our sense of self and interaction with our environment. While research suggests that the clarity of this boundary can fluctuate, precise assessments of anatomical body boundary perception remain underexplored. Across two studies, we tested how accurately individuals perceive their body boundaries without visual input, alongside self-reported measures of mental imagery, embodiment, and third-person dreams and memories. Our results showed that while participants demonstrated millimeter-level precision in identifying their body boundaries, that accuracy varied by body region and individual differences in our self-reported measures. For example, participants who frequently experience third-person dreams performed significantly worse at the task, whereas those who reported more out-of-body experiences showed greater accuracy in judging their ankle boundaries compared to their hand boundaries—a pattern not

observed in other participants. Overall, our findings suggest that the dominant perspective one adopts in the mind's eye plays a significant role in body boundary perception, influencing both its precision and the regions where this accuracy is altered.

Inducing Longer Time Production by Modifying Attentional State

Joseph Glicksohn, Bar-Ilan University; Tal Dotan Ben-Soussan, Patrizio Paoletti Foundation for Development and Communication

What happens when one performs a task of time production while maintaining focused attention on an object of contemplation? This is not the type of dual-task situation discussed in the literature between temporal and non-temporal tasks, resulting in longer time production with increasing engagement in the non-temporal task. This is also not the type of divided-attention situation between externally-oriented and internally-oriented attention, whereby absorbed involvement in ongoing experience results in longer time productions. However, if one is able to focus on a figure at the expense of the background, then the figure will attract more and more attention, resulting in longer time production. This condition of focused attention (FA) is produced in our study by focusing on either the two faces, or the vase, of the Rubin face-vase figure. Now, what happens when in addition to this, one must also monitor either the internal or external environment? This condition of focused attention plus monitoring (FAMO) is produced by continuing to focus, while monitoring either one's breath, or periodic sounds. I present our study and results supporting our directional hypothesis regarding relatively longer time production in FAMO.

A Closer Look at the Agent Advantage Effect: The Impact of Biting Orientations

Wenjia Xu, University of Tübingen; Markus Huff, University of Tübingen; Frank Papenmeier, University of Tübingen

People extract and filter information from their surroundings to understand everyday events. One important component of events is event roles, which include the agent (action performer) and the patient (action recipient). Human observers react faster toward the agent information than the patient information (agent advantage effect). In our previous

studies, we replicated the agent advantage effect using a search task with images of two fish, one fish (the agent) biting the other (the patient). In this project, we investigated whether biting orientations, face-to-face (suggesting a fighting action) versus face-to-tail (suggesting a chasing action), influence the magnitude of the effect. We observed a significant interaction between biting orientation and search task (agent search vs patient search): the agent advantage effect emerged in the face-to-face condition but not in the face-to-tail condition. Additionally, the mean reaction time for face-to-tail conditions was significantly faster than that for face-to-face conditions. These findings suggest that the agent advantage effect depends on the context of the agent-patient relation (fighting vs. chasing). In other words, agents are not always identified faster than patients.

Internalized Stereotypes Impair Speech Perception in Older Adults: Insights From Speech-In-Noise Tasks

Ornella Dakwar Kawar, Achva Academic College; Vered Shakuf, Achva Academic College

Older adults commonly report difficulties in understanding speech, especially in challenging listening situations. While physiological decline and cognitive factors partly explain these difficulties, psychosocial influences such as internalized stereotypes remain understudied. This talk presents data from an experiment exploring the impact of negative age-related hearing stereotypes on older adults' speech perception. Forty-one participants aged 60+ were randomly assigned to receive either negative stereotype or neutral content before performing speech recognition threshold (SRT) tasks in quiet and noise. Results revealed significantly impaired performance after stereotype activation, correlated with participants' negative self-perceptions of hearing. These findings underscore how internalized stereotypes can adversely affect auditory outcomes, highlighting important theoretical and practical implications for addressing age-related hearing challenges.

High-Level Expectations Drive Detection of Biological Motion in Noisy Point-Light Displays

Piotr Szymanek, Jagiellonian University; Mateusz Hohol, Jagiellonian University; Magdalena Senderecka, Jagiellonian University

Despite extensive research on top-down effects on vision, little is known about how high-level expectations impact biological motion processing. We hypothesized that expecting a higher or lower number of human walkers would influence detection of biological motion in point light displays, with this effect being more pronounced in stimuli with higher levels of perceptual noise. Seventy-four participants aged 18-40 ($M = 23.12$, $SD = 4.75$) completed a signal detection task, identifying walking figures in 160 point-light animations. While half of the animations featured biological motion, participants were told that the proportions were 75% or 25%. Noise was manipulated by adding 24, 48, 96, or 192 scrambled motion points to the stimulus. A linear mixed-effects model revealed no main effect of expectations on response bias ($\beta = 0.14$, $p = .214$). There was a main effect of noise at levels 96 ($\beta = 0.39$, $p < .001$) and 192 ($\beta = 0.53$, $p < .001$) and expectations interacted with noise, driving response bias at levels 96 ($\beta = 0.27$, $p = .028$) and 192 ($\beta = 0.43$, $p < .001$). Our results suggest that high-level expectations influence perception of biological motion and that this effect strongly depends on the quality of perceptual information.

What You Hear Is Not What You See: Irony Comprehension in Monolingual and Multilingual Children

Kimberley Mulder, Center for Language Studies, University of Amsterdam; Elise van Wonderen, Center for Language Studies, University of Amsterdam; Josje Verhagen, Center for Language Studies, University of Amsterdam

Research suggests that multilingual children are more sensitive than their monolingual peers to non-verbal information (e.g., Verhagen, Grassman & Kuntay, 2017; Yow & Markman, 2011a, 2011b). Verbal irony provides an interesting case to examine whether and to what degree comprehension of another speaker is facilitated by heightened sensitivity to non-verbal cues. In the current study, we investigate whether multilingual children comprehend verbal irony more readily than monolingual peers. 60 Monolingual Dutch and 60 multilingual children (between 5 and 7 years old) completed an irony judgement task. In this task, the children watched videos of speakers producing utterances of the type 'What a + adjective + noun' (e.g., 'What a beautiful car!') in either an ironic or non-ironic manner and indicated for each video whether the

speaker was being ironic or not. We measured accuracy and response latencies. The results show that monolingual children were faster and more accurate than multilingual children in processing ironic but not non-ironic sentences. In conclusion, multilingual children's presumed enhanced sensitivity to non-verbal cues does not seem to extend to their understanding of ironic sentences.

B-07: Numerical & Mathematical Cognition

Understanding Position Coding in Alphanumeric Strings: Testing Character Spacing and the Triplet Hypothesis

Ana Calviño, Universidad de Málaga; Ismael Gutiérrez-Cordero, Universidad de Málaga; Javier García-Orza, Universidad de Málaga

Previous research has shown that letter stimuli incur greater transposition costs than digit stimuli (Duñabeitia et al., 2012; Massol et al., 2013). However, these studies used Courier fonts that slightly vary in the inter-character spacing of digits and letters. Additionally, Dotan and Friedmann (2017) suggested that digit strings are processed in a triplet-based structure, enhancing positional stability compared to letters. This ongoing study explores the roles of inter-character spacing and triplet organization during early visual position coding. Participants perform a same-different visual matching task with six-character letter or digit strings. Differences between probe and target involve transpositions or replacements in positions 3-4 (between triplets) or 4-5 (within triplets). Stimuli are presented in two fonts (Courier, Digital) to examine character spacing effects. We hypothesize that if digit strings follow a triplet-based organization, between-triplet transpositions or replacements should be harder to process than within-triplet ones; this effect should differ from those in letter strings. If spacing plays a role, no differences between letters and digits transposition costs should be observed in Digital font.

Cognitive Profiles: Working Memory and Finger Counting in 5-8-Year-Olds

Fanny Ollivier, Univ Angers, Nantes Université, LPPL, SFR CONFLUENCES, F-49000

Calculation strategies show significant variability. Finger use correlates with success in 5-year-olds but difficulties in 8-year-olds (Jordan et al., 2008). While sometimes viewed as compensating for weak working memory (Crollen & Noël, 2015), it also appears in young children with high memory spans (Dupont-Boime & Thevenot, 2018; Krenger & Thevenot, 2024). Profile analysis would unravel potential compensatory mechanisms. In our study, 90 children (ages 5-8) solved 20 addition problems (half with results under 10, half above). Working memory was measured via Corsi test, and spontaneous finger use was observed. Hierarchical profile analysis revealed groups with weak spans/rare finger use, average spans/varying finger use, and strong spans/rare finger use. Groupings varied with calculation complexity, showing task-related variability. Results suggest children do not spontaneously use fingers to compensate for weak memory spans. In simple calculations, finger use improved scores for weak and average-span children, but highest-span groups performed best. For complex calculations, the average-span/frequent-finger-use group performed similarly to the strong-span/rare-use group, suggesting finger use compensated for memory differences.

Impact of Perceptual Processing on Numerical Estimation: Priming Local Processing Amplifies Number/Size Conflicts

Léa Chrétien, Université Paris Cité, LaPsyDÉ, CNRS; André Knops, Université Paris Cité, LaPsyDÉ, CNRS; Nicolas Poirel, Université Paris Cité, LaPsyDÉ, CNRS; Arnaud Viarouge, Université Paris Cité, LaPsyDÉ, CNRS

In non-symbolic numerical comparison tasks (NS tasks) where participants determine which of two dot arrays is more numerous, judgments can be biased by irrelevant dimensions, such as dot size or the total occupied area. While inhibition may help overcome these conflicts, the mechanisms driving the focus on relevant numerical information remain unclear. We hypothesised that modes of perceptual processing - focusing on individual elements (local processing) versus the overall configuration (global processing) - may influence how participants resolve numerical conflicts. Fifty-four adults (Mage=32.49, SD=11.03) completed NS tasks in which each trial began with a prime item designed to activate either a local or global mode, or no priming in the control condition, followed

by a numerical comparison item. Results show that global priming does not significantly affect performance, while local priming amplifies conflicts between numerosity and dot size. These findings suggest that perceptual processing influences numerical conflict resolution. Given that perceptual processing evolves from a local mode in early childhood to a more global one in adulthood, we are now extending this study to children to explore developmental trajectories.

Eye Movement Signatures of High vs. Low Mathematical Creativity: Mapping Creative Cognition

Raisa Guberman, Achva Academic College; Adi Eraky, Achva Academic College

Research on mathematical creativity typically focuses on outcomes rather than cognitive processes. This study investigates how eye movements reveal cognitive mechanisms during creative problem-solving. We used eye-tracking methodology to compare two teachers with high (PHC) and low (PLC) mathematical creativity during a polygon construction task. Their approaches differed despite similar fluency (PHC: 15 solutions; PLC: 14). PHC constructed diverse shapes (triangles, squares, pentagons, and hexagons) with broader visual scanning patterns and longer fixations at decision points. PLC primarily created squares, using narrower scanning. Both exhibited cognitive flexibility: PLC made more transitions between polygon types, while PHC integrated similar polygons with orientation changes. The significant difference was in originality: PHC created fewer unique polygons (4) representing different cognitive categories, whereas PLC produced more unique polygons (7) within the same categories. Results indicate that high mathematical creativity involves flexible cognitive processes generating novel and structurally diverse solutions across conceptual domains.

Learning Patterns, Seeing Numerosity

Virginie Leclercq, UMPV

Humans have a cognitive mechanism that enables them to automatically extract regularities from their environment. This mechanism, known as statistical learning, is fundamental for information processing and learning. While its role in language acquisition is

well-established, its involvement in mathematical cognition remains underexplored. Yet, recent research on numerosity processing suggests that this ability—crucial for mathematical learning—may also rely on statistical learning. Specifically, it has been proposed that humans learn the correlation between convex hull shape and numerosity and use it to enumerate (Katzin et al., 2020), with statistical learning potentially underpinning this process. In this context, our study aims to examine the relationship between individual statistical learning abilities and numerosity processing performance in 7 to 8 y.o. children through a dot comparison task involving the manipulation of visual properties. Findings suggest that visual characteristics, particularly convex hull, are processed via statistical learning. These results, discussed in light of recent research, highlight the need for cross-disciplinary studies to explore shared cognitive mechanisms.

Free to Choose, Bound by Numbers: Does Response-Side Bias Account for SNARC Inconsistencies in the Turkish Population?

İlayda Korkut, Izmir University of Economics; Samet Kahraman, Izmir University of Economics; Seda Dural, Izmir University of Economics; Hakan Çetinkaya, Yasar University; Ezgi Gür, Izmir University of Economics

This study investigates the relationship between response-side bias to numbers and the SNARC (Spatial-Numerical Association of Response Codes) effect in Turkish participants, a population known for inconsistent SNARC findings. We aimed to determine whether Turkish participants exhibit a systematic response-side bias, preferring the left hand for small numbers and the right for large numbers, akin to populations with a consistent SNARC effect. We hypothesized that a stronger bias in a free-choice task would be associated with a stronger SNARC effect. To test this, we will use a free-choice paradigm in which participants (N=70) respond to small and large numbers, with no imposed constraints, to measure response-side bias and a parity judgment task in which participants are instructed to give responses specifically with left or right hand for odd/even numbers to assess SNARC performance. A weak lateralized bias in Turkish participants would support the role of cultural factors in shaping SNAs, as suggested for the inconsistent SNARC findings in the Turkish population. Conversely, a strong bias would indicate that the SNARC is influenced by factors

beyond culture, such as individual differences, emphasizing the dynamic nature of SNAs.

B-08: Neurodiversity

Testing Contextual Modulation of Social Prediction in Typical and Atypical Development

Valentina Bianco, University of Pavia; Sara Boscarol, IRCCS E. Medea; Gaia Garghetti, IRCCS Mondino; Viola Oldrati, IRCCS E. Medea; Andrea Ciricugno, IRCCS Mondino; Alessandra Finisguerra, IRCCS E. Medea; Renato Borgatti, IRCCS Mondino; Romina Romaniello, IRCCS Mondino; Laura Farinotti, IRCCS Mondino; Cosimo Urgesi, University of Udine

Introduction: Social cognition depends on past experiences to anticipate others' intentions and beliefs. Contextual cues play a crucial role in shaping these expectations. This multi-center study examines how individuals with Autism Spectrum Disorder (ASD) and Attention-Deficit/Hyperactivity Disorder (ADHD) process contextual information in social prediction. **Method:** The total sample included 75 participants: 25 with ASD, 25 with ADHD, and 25 with typical development. In 4 different priming paradigms, participants performed categorization tasks assessing prediction of action intentions, emotional states, or personality traits, as well as a control object categorization task. In all tasks, target stimuli were ambiguous and were preceded by congruent or incongruent contextual scenarios. **Results:** While individuals with ADHD showed reduced contextual modulation for action intention predictions, those with ASD showed a reduced modulation for the emotion prediction and non-social categorization tasks. The contextual modulation was comparable for the prediction of personality traits. **Conclusion:** The use of context to interpret sensory information is exploited differently in ASD and ADHD depending on the specific social cognition domain.

Development and Validation of the Mandarin Version of the Theory of Mind Inventory-2 and Theory of Mind Task Battery in Children With Autism Spectrum Disorder in Mainland China

Wenyu Xia, Nanjing Normal University; Shiyue Cao, Nanjing Normal University; Mi Tian, Nanjing Normal University; Xuezheng Xiao, Zhuhai Fudan Innovation Institute

Theory of Mind (ToM) is the social cognitive ability that enables individuals to infer and understand the mental states of others, such as beliefs, desires, and intentions. Children with Autism Spectrum Disorder (ASD) often exhibit significant impairments in ToM, leading to substantial social and communication challenges. This study aimed to develop and validate the Mandarin versions of the Theory of Mind Inventory-2 (ToMI-2-M) and the Theory of Mind Task Battery (ToMTB-M) for application in Chinese children in clinical and research settings in mainland China. The ToMI-2-M and ToMTB-M were developed through translation, expert validation, pilot testing and cultural adaptation. A total of 95 children with ASD and 47 typically developing (TD) children aged 3-8 years, were evaluated with ToMI-2-M, ToMTB-M and measures of symptom severity, cognitive abilities, and verbal ability. Both the ToMI-2-M and ToMTB-M demonstrated high internal consistency, test-retest reliability, content validity, convergent validity and discriminative validity. The ToMI-2-M and ToMTB-M are reliable, valid, and culturally adapted tools for assessing ToM in children with ASD in mainland China, offering valuable insights for clinicians and researchers.

Oddball Fast Periodic Visual Stimulation to Explore Facial Emotion Recognition in Children With Autism Spectrum Disorder: An fNIRS Study

Wenyu Zhao, School of Education Science, Nanjing Normal University; Chuchu Ren, School of Education Science, Nanjing Normal University; Mi Tian, School of Education Science, Nanjing Normal University; Xuezheng Xiao, Zhuhai Fudan Innovation Institute; Gaoding Jia, Shijiazhuang University

Children with autism spectrum disorder (ASD) exhibit impaired implicit facial emotion recognition (FER). Functional Near-infrared Spectroscopy (fNIRS) offers an avenue to study their FER response especially for its high ecological validity. Yet, fNIRS studies on implicit FER in ASD children are scarce. In previous research, the oddball fast periodic visual stimulation (FPVS) paradigm is considered as an effective way to study implicit FER in ASD. In this study, we used the oddball FPVS to explore implicit FER differences between ASD and TD children. We recorded fNIRS signals in 28 ASD children and 18 typically developing (TD) children, all aged 3-8. In the paradigm, neutral faces were shown at 5 Hz as the base stimulus, while emotional faces (angry & sad) were shown at 1 Hz as

the oddball stimuli. Each participant viewed two blocks of upright and inverted faces. Our preliminary analysis revealed significant differences in how ASD and TD children respond to emotional faces with different orientations. Future analysis is expected to draw a more precise conclusion about the response in the prefrontal, occipital, and temporal cortices, contributing to a more comprehensive elucidation of FER deficits in ASD children.

Exploring Prosodic Perception and Musical Perception in Musicians and Non-Musicians With and Without Dyslexia

Bairavi Selvarajah, University of Leeds; Richard Allen, University of Leeds; Christina Sotiropoulou Drosopoulou, University of Leeds

Research on dyslexia reveals phonological deficits extend to prosody, including word-level stress sensitivity. Since language and music rely on overlapping auditory processing skills, studies link musicianship to improved prosodic perception and reading skills. However, the effectiveness of music interventions is debated, with evidence suggesting natural musical perception may influence reading skills more than musical training alone. This ongoing study employs a 2x2 factorial design to examine the effects of dyslexia and musicianship on prosodic perception, and their interaction, in adults with and without dyslexia. Four groups of university students (Dyslexic Non-Musicians, Non-Dyslexic Non-Musicians, Dyslexic Musicians, and Non-Dyslexic Musicians) complete online tasks assessing phonological processing, reading accuracy and speed, working memory, musical perception, and word-level prosodic perception. Preliminary findings will be presented at the conference. Additionally, we will explore the contributions of each measured variable to prosodic perception to better understand these relationships in adults with and without dyslexia, and to inform more targeted music-based interventions.

Theory of Mind Intervention Enhances Facial Emotion Recognition in Children with Autism Spectrum Disorder: a Functional Near-infrared Pilot Study

Chuchu Ren, School of Education Science, Nanjing Normal University; Wenyu Zhao, School of Education Science, Nanjing Normal University; Mi Tian, School of

Education Science, Nanjing Normal University; Xuezheng Xiao, Zhuhai Fudan Innovation Institute, Zhuhai, China; Gaoding Jia, Shijiazhuang University, Shijiazhuang, China

Children with autism spectrum disorder (ASD) often exhibit deficits in facial emotion recognition (FER), which may be influenced by their delayed development of theory of mind (ToM). This pilot study aims to explore the neural mechanisms underlying FER in children with ASD and the potential impact of ToM intervention on enhancing rapid, unconscious FER. Seven boys with ASD (mean age: 5.64±1.28 years) participated in this study. The ToM intervention consisted of 12 sessions of thought-bubble training over 20 days, each lasting 30 minutes. For the FER task, an Oddball FPVS paradigm was employed, presenting 72 sets of upright and inverted Chinese young and elderly faces. Neutral emotional expressions were utilized as the baseline stimuli, while sad and angry expressions served as oddball stimuli, presented at frequencies of 5 Hz and 1 Hz respectively. A 32-channels functional near-infrared spectroscopy (fNIRS) was used to measure responses in the prefrontal, occipital, and temporal cortices. Our preliminary analysis has showed that there is a slight difference in FER before and after the ToM intervention.

B-09: Social Cognition

How Do We View Faces on Zoom Calls? Live Video Slows Perceptual Search of Faces

Chloe Sainsbury, University of Cambridge; Gregory Davis, University of Cambridge

With the ever-increasing adoption of online video-calling, understanding human perception and cognition in this novel environment is vital. Humans are typically experienced in either viewing live faces in-person or as pre-recorded images on screens. Video calls create novel hybrids of these two disparate environments: 2D, distant faces that can be nonetheless consciously present. Here, in two initial experiments we examined visual search for 'odd-one-out' gaze directions in arrays of face videos (a direct gaze among averted gazes, or vice versa). We found slowed RTs and delayed fixation to the target face when viewing live-face arrays compared to physically-identical pre-recorded face arrays. Speed of serial, overt attention did not differ, implicating slower, noisy, parallel guidance of attention in live-face displays. A

further experiment augmented participants' awareness of being seen via the two-way link; this removed RT slowing for live faces, but introduced a drop in task accuracy. We conclude that 'liveness' of face stimuli can slow guidance of attention to singleton gaze-directions, a high-level influence on visual search.

Cognitive Evolution and Stone Tool Recognition: An Eye-Tracking Study

Chloé Bryche, Laboratoire d'Étude des Mécanismes Cognitifs (EMC); Giovanni Federico, Laboratory of Experimental Psychology and Cognitive Neuroscience; Arthur Seye, Laboratoire d'Étude des Mécanismes Cognitifs (EMC); Arnaud Fournel, Laboratoire d'Étude des Mécanismes Cognitifs (EMC)

Eye-tracking technology provides insights into the cognitive processes underlying tool expertise and its evolution, contributing to the field of cognitive archaeology. Our study examines whether naive participants can distinguish stone tools from randomly fractured stones and how brief training influences visual exploration and classification accuracy. Forty-two right-handed participants (18-35) with no prior knowledge of lithic industries were divided into a novice and a trained group, the latter receiving a short instructional video. Using an EyeLink 1000 system, we recorded eye movements while participants classified images of handaxes, choppers, cleavers, and fractured stones. Trained participants showed greater accuracy, particularly for choppers and handaxes, while cleavers remained difficult to classify. Eye-tracking data revealed more fixations and shorter fixation durations in trained participants, indicating enhanced information extraction. Orientation effects were marginal. These findings highlight expertise's role in tool recognition and suggest that the ability to distinguish functional tools from stones was a learned cognitive skill, shaped by evolutionary pressures in early hominins.

Empathy in a Glance: Evaluations of Listener Gaze Depend on Emotional Context

Eva Landmann, Julius-Maximilians-Universität; Anne Böckler, Julius-Maximilians-Universität

Human conversations cover a wide range of emotional experiences, from joyful moments to deep-seated anxieties, often shared in the hope of receiving an empathetic response. It is commonly assumed

that direct gaze (eye contact) is a particularly powerful signal of empathic listening. In multiple studies, we used a “Zoom task” to investigate how listener gaze behavior is evaluated in diverse emotional contexts. In each experiment, participants watched videos of listeners displaying either direct gaze, downward gaze, or alternating direct and downward gaze (gaze direction) while (unseen) narrators shared autobiographical experiences with different emotional content (neutral, sadness, joy, embarrassment, fear, disgust). Our published and preliminary results indicate that gaze directions are judged depending on emotional context: Gaze aversion of the listener, for instance, is perceived as empathetic specifically during sad, but not during neutral or positive narrations. These findings contribute to a more comprehensive understanding of how emotional context shapes the interpretation of listener gaze behavior, expanding current insights across a broad range of emotions.

Beyond Intrinsic Cues: Gaze-Cueing and Social Evaluation of Ingroup and Outgroup Faces

Irene Razpurker-Apfeld, Zefat Academic College; Lipaz Shamo-Nir, Zefat Academic College

The gaze-cueing effect (GCE), in which attention shifts to the direction another person is looking, is well established. Prior studies using faces that display distinct racial features indicating group membership report mixed findings regarding GCE's sensitivity to racial cues. We examined GCE using ethnic ingroup/outgroup faces defined by prior acquaintance rather than intrinsic saliency. We created a pool of 32 computer-generated, emotionally neutral faces, typical of Israeli society. In an online experiment, participants were familiarized with four sampled faces, learning to classify them as ethnic ingroup or outgroup (N = 148). Then they responded to a target appearing in a location either congruent or incongruent with a preceding averted gaze of the face. Finally, they rated the faces along various characteristics. Results reveal a robust GCE unaffected by the social affiliation of the face. Yet, outgroup faces receive more negative evaluations (e.g., perceived as dangerous). These findings indicate that while social cues do not bias attentional orienting, they do influence evaluative judgments – suggesting dissociable underlying mechanisms. Two additional studies are ongoing to rule out alternative explanations.

A Competitive Edge: How Social Cues and Spatial Congruence Influence Joint Attention in Addressed or Witnessed Interactions

Isabel Blackie, University of Birmingham; Anisah Islam, University of Birmingham; Andrew Surtees, University of Birmingham; Mahmoud Elsherif, University of Birmingham

Joint attention is crucial for the development of social cognition, but whether the type of relationship (i.e., cooperative or competitive) or interaction (e.g., addressed or witnessed) modulates joint attention is unclear. This study investigated these factors in 96 neurotypical adults using a video object-choice task. Here, participants chose between cups based on an actor's pointing cue, either while being addressed or witnessing an interaction between two actors. Participants were primed about the actor's cooperative or competitive intent. Experiment 1 found no significant interaction between these factors. However, Experiment 2, considering spatial attention (cue direction), revealed nuanced effects. In addressed interactions, more social cues led to faster responses, especially during spatially congruent cooperative trials. In witnessed interactions, responses were faster to spatially incongruent cues in cooperative trials and vice versa in competitive trials. These findings suggest that joint attention is not solely a passive response to social cues, but is actively shaped by the social context and spatial configuration, highlighting how individuals actively interpret and adapt to others' attentional cues.

My New Habit Is Special: Prioritised Cognitive Processing Within Four Weeks of Habit Formation

Michella Feldborg, University of Aberdeen; Jie Sui, University of Aberdeen

People deliberately change their everyday behaviours to form new habits and improve their lives mentally and physically. Habit formation research routinely relies on self-report ratings like the Self-Report Habit Index (SRHI), yet implicit cognitive measures of habit formation are still to be established. The study adapted a shape-label association paradigm from the field of self-prioritisation effects to measure cognitive prioritisation of habit-related information during habit formation. Across four weeks, 51 participants formed a new habit which was measured using SRHI and the habit association task. Results revealed immediate performance advantage for habit-related stimuli,

which persisted across weeks and might reflect intention-driven processing. A Hierarchical Drift Diffusion Model (HDDM) revealed progressive increases in information uptake rate across weeks, which paralleled self-reported habituation. The association task is a novel measure of habituation which illuminates the cognitive processes of habit formation and inspires new research in the intersection between habit behaviours and identity.

Thursday

10:30 – 12:10: Symposia

KSYM-03: The Cognitive and Neural Underpinnings of Executive Functions in Development: Insights From Diverse Populations and Methodologies

Chair(s): Emma Blakey, University of Sheffield

Symposium Abstract

Executive functions develop rapidly over childhood and are critical in supporting children's learning in a range of domains. Children differ markedly in their executive functions and there remains debate around why this is and how we might best measure these skills in childhood. This symposium brings together researchers studying executive functions and their cognitive and neural underpinnings, in celebration of Professor Gaia Scerif's research. The symposium will present research on how executive functions develop over childhood from infancy to early adolescence and from a cognitive and cognitive neuroscience perspective. The presentations bring together researchers who work with diverse populations, across typical and atypical development and using a range of methodologies. The research uncovers how executive functions relate to learning, how we might best measure executive functions and why differences may emerge in these skills.

Executive Functions During the Toddler and Preschool Years: Relations With Language and the Home Environment

Emma Blakey, University of Sheffield; Molly Jackson, University of Sheffield; Molly Willis, University of Sheffield; Emma Smith, University of Sheffield; Chris Stride, University of Sheffield; Danielle Matthews University of Sheffield

Executive functions develop rapidly in childhood and play an important role in learning and academic attainment. During early childhood, large differences emerge in children's skills. As yet, it is unclear the extent to which other core cognitive domains (such as language) and features of the child's home environment and resulting interactions with caregivers shape differences in executive functions. I will discuss preliminary findings from the 'Sheffield Early Years Study' - a longitudinal study designed to understand how language and the child's environment impacts executive function development and later maths learning. In this study, just over 200 two-year-olds and their parents attended three sessions once every six months until their child was four. We examined children's executive functions and language using a broad array of tasks, as well as seeking to understand wider factors at play including family constraints and parent stress and mental health. In this presentation, I will present preliminary findings from the dataset regarding the role of language in the development of early executive functions and how growth in language and executive functions predicts later maths ability. I will also discuss wider measurement considerations when working with young children to ensure we can fully capture their abilities.

Attention, Working Memory and Mathematics Skills in Children Born Preterm

Lucy Cragg, University of Nottingham; Jenny Retzler, University of Leeds; Madeleine Groom, University of Nottingham; Samantha Johnson, University of Leicester

Children born preterm (before 37 weeks of gestation) are at higher risk of attention difficulties compared to children born at term. This can have an adverse impact in the classroom, particularly on mathematics. Across 2 projects, we explored the cognitive and neural mechanisms underpinning attention and mathematics skills in children born very preterm (before 32 weeks of gestation), as compared to their term-born peers. We found that working memory was a strong predictor of parent-reported attention skills, regardless of birth status. Moreover, working memory accounted for the difficulties in mathematics experienced by children born very preterm. Sustained attention performance did not differ between very preterm and term-born groups matched for parent-rated attention. However, the underpinning neural activity suggested disrupted

processing of salience in children born very preterm. These findings indicate that similar cognitive and neural mechanisms underpin attention and mathematics skills in children born very preterm as compared to the general population, suggesting comparable types of support are required. However, subtle differences, particularly in neural mechanisms, warrant further investigation.

Developmental Dynamics Between Cognitive Control and Statistical Learning in Childhood

Nicolas Chevalier, University of Edinburgh; Matthew Johnston, University of Edinburgh; Jessica Dolan, University of Edinburgh

Immature cognitive control in early childhood may promote diffuse attention and implicit learning of environmental cues and regularities. In turn, knowledge accumulation through statistical learning may support more efficient cognitive control with age. This project explored the potential relations between cognitive control and statistical learning in middle childhood. 165 children between 5 and 12 years of age completed a battery of tasks assessing learning of three types of statistical regularities (adjacent conditional, non-adjacent conditional, and cue-based statistics) and different aspects of cognitive control (set-shifting, proactive control, inhibition, and working memory). Performance across the three statistical tasks were independent of each other and age-invariant, while cognitive control increased with age. Critically, lower cognitive control predicted greater statistical learning, but only for adjacent conditional statistics. Thus, relations between statistical learning and cognitive control likely depend on the type of statistical regularity in childhood. Follow-up assessments at two subsequent timepoints over 18 months are currently being conducted (through spring 2025) to explore these relations longitudinally.

Neural Mechanisms of Attentional Selection and Suppression: Insights From ERPs on Developmental Changes

Andria Shimi, University of Cyprus

Selective attention develops through childhood, yet the neural mechanisms underlying distractor suppression across development remain underexplored. This talk presents novel ERP findings

from a visual search task investigating target selection and distractor suppression across children and adults. Participants responded to a target while ignoring distractors, with continuous EEG recordings capturing neural activity. Results revealed developmental differences in neural patterns for both target selection and distractor suppression, highlighting how attentional mechanisms evolve from childhood to young adulthood. These findings provide key insights into the maturation of top-down attentional control and the foundational processes shaping adult cognitive efficiency.

Reverse Engineering the Developing Brain: How Do the Higher-Order Principles of Our Brains Emerge?

Duncan Astle, University of Cambridge

Human brain development takes a long time and results in highly variable outcomes, with executive functioning being some of the most variable cognitive outcome. This variability in brain development is important for understanding differences in cognition, mental health and learning. But measuring and mapping that variability is extremely challenging. This talk showcases the application of different computational frameworks that address two developmental challenges. Firstly, how do we capture the incredible cognitive heterogeneity that exists across childhood and adolescence? Here we use non-linear mapping techniques to capture differences in cognitive ability, such as difficulties in executive function and language. Secondly, can we build developmental models that formalise simple biological principles in order to capture complex developmental phenomena? Here we create simple simulations that capture the emerging connectivity of the human brain and allow us to test systematically what ingredients are needed for complex brain topologies – and individual differences therein – to emerge.

SYM-14: Engagement and Cognitive Health in Older Adults

Chair(s): Lixia Yang, Toronto Metropolitan University

Symposium Abstract

Cognitive Decline associated with healthy or pathological aging can be attributed to a range of modifiable lifestyle or engagement factors. This

symposium features five research talks with a specific focus on the cognitive benefits of active engagement among older adults. Engagement involves active participation in cognitive, physical, and social activities in a community setting or a virtual environment. Methods span from large-scale cross-sectional assessments, experimental manipulations, to randomized controlled validation trials. The outcome measures include subjective and objective cognitive measures such as Dementia risk perception, subjective memory, cognitive health, autobiographical memory, beat perception, auditory attention, and computerized cognitive task on executive attention, memory, and speed. The results showed that active engagement is crucial for cognitive health and efficacy among older adults. These results hold significant implications in promoting cognitive health, identifying risk and protective factors for dementia-related cognitive declines, and developing feasible and effective cognitive intervention programs for older adults.

Preliminary Efficacy of a Community Centre-Based Personalized, Multidomain Lifestyle Dementia Risk Reduction Intervention: The Kimel Family Centre for Brain Health and Wellness

Nicole Anderson, Rotman Research Institute

At least 45% of dementia cases worldwide can be attributed to modifiable lifestyle factors, underscoring the need for scalable, multidomain dementia prevention interventions. At the Kimel Family Centre for Brain Health and Wellness, we are recruiting >2,000 individuals aged 50+ without a diagnosis of dementia. Participants receive a detailed dementia risk assessment, resulting in a Personalized Dementia Risk Report and Program Strategy, listing their health conditions contributing to dementia risk, as well as their dementia risk based on engagement and wellbeing in five domains: physical activity, brain-healthy eating, cognitive engagement, social connections, and mental wellbeing. Participants then sign up for programs in the community centre to address their risk factors, and every six months receive an updated Personalized Program Strategy based on reassessments. In this symposium, I will be reporting preliminary data from the first ~100 enrolments, on the effects of this approach on lifestyle dementia risk, health, and cognition.

Improving Access to Memory and Brain Health Intervention for Older Adults With an Online Program

Renée Biss, University of Windsor

Interventions that teach practical memory strategies and promote brain healthy lifestyle behaviours are beneficial for older adults. However, access to evidence-based programs is often limited for people outside of major urban centres or with disabilities or work responsibilities that prevent in-person attendance. I will discuss the implementation and evaluation of a novel online, flipped classroom version of a memory program for participants from a mixed urban/rural setting. We found improvements in web-based pre/post measures of subjective memory, strategy use, adoption of brain-healthy lifestyle behaviours, and story memory performance. Videoconference-based peer discussion was particularly beneficial for participants' social engagement and to help normalize memory slips. However, individuals with lower cognitive function and more subjective cognitive concerns had lower participation, especially for self-directed online activities. Research to explore who accesses and benefits from online cognitive interventions is important to understand how to promote cognitive health for a broader range of older adults.

How Does Popular Music Help Younger and Older Adults Remember Their Past?

Myra Fernandes, University of Waterloo; Khalil Husein, University of Waterloo

Music can involuntarily and rapidly evoke autobiographical memories. The source of music's cueing ability is unspecified. We investigated which component of songs drives this effect, and whether they differentially enhanced recollection in older than younger adults. Participants listened to 15-second clips of 24 popular songs coinciding with their adolescent period. Clips were either unmodified, with their lyrics or instruments removed, or the song and artist name was presented visually. On each trial, if a participant experienced a memory, they wrote a description of it and self-rated its properties (emotional valence, arousal, sense of re-living). Unmodified song clips evoked significantly more memories than all other cue types, regardless of age. Importantly we found evidence of temporal and

emotional alignment between cues and their evoked memories: older cues evoked older memories, and more positive cues evoked positive memories. Music may function to constrain search, facilitating retrieval.

Help or Hinder? Response to Walking to a Beat Depends on Task Complexity and Individual Differences in Age, Beat Perception, and Auditory Selective Attention

Karen Li, Concordia University; Averil Parker, Concordia University

Increased walking variability is associated with risk of falling in older adults. Walking to a beat (Rhythmic Auditory Stimulation; RAS) can improve walking performance, however not all individuals benefit. Higher task complexity negatively impacts performance during dual tasking, particularly for older age groups. Similarly, we hypothesized age-related complexity effects during RAS. Young, middle-aged, and older adults performed a walking task under full attention (i.e., single-task) and in three dual-task conditions: synchronizing steps to low tones (Simple); to low and high tones (Moderate); to low and high tones while monitoring for a target sequence of tones (Complex). Middle-aged adults improved their walking in the Simple condition relative to single-task walking; improvement was attenuated in the Complex condition. Stronger beat perception and auditory selective attention was associated with improved walking in the Complex and the Moderate conditions, respectively. In conclusion, response to RAS is modulated by task complexity, age, and perceptual/attentional abilities.

Thriving to Age Actively: Cognitive Benefits of Active Aging Activity Engagement

Lixia Yang, Toronto Metropolitan University; Cassandra Skrotzki, Toronto Metropolitan University

Older adults' cognition could be improved through engagement in mental or physical activities. This presentation features two studies. Study 1 assessed the immediate and 3-year delayed cognitive benefits of a home-based executive function (mental exercise) or low-intensity aerobic (physical exercise) training program. The results showed that mental exercise resulted in a differentially larger immediate cognitive benefit on the 64-card Wisconsin Card Sorting Task (WCST-64). However, the benefits did not survive the

3.5-year delay. The follow-up results nevertheless showed delayed benefits on episodic memory. Study 2 assessed the immediate and 1-month delayed cognitive benefits of a virtually delivered multi-domain active aging training program involving physical, mental, and social engagement and active aging workshop series. The results showed immediate cognitive benefits across all three training conditions and the benefits were maintained over the 1-month delay. Taken together, active aging engagement has significant and endurable cognitive benefits among healthy older adults.

SYM-15: The Focus of Attention: Insights, Progress, and What Lies Ahead

Chair(s): Caro Hautekiet, Vrije Universiteit Amsterdam

Symposium Abstract

When attention is directed toward specific information in either perception or working memory, this information is thought to receive enhanced processing by occupying the focus of attention. Although recent advances have deepened our understanding of the processes involved in the interplay between memory, perception, and attention, some fundamental aspects remain unclear, and our conclusions are sometimes conflicting. This symposium brings together researchers from different parts of the world to address key gaps in our understanding of focused attention in perception and working memory. Talks will explore recent insights into (1) how and why focused attention boosts memory performance, (2) the interplay between perception and working memory, and (3) the consequences and boundary conditions of the focus of attention. Establishing these mechanisms is essential for advancing knowledge of working memory and attention, sparking new insights and collaborative opportunities for future research.

Working Memory Prioritization Produces Asymmetrical Interactions With Perception

Joseph Saito, University of California San Diego; Frida A.B. Printzlau, University of Toronto Mississauga; Yvanna Yeo, University of Toronto Ontario; Keisuke Fukuda, University of Toronto Mississauga

During behavior, observers shift their focus of attention (FOA) towards working memories that are relevant for impending action and away from those

that may become relevant later. These attentional shifts are theorized to create different priority statuses across memoranda that can influence their interactions with perception. However, evidence of these interactions is often conflicting. In this talk, I start by showing that these conflicting findings may be explained by systematic differences in the cues that are used to incentivize prioritization, making for unfair comparisons across studies. I then show in two experiments that when these cues are controlled, the FOA produces a clear protective effect over prioritized memories but little reciprocal effect on perception. I conclude by interpreting these asymmetrical effects through the lens of a recent theoretical framework that distinguishes between the functional memory states that are conferred by the FOA and their corresponding representational states in the brain.

Revisiting the Retro-Cue Effect: Protection Against Decay and Test-Display Interference

Caro Hautekiet, Vrije Universiteit Amsterdam; Klaus Oberauer, University of Zurich

When attention is focused on specific information in working memory, this information is assumed to reside in the focus of attention. This process is often studied using the retro-cue paradigm, where a cue presented between encoding and test highlights an item, which improves recall for this item compared to uncued items. Many studies have explored the mechanisms behind this retro-cue benefit, but no consensus has been reached. In the current study, we revisited this debate to better understand how retro-cueing enhances performance. Consistent with previous research, we found that the retro-cue protects against interference at recall, but only for visual materials, not for verbal materials. Additionally, when perceptual interference is minimized, retro-cues help preserve both visual and verbal representations from (brief) decay. Together, these two mechanisms appear sufficient to explain the retro-cue effect.

A Domain-General Focus of Attention, or Are There Domain-Based Boundary Conditions to the Retro-Cue Effect?

Evie Vergauwe, University of Geneva; Johanna Hein, University of Geneva; Caro Hautekiet, University of Zurich, and Vrije Universiteit Amsterdam

The retro-cue effect—enhanced memory for items cued during retention—is a key tool for studying the focus of attention in working memory. While the focus of attention is generally assumed to be domain-general, the retro-cue effect seems observed more consistently with visuo-spatial materials than with verbal materials. These differences in findings across the literature may indicate domain-based boundary conditions, challenging the assumption of a domain-general focus of attention. Alternatively, these differences could result from differences in presentation modes, as verbal materials are more often presented sequentially, and visuospatial materials more often simultaneously. To disentangle these possibilities, we directly compared the retro-cue effect for verbal and visuo-spatial materials under both sequential and simultaneous presentation modes. By clarifying whether these differences arise from presentation mode or reflect fundamental distinctions in how the focus of attention operates across domains, this study advances our understanding of the focus of attention in working memory.

Running After Two Hares in Visual Working Memory: Exploring Retrospective Attention to Multiple Items Using Simulation, Behavioural Outcomes, and Eye-Tracking

Richard Allen, University of Leeds; Taiji Ueno, Tokyo Woman's Christian University

We examined whether multiple items in working memory can be attended and enhanced when simultaneously retro-cued. In Study 1, Monte-Carlo simulation of prior findings indicated that a strategy to focus on only one of the cued items might yield erroneous evidence of multi-item cueing. Two new experiments (Studies 2a and 2b) then explicitly instructed participants to fixate their gaze on all cued positions, verified through eye-tracking (Study 2b). Both studies produced multi-item retro-cueing effects on cued recall accuracy. Notably, gazes were fixated to multiple cued positions within each trial, though in an imbalanced way for each cued position. However, simulation revealed that our accuracy patterns could also in principle be produced by single item enhancement on each trial. This work highlights the need to disentangle different forms of attentional focus and for methodologies that probe genuine multiplicity in working memory.

Value-Based Interference: How Working Memory Representations Influence Interruption Processing

Marlene Rosner, University of Birmingham; **Thaleia Mouratidou**, University of Birmingham; **Damiano Grignolio**, University of Birmingham; **Clayton Hickey**, University of Birmingham

Attention is drawn to reward-associated sources of information. Based on behavioural and EEG data from an interrupted working memory task I will demonstrate that WM-based reward effects survive interference by interruptions. Furthermore, incentive salience translates to the non-rewarded interruption task: attentional processing of reward-associated salient interruptions is increased, as evident in posterior alpha power suppression, though interruption stimuli never garner reward. Similarly, the onset of cognitive control processes is delayed by reward-associated interruptions, as evident in increased midfrontal theta power and similarly in response times. Interestingly, reward-associated salient interruptions are followed by increased alpha power lateralization, indicating an attentional shift back to the core WM task once the interruption is complete. This suggests that attention was fully engaged by the reward-associated interruption, creating the need for instantiation of WM representations. Our results demonstrate how irrelevant value associations impact WM task performance in the face of interruptions.

SYM-16: Moving Beyond Standard Memory and Language: Insights From Evolutionary Psychology (Take 1)

Chair(s): Jeanette Altarriba, University at Albany, State University of New York; Josefa Pandeirada, University of Aveiro; Sara Félix, University of Aveiro

Symposium Abstract

This symposium brings together a diverse group of worldwide researchers to showcase cutting-edge research on language and cognition inspired by an evolutionary perspective. These talks will cover new insights on the survival effect on learning a foreign language (Jeanette Altarriba), and on recognition and source memory (Raoul Bell). We also reveal that animates (vs. inanimates) enhance the remembering of future intentions in both young and older adults (Sara Félix), highlighting memory's future orientation

purposes, and the impact of social-relevant interactions in memory (Meike Kroneisen). The symposium concludes with a 20-minute panel discussion, inviting dialogue on the theoretical and practical implications of these findings (e.g., enhancing memory in older adults, improving second-language acquisition).

Testing the Effects of Survival-Focused Retrieval on Word Recognition and Source Memory

Raoul Bell, Heinrich Heine University Düsseldorf; **Meike Kroneisen**, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau; **Laura Mieth**, Heinrich Heine University Düsseldorf

In two experiments, we examined the effects of survival-focused retrieval on memory. Each experiment consisted of three phases. First, participants encoded words in either a survival scenario or a control condition. Next, participants completed a source-constrained retrieval test with words from both scenarios plus new words, focusing either on whether the word had been present in the survival scenario or in the control condition. Finally, word recognition was assessed in both experiments, with an additional focus on source memory in the second experiment. Two competing accounts were tested: the retrieval-enhanced-learning account, which proposes that retrieving survival-related information enhances memory, and the retrieval-interference account, which suggests that similar encoding and retrieval contexts may cause interference, particularly in survival conditions. Results showed better recognition when encoding and retrieval conditions matched, supporting the retrieval-enhanced-learning account for recognition. Additionally, source memory was enhanced for survival processing regardless of retrieval condition, challenging the retrieval-interference account.

Ageless Memory? The Animacy Effect in Prospective Memory in Older Adults

Sara Félix, University of Aveiro; **Josefa N. S. Pandeirada**, University of Aveiro

Prospective memory (PM)—the ability to remember and execute future intentions, like medication intake—is an adaptive cognitive function crucial for daily living, particularly in older adults. However, stimuli variables that could significantly impact PM,

such as animacy, have been overlooked in research. The “animacy effect” refers to remembering animates (e.g., animals) better than inanimates (e.g., furniture) an adaptive bias grounded in evolutionary psychology’s emphasis on remembering information relevant for one’s survival and/or reproduction. Following-up on our recent novel report of an animacy effect in PM in young adults, this study explored whether it extends to older adults (young adults as controls). Prior data revealed a free recall animacy effect in both age-groups, suggesting it may also enhance PM in older adults. Our preliminary data confirm our hypothesis, offering insights into memory’s evolutionary underpinnings. Practical applications for supporting PM in aging populations are also discussed (e.g., improving medication adherence).

Who Is the Nice Guy? Can We Genuinely Remember Relevant Interaction Partners Better, or Has Previous Research Only Demonstrated Improved Visual Memory?

Meike Kroneisen, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau

Our memory has evolved not only to guide our future decisions but also to prepare us for interactions with the environment, including the social domain. Previous research has demonstrated that mutual cooperation relies on (source) memory. However, the hypothesis of a highly specialized cheater detection module, designed to identify uncooperative individuals, lacks empirical support. Instead, the literature suggests the flexible use of cross-domain inference and source memory mechanisms, which help to predict the future behavior of others by considering both situational and person-specific factors. Nevertheless, typical research designs have used the same visual material in both the learning and test phases, raising questions about the validity of the results when more realistic materials are used. To address this, the lack of realism was manipulated in various experiments. I discuss the theoretical implications of these findings in relation to the mechanisms underlying source memory for social interaction partners.

Extended Symposium Discussion

Josefa N. S. Pandeirada, University of Aveiro

SYM-17: Drift-Diffusion Modelling: A Method for Exploring Group Differences in Psychology

Chair(s): Amber Copeland, University of Sheffield

Symposium Abstract

Laboratory research on individual differences often faces challenges from measurement error and low reliability, partly due to reliance on traditional methods that use observed behavioural data (e.g., reaction time) as primary variables. The drift-diffusion model (DDM) combines reaction time and accuracy data to estimate key core parameters: drift rate (evidence accumulation speed), response threshold (speed-accuracy trade-offs), and non-decision time (encoding and motor processes). This approach disentangles the cognitive processes underlying decision-making, offering greater precision and sensitivity to group differences—crucial for research in applied and clinical contexts. In this symposium, we present findings from various use cases of the DDM for capturing group differences in cognition. The presentations will explore the benefits, challenges, and practical considerations involved in applying DDMs to different groups across varied psychological contexts. The five presenters represent a diverse group of early- and mid-career researchers, including a postdoctoral associate (Copeland), two lecturers (Poole, Hedge), and two senior lecturers (Manning, Evans), spanning four different universities.

Inhibition, Impulsivity and Processing Speed: What Have Evidence Accumulation Models Taught Us About Individual Differences

Craig Hedge, Aston University

The ability of evidence accumulation models to account for the multifaceted nature of speeded decision-making has prompted us to re-evaluate several questions about individual differences in cognitive abilities. I will discuss the findings from two projects and reflect on how they inform the use of these models to understand individual and group differences. The first project uses the Welsh Advanced Neuroimaging Database to examine the relationship between “processing speed” derived from three tasks and white matter (WM) characteristics. We observed correlations between WM characteristics and reaction time, but these associations were not reflected in the diffusion model

parameters. I will discuss the interpretation of the drift rate parameter in the context of literatures that have traditionally focused on speed. The second project tests whether performance in three response inhibition tasks predicts problem gambling symptoms. Inhibition is implicated in addictive and impulse control disorders, yet recent empirical work raises questions about whether a general inhibitory control ability exists. We have collected online data and will apply the diffusion model to examine which, if any, parameters predict self-reported symptoms.

The Influence of Positive Alcohol Memories and Alcohol Cues on Value-Based Decision-Making and Ad Libitum Drinking: A Drift-Diffusion Model Approach

Amber Copeland, University of Sheffield; Cameron Crook, University of Sheffield; Michelle Pun, University of Sheffield; Tom Stafford, University of Sheffield; Matt Field, University of Sheffield

We explored whether computational parameters of value-based decision-making (VBDM) change after manipulation of alcohol craving and if these parameters predict actual drinking behaviour. Using a pre-registered design, heavy drinkers (>28 units/week) were randomised to alcohol craving (positive drinking memory with alcohol cue; $n = 65$) or a control (positive non-alcohol memory with soft drink cue; $n = 64$) condition before completing a VBDM task where they chose between alcohol or non-alcohol images. A drift-diffusion model was fitted to behavioural data to estimate evidence accumulation (EA) processes and response thresholds. Next, participants were presented with alcohol (2 units) and their ad libitum consumption was measured. Participants in the alcohol craving condition had significantly higher response thresholds for alcohol-free reinforcement decisions ($p = .03$, $d = .40$) compared to the control group. However, other VBDM parameters were unaffected. Only soft-drink EA rates were negatively associated with ad libitum alcohol consumption ($\beta = -.18$, 95% CI = $-.34$ to $-.02$). Elevated alcohol value affects cognitive processes involved in decisions about alcohol-free reinforcement, but these changes did not predict drinking behaviour.

Making Use of Drift Diffusion Models When Measuring Selective Attention in Autism

Daniel Poole, University of Sheffield

In recent work, I have made use of variants of the drift diffusion model (DDM) in studies exploring differences in selective attention between autistic and neurotypical adults. For instance, autistic people have been theorised to suppress distractors less effectively than neurotypicals. This has been supported by observations that autistic children produce an increased response time congruency effect on the flanker task, although notably findings are mixed. We replicated this increased congruency effect in autistic ($n = 153$) and non-autistic adults ($n = 147$). We also fitted participant data to an extension of DDM for conflict tasks. Parameter estimates suggested interference from the foils was increased. Additionally, in the autistic group, response caution was increased, and perceptual efficiency was reduced. These findings suggest that inefficient suppression, response strategy and perceptual processing likely contribute to differences in performance on the flanker task in autism. This highlights the benefit of using DDM in autism selective attention research. Considerations for future work when characterising neurodiverse selective attention will be discussed.

Applying the Diffusion Model to Understand Perceptual Decision-Making in Autistic and Dyslexic Children

Cathy Manning, University of Birmingham

Altered visual perception has been reported in many developmental conditions. Yet, few studies directly compare across developmental conditions, or use sensitive-enough methods, to conclude whether perceptual differences are condition-specific, or reflect a general marker of atypical development. I will show how we have used pre-registered, hierarchical diffusion models with a blind modelling approach and high-density EEG to decompose autistic, dyslexic and typically developing children's performance ($n = 50$ per group) into distinct processing stages. Dyslexic, but not autistic, children showed a reduced accumulation of sensory evidence which was reflected in a shallower build-up of activity in a centro-parietal EEG component. The diffusion model has therefore identified divergence between conditions, which can inform theories. I will also present work which explores why our studies find no group differences between autistic and typically developing children, unlike previous work. Initial analyses

suggest that both autistic and non-autistic children can adjust their strategies based on instructions, which may explain previous mixed results.

Symposium Discussion

Alekhyia Mandali, University of Sheffield

Symposium Discussion

SYM-18: The Effects of Expectations on Cognition and Beyond

Chair(s): Avi Mendelsohn, University of Haifa

Symposium Abstract

Expectations shape nearly every aspect of cognition and behavior. Predictive processes, which involve the brain's ability to anticipate future events based on prior experiences and contextual cues are fundamental to efficient perception, decision-making, and learning. This symposium focuses on how predictive processes affect cognitive functions, offering interdisciplinary insights from animal models, behavioral studies, and neurostimulation experiments. By integrating these approaches, the symposium aims to illustrate how predictions guide behavior, and how deviations between predictions and reality drive cognitive adaptation and learning. Understanding these effects is crucial for unraveling how the brain anticipates and adapts to dynamic Prof. Shai Gabay will present findings from studies with humans and archerfish, shedding light on subcortical mechanisms and the evolutionary origins of predictions involved in tracking the movement of occluded objects. Dr. Pom Charras will explore the role of predictions in guiding attentional deployment over time, emphasizing how temporal dynamics shape cognitive processes. Prof. Luca Rinaldi will highlight how prior linguistic knowledge contributes to the construction of memory representations, showcasing the interplay between language and memory. Dr. Avi Mendelsohn will further expand on this theme by demonstrating how musical expectations enhance declarative learning and memory, offering a novel perspective on the interaction between auditory predictions and cognitive retention. Finally, Prof. Roi Cohen Kadosh will reveal how individual beliefs about receiving active treatment or placebo often better explain changes in clinical and cognitive outcomes than the objective treatment itself, emphasizing the importance of subjective experience in

neuromodulation research and its implications for treatment efficacy. Together, these talks illustrate the profound role of expectations across various domains and methodologies, highlighting how predictive models enable the brain to navigate complex environments while influencing its function. These insights have significant implications for understanding both adaptive and biased cognitive processes and for developing innovative applications in education, clinical practice, and healthcare.

Linguistic and Visual Priors Reveal the Structure of Semantic Memory

Luca Rinaldi, University of Pavia

In our daily lives, we are constantly bombarded by a vast amount of information that often appears chaotic. Philosophers and cognitive scientists have long questioned how this seemingly disordered input is transformed into knowledge or mental representations, enabling us to process, store, and manipulate information about the world. In my talk, I will explore this question using false memories as a case study. I will first propose that the information we encounter is often not truly chaotic but inherently structured. By quantifying this structure through prior semantic similarity, as captured by distributional semantics, I will show that false memories can be systematically predicted. Extending this analysis, I will demonstrate that even when the to-be-memorized items appear unstructured, underlying patterns emerge, shaped by prior linguistic knowledge. Finally, I will uncover both modality-independent and modality-dependent processes in the formation of memory traces. Specifically, I will reveal that visual and linguistic priors contribute to memory formation across different types of stimuli, though the extent of their influence depends on the modality tested: visual priors have a stronger impact in image-based tasks, while linguistic priors dominate in word-based tasks. These findings will offer a deeper understanding of the experiential priors that structure semantic memory.

The Tunnel Effect: Evolutionary Roots and Subcortical Contributions in Humans and Archerfish

Shai Gabay, University of Haifa

Human cognition retains evolutionary contributions from ancient subcortical structures, which are often overlooked in favor of cortical regions. This study investigates the role of these subcortical regions in the "tunnel effect"—the perception of an object's persistence despite temporary occlusion. While human cognition has evolved to include complex cortical processes, the contributions of older evolutionary structures may still play a critical role in certain cognitive phenomena. However, contemporary research has largely focused on cortical mechanisms, neglecting the potential influence of subcortical systems. To address this gap, we examined the subcortical basis of the tunnel effect in humans and archerfish. In human participants, we manipulated whether an object's reappearance was perceived by the same eye that saw its disappearance or by the opposite eye, leveraging the monocular visual system's unique characteristics. To explore the evolutionary origins of this phenomenon, we studied the archerfish, a non-mammalian vertebrate that uses water jets to dislodge insect prey and relies on precise spatiotemporal predictions of object trajectories. Both species were tested using spatiotemporal manipulations of occluded objects. Our findings suggest that the representation of occluded objects in humans involves monocular and subcortical visual systems, demonstrating the continued influence of these ancient neural mechanisms. Remarkably, archerfish, which lack cortical structures entirely, exhibited a similar tunnel effect, further emphasizing the role of subcortical processes. These results underscore the importance of subcortical mechanisms in object permanence, providing insights into the neural and evolutionary foundations of this perceptual phenomenon. Future research should focus on identifying the specific subcortical neural substrates that facilitate this capability, deepening our understanding of the shared evolutionary pathways underlying cognitive functions in humans and non-mammalian vertebrates.

The Importance of Individual Beliefs in Assessing Treatment Efficacy

Roi Cohen Kadosh, University of Surrey

In recent years, there has been debate about the effectiveness of treatments from different fields, such as neurostimulation, neurofeedback, cognitive training, and pharmacotherapy. This debate has been

fuelled by contradictory and nuanced experimental findings. Notably, the effectiveness of a given treatment is commonly evaluated by comparing the effect of the active treatment versus the placebo on human health and/or behaviour. However, this approach neglects the individual's subjective experience of the type of treatment she or he received in establishing treatment efficacy. Here we show that individual differences in subjective treatment - the thought of receiving the active or placebo condition during an experiment - can explain variability in outcomes better than the actual treatment. We analysed four independent datasets (N = 387 participants), including clinical patients and healthy adults from different age groups who were exposed to different neurostimulation treatments (transcranial magnetic stimulation: Studies 1 and 2; transcranial direct current stimulation: Studies 3 and 4). Our findings show that the inclusion of subjective treatment can provide a better model fit either alone or in interaction with objective treatment (defined as the condition to which participants are assigned in the experiment). These results demonstrate the significant contribution of subjective experience in explaining the variability of clinical, cognitive, and behavioural outcomes. We advocate for existing and future studies in clinical and non-clinical research to start accounting for participants' subjective beliefs and their interplay with objective treatment when assessing the efficacy of treatments. This approach will be crucial in providing a more accurate estimation of the treatment effect and its source, allowing the development of effective and reproducible interventions.

Exploring the Interplay of Spatial and Temporal Attention

Pom Charras, Université Paul Valéry, Montpellier III

Humans rely on predictive processes to adapt and survive in complex, dynamic environments by prioritizing relevant information while discarding less critical elements. One well-studied aspect of this prioritization lies in the spatial domain, extensively explored over the past five decades using paradigms such as Posner's spatial cueing task. However, effective interaction with the environment also depends on anticipating and focusing on temporal dynamics. Recent research has highlighted how predictive processes enable the implicit or explicit use of temporal information to prioritize specific

moments in time. While the cognitive mechanisms underlying selective spatial and temporal attention are well-documented, their interaction remains underexplored. Yet, this interplay is crucial for tasks such as catching a ball, where integrating spatial and temporal information is essential for success. In this talk, I will first provide a comprehensive overview of current research to identify key gaps and propose future directions for studying the integration of spatial and temporal attention. I will then present findings from our studies investigating this interaction across sensory modalities, employing both automatic and controlled modes of orienting. These insights shed light on how spatial and temporal dimensions combine to optimize sensory processing and behavior in dynamic contexts.

The Effects of Musical Expectations on Long-Term Memory Formation

Avi Mendelsohn, University of Haifa

Music is a pervasive element in our lives, present into our everyday experience. The effects of background music on learning and memory are inconsistent, partly due to the intrinsic complexity and variety of music, and partly to individual differences in music perception and preference. A prominent musical feature that is known to elicit strong emotional responses is musical tension. Musical tension can be brought about by building anticipation of rhythm, harmony, melody, and dynamics. In this talk, I will present studies in which we explored how declarative memory is influenced by musical tension, brought about within continuous music as well as in the form of isolated chords with varying degrees of dissonance/consonance. In three separate experiments, we found positive relationships between tension perception and physiological measurements of SCR and pupil dilation. As for memory performance, we found that background music in general led to superior memory performance, as compared to silence. We detected a trade-off effect between tension perception and memory, such that individuals who perceived musical tension as such displayed reduced memory performance for images encoded during musical tension, whereas tense music benefited memory for those who were less sensitive to the perception of musical tension. Delineating the conditions and mechanisms that underlie the impact that expectations evoked by musical elements exert on cognitive functions can

benefit our understanding of musical perception at large, and the diverse effects that music has on ongoing processing of learning and memory.

SYM-19: Towards a More Diverse Science of Reading and Language Processing, Inside and Outside the Laboratory

Chair(s): Pablo Gomez, Skidmore College

Symposium Abstract

This symposium addresses the need for a more inclusive science of reading and language processing, one that embraces diverse languages and accessible methodologies. Despite significant advancements in understanding reading and language, many studies remain geographically and linguistically limited due to reliance on costly tools like high-precision eye trackers. The symposium gathers experts presenting research conducted in multiple languages and countries, using innovative yet affordable techniques—such as low-cost eye trackers and consumer-grade VR devices with eye-tracking—to explore reading in both digital and virtual environments. Talks address adaptations of eye-tracking technology, the cognitive benefits of bilingual education, VR's utility in testing language processing under real-world conditions, and the power of behavioral measures and self-paced reading variations for deeper insights into language comprehension. This symposium hopes to expand the reach and applicability of language science research and expanding the range of studies across underrepresented languages and under-resourced regions worldwide.

The Eye-Tracking Gap in Reading and Language Research and How It Can Be Closed

Bernhard Angele, Universidad Antonio de Nebrija

Eye-tracking has transformed research on reading and language processing, yet its application remains geographically restricted, primarily concentrated in Western countries and China. This limitation, largely due to the high cost of eye-tracking equipment, hinders the inclusivity and generalizability of research findings. We need a global approach to studying reading, especially in diverse languages and

populations that have not been investigated in depth before. This can be achieved by promoting accessibility to eye-tracking technology in under-resourced regions. We show findings demonstrating the feasibility of capturing fundamental reading processes, like the influence of word frequency on fixation duration, even with less expensive equipment that uses lower sampling rates. The wider use of eye-tracking devices, even those not previously considered to be precise enough to study language processing, will enable a deeper understanding of reading across diverse linguistic and cultural contexts, ultimately benefiting the field as a whole.

The Impact of Bilingualism on L1 and L2 Lexical Access and Vocabulary Development

Montserrat Comesaña, University of Minho

Content and Language Integrated Learning (CLIL) in schools, which has the goal to improve immersion in a second language (L2) by teaching one or more subjects (e.g., biology or geography) in the L2 instead of the L1, has been recommended by the EU as one of the most effective ways of learning an L2. However, despite CLIL being implemented in many schools, many parents worry that any enhancement in L2 skills will come at the cost of lower L1 skills. We evaluated the effect of CLIL on Portuguese elementary and middle school students at schools with a different number of subjects taught in the L2. We found no impact of instruction in a second language (English) on lexical processing and vocabulary in the L1 (Portuguese), while, as expected, L2 instruction improved L2 proficiency, showing that L2 proficiency outcomes can be improved through CLIL without a negative impact on L1 skills.

Visual Disruptions and Word Processing in Native and Foreign Languages: Insights From Virtual Reality Studies

Jon Andoni Duñabeitia, Universidad Antonio de Nebrija

Across a series of studies, we explored how immersive virtual environments influence word processing in both native (L1) and foreign (L2) languages. Using virtual reality (VR) simulations participants encountered words under varying environmental conditions, such as rain and motion, designed to mimic real-world visual noise. The experiments examined whether such disruptions affect the

processing of emotionally charged versus neutral words in L1 and L2 contexts. Results across studies consistently showed that environmental noise, like simulated rain, impaired foreign and native language word processing. However, emotional words displayed a greater resistance to these disruptions, regardless of language. These findings highlight VR's potential for investigating cognitive processing under real-life conditions.

Living Meta-Analyses Can Make Research More Diverse

Pablo Gomez, Skidmore College

Meta-analyses are essential in the behavioral sciences, but their static nature causes them to quickly become out of date in active research areas. We advocate for "living" meta-analyses and introduce an accessible tool built in the R environment using the Shiny package. Our app enables researchers to dynamically update existing meta-analyses by seamlessly incorporating new studies as they emerge, and to create new meta-analyses through an intuitive and user-friendly interface. Researchers can interactively explore data and visualize results, perform sensitivity analyses, and generate diverse graphical outputs. Furthermore, they can conduct both frequentist and Bayesian analyses for comprehensive and transparent evaluation. This promotes collaborative, up-to-date meta-analyses across the behavioral sciences, ensuring current, comprehensive, and readily accessible synthesis of research. We highlight how researchers everywhere can use this tool to prepare living meta-analyses on topics of their interest, especially involving studies in diverse languages that may not have received much attention.

Investigating Word Presentation Effects on Sentence Processing During Self-Paced Reading

Maki Kubota, University of Bergen

Self-paced reading (SPR) is a widely used paradigm for studying sentence processing in real time, offering insights into the cognitive mechanisms of sentence comprehension. This study examines how cumulative versus non-cumulative word presentation in SPR tasks affects linguistic processes like ambiguity resolution and detecting anomalies. In cumulative presentation, previously seen words remain visible,

facilitating re-analysis and retrieval. In contrast, non-cumulative presentation removes earlier words, increasing reliance on immediate processing and memory. This study investigates how differences in presentation mode influences SPR measures of re-analysis and retrieval processes, such as resolving syntactic ambiguity and long-distance dependencies, compared to detecting local anomalies like gender or number violations. The findings shed light on how subtle design choices in SPR can impact real-time sentence processing.

SYM-34: Innovative Approaches to Assessing and Understanding Dyslexia and Related Language Disorders

Chair(s): Esther Adi-Japha, Bar-Ilan University

Symposium Abstract

This symposium will showcase recent advances in dyslexia research and related language disorders. It will focus on the cognitive and neural basis of the disorders, approaches to assessment, and implications for intervention programs. In his talk, Professor Rod Nicolson will suggest that sight word reading has a critical role in internalized speech development. His findings have important educational implications by highlighting the critical role of sight word reading in cognitive development. Based on her collaborative research with Professor Rod Nicolson, Professor Angela Fawcett will present the Brain Efficiency Screening Test (BEST), a novel screening tool designed to identify children at risk for dyslexia that includes the assessment of brain efficiency and literacy skills. The application of the BEST in a recent UK intervention program for disadvantaged children will also be presented. Professor Yafit Gabay will present her work on the role of procedural learning deficits in dyslexia, particularly in the auditory domain. Her research suggests that individuals with dyslexia experience difficulties in acquiring complex auditory categories through procedural learning, which may be linked to phonological impairments commonly observed in dyslexia. Professor Esther Adi-Japha will present her research exploring the relationship between procedural motor skill learning and written language disorders. Her study examines the predictive value of a motor skill learning task on reading comprehension and text copying abilities in second and third-graders from low socioeconomic backgrounds. Professor

Timothy Papadopoulos will present his research on using EEG and machine learning techniques to investigate the neural components of phonological awareness in children with and without dyslexia. His work aims to identify neural markers associated with phonological processing difficulties, which can enhance our understanding of dyslexia and may help improve diagnostic approaches. The symposium will emphasize the translational implications of current research related to dyslexia and language disorders. It will examine how cognitive and neurocognitive research can influence educational practices and interventions. The symposium aims to facilitate a dialogue between researchers involved in both basic and applied research.

The 'Inner Eye' Begets the 'Inner Voice': Sight Reading Scaffolds Speech Internalisation

Rod Nicolson, Edge Hill University

Working memory (WM) plays a crucial role in a child's cognitive development, but it is unclear how it develops, can be taught, or how it relates to the major school activity of learning to read. 'Reading Silently' is linked to the creation of the Visual Word Form Area but has been relatively neglected by literacy researchers. I posed the question: which comes first: Internalised Speech (IS) – the Inner Voice - or Sight Word Perception – the 'Inner Eye'? I utilised the Phoneme Exchange (PE) measure of IS from the recent Brain Efficiency Screening Test (BEST), and developed a novel measure of sight word reading (SWR) - the FlashWord app. These measures were administered to 102 8-10 year old children, creating a 2x2 matrix (LoPE_LoSWR, LoPE_HiSWR, HiPE_LoSWR and HiPE_HiSWR). The HiPE_LoSWR quadrant was essentially empty, indicating that efficient SWR is necessary for IS development. Equivalent findings obtained using the simpler BEST Backwards Digit Span WM test. Post-intervention data (n=55) revealed that progress between stages invariably involved progression to SWR. These results have high significance regarding the teaching of reading, but also highlight the unexpected role of SWR in underpinning cognitive development.

The Brain Efficiency Screening Test: Re-Uniting the Developmental Disorders!?

Angela Fawcett, Swansea University; Rod Nicolson, Edge Hill University

It has long been recognised that, in addition to their defining differences, there are commonalities between developmental disorders, as evidenced by their ‘comorbidities’. These commonalities have been partially explained by recent research on executive function, working memory and speed of processing in cognitive development. Applying this ‘inclusive’ framework to the understanding and support of all children with special educational needs (SEND) we upgraded our well-established 30 minute Dyslexia Screening Test to create an index of brain efficiency (BEI) as well as a literacy index (LI) renaming the test the Brain Efficiency Screening Test (BEST). The BEST, uniquely, meets all the requirements of the recent Delphi group recommendations for dyslexia screening while empowering teaching professionals to undertake the test. It was utilised in a recent UK intervention with highly disadvantaged ‘Children with a Social Worker’ aged 8-11 years to supplement existing measures. Data will be provided on comparison of BEST ‘at risk’ classifications with school diagnostic classification; of BEI with other assessments of executive function; and of BEST as a principled method of assessing the ‘progressive’ benefits of an intervention.

Auditory Category Learning in Developmental Dyslexia

Yafit Gabay, University of Haifa

Despite extensive research, the root causes of developmental dyslexia remain a topic of significant debate. While much attention has focused on phonological deficits—such as difficulties in distinguishing speech sounds like [b] and [p]—growing evidence points to broader procedural learning impairments. Contemporary theories of speech perception emphasize the central role of general auditory category learning in acquiring phonetic categories and making a case for the involvement of the procedural memory system in this learning. Hence, procedural category learning, particularly in the auditory domain, may provide a crucial lens for understanding these challenges. In this talk, I will describe recent findings showing that children and adults with dyslexia face significant difficulties in acquiring complex, multidimensional, non-linguistic auditory categories, compared to neurotypical controls. These deficits correlate with the severity of phonological impairments in dyslexia

and cannot be explained by differences in auditory perceptual acuity. Decision-bound computational modeling reveals inefficiencies in employing procedural-based strategies among learners with dyslexia, even as declarative strategies during auditory category learning are spared. Further preliminary data suggests that the deficit is selective to the auditory sensory modality. This research suggests a potential link between procedural learning impairments and the phonological challenges that are central to dyslexia, thus offering new insights into the underlying mechanisms of this condition.

Predicting Written-Language Disorders Among Second and Third Graders

Esther Adi-Japhe, Bar-Ilan University; Chagit Hollander, Givat Washington College of Education

This study tested associations between children's procedural motor skill learning and the risk of written-language disorders. The procedural learning Invented Letter Task (ILT) phases served as the first of three developmental linguistic levels: A. Subword-graphic-motor (writing of letters); B. Word-cognitive (verbal/non-verbal) and literacy measurements (reading/spelling); C. Syntax/Text-The risk of literacy disorder (reading comprehension and text copying rate). One hundred and fifty-one second-graders of low socioeconomic backgrounds were tested. Structural equation modeling indicated direct and mediated associations strengthening the notion of an association between procedural motor skill learning phases and written language disorder. Reading comprehension disorders were directly predicted by the ILT learning and automaticity phases. In addition to the well-established associations between cognitive and literacy measurements, cognitive measures mainly predicted the level of reading comprehension while literacy measures mainly predicted the ability to copy texts. Educational implications are discussed.

Phonological Ability and Neural Congruency: Phonological Loop or More?

Timothy Papadopoulos, University of Cyprus

This study investigates the neural basis of phonological awareness (PA), a critical skill for reading and linked to dyslexia, using EEG data and applying machine learning (ML). Sixty Greek-speaking

children (30 with dyslexia, 30 controls), aged 7.6-12.1 years, completed a phoneme elision task requiring phoneme manipulation. Two ML models analyzed initial and final phoneme conditions, revealing decreased neural congruency in children with dyslexia. Initial Phoneme Elision (IPE) and Final Phoneme Elision (FPE) models accurately differentiated groups (AUC=0.82 and 0.83, respectively, $p < .001$). The combined model (CONCAT) improved accuracy (AUC=0.85). Findings supported shared neural processing for IPE and FPE, advancing Baddeley's working memory model, and highlighted components critical for distinguishing groups. This study underscores the importance of novel ML approaches in isolating PA neural components, enhancing understanding of dyslexia's neural basis, and informing diagnostic methods.

SYM-20: The Sound of Thought - Exploring the Frontiers of Inner Speech

Chair(s): Hamutal Kreiner, Ruppin Academic Centre

Symposium Abstract

This symposium presents recent advances in understanding inner speech - the phenomenon of "talking to ourselves in our heads". Through diverse methodologies including behavioral studies, neuroimaging, and self-report measures, the talks demonstrate that inner speech is a sophisticated cognitive tool that embodies structural features of overt speech, including prosody. The talks conceptualize inner speech within embodied cognition frameworks and address fundamental theoretical questions about its functionality. The studies reveal how inner speech serves various psychological functions, from cognitive processing and abstract thinking through emotional perception to physical performance and self-regulation. The symposium also addresses practical applications, particularly in brain-computer interfaces for communication disorders. Together, these studies advance our understanding of inner speech as a fundamental aspect of human cognition with important theoretical and practical implications for psychology, linguistics, and clinical applications.

Inner Speech as a Cognitive Tool: Recall of Actions and Processing of Abstract Concepts

Anna M. Borghi, Sapienza University of Rome; Chiara De Livio, Sapienza University of Rome; Mattia Gervasi, Sapienza University of Rome; Charles Fernyhough, Durham University

The recent interest in the role of language in shaping cognition has led to a renewed interest in inner speech. In the presentation, I will move from the assumption that inner speech is a cognitive tool that enhances human cognitive abilities in various ways. Specifically, I will focus on two research lines. The first investigates whether inner speech can help recall and reproduce observed actions, facilitating their encoding and execution. The second addresses the hypothesis that inner speech might be more involved in the processing of complex concepts, such as abstract (e.g., "freedom"), compared to concrete concepts (e.g., "dog"), contributing to the inner search of the meaning and re-explanation of it. I will present recent results from behavioral studies with interference paradigms (e.g., articulatory suppression) and from questionnaires on individual differences in thinking modalities and varieties of inner speech involvement.

The little voice in bilinguals' head: what language does it speak? Varieties of inner speech among multilingual speakers

Reem Dallasheh Khatib, Zohar Eviatar, University of Haifa

The subjective experience of inner speech is often described as the conscious experience of hearing ourselves talking to ourselves. This suggests that inner speech is not an abstract thought, but rather a fundamentally language related experience. This study asked what language bilinguals use for their inner speech, and do they use different languages for different varieties of inner speech. Bilingual participants filled in a self-report questionnaire about the frequency of use of different varieties of inner speech (VISQ-R), once about their dominant language, the once about their second language. Results show that bilinguals use their L1 more often than L2 for most but not all aspects of inner speech. Interestingly, some characteristics of the bilingual background such as L2 proficiency and age of acquisition were correlated with the frequency of using certain varieties of inner speech. These results clearly support the view that inner speech is a language based experienced.

Inner Speech: Connecting Body and Mind

*Johanne Sofie Krog Nedergård, University of Copenhagen;
Mikkel Wallentin, Aarhus University*

In both cognitive and sport psychology, inner speech is considered a valuable tool for control of attention, self-regulation, motivation, and endurance. While relationships between inner speech and these control functions are widely reported, the underlying mechanisms and directions of causality are less clear, especially when we consider how inner speech – a subjective, mental phenomenon – can have physiological effects. In our studies, we have sought to explore these relationships. In one set of experiments, participants for example appeared less able to push themselves to perform optimally in a physical endurance task when prevented from accessing inner speech resources. Another set of experiments indicated that participants' heart rate changed with self-induced both positive and negative inner speech in the absence of any other movement. We consider these and other related results and discuss their implications for the relationship between inner speech and the body.

Rethinking Inner Speech Through Linguistic Active Inference

Bo Yao, Lancaster University

This paper presents the Linguistic Active Inference Theory (LAIT), which conceptualises inner speech as a linguistic implementation of active inference within an embodied cognitive framework. LAIT posits that inner speech orchestrates simulations of embodied experiences to predict and infer about the world, aiming to minimise uncertainty. The paper begins by introducing active inference as a fundamental principle of adaptive behaviour, then explores embodied cognition's insights into the relationship between language and sensorimotor processes. Finally, it presents linguistic active inference as a synthesis of these concepts, rethinking inner speech as a linguistically mediated inferential mechanism that guides action, shapes perception, and facilitates adaptive behaviour. This emerging perspective unifies existing theories of inner speech, generates novel predictions, and outlines promising directions for future research.

The Sound of Thought: Form Matters – the Prosody of Inner Speech

Hamutal Kreiner, Ruppiner Academic Centre; Zohar Eviatar, University of Haifa

Recent research inspired by the theoretical framework of embodiment offers a new perspective on inner speech as an embodiment of language. In this talk, I focus on the embodiment of structure rather than content and argue that (1) inner speech is used to simulate the acoustic aspects of overt speech including prosody – the rhythm, intonation, and stress of spoken language; (2) inner speech prosody gives form and structure to thought and facilitates different psychological processes. I will present findings from two experiments that examined how interfering with the natural prosody of inner speech impairs processing. The first, showed that using incongruent prosody impairs morpho-syntactic processing. The second, showed that using incongruent prosody attenuated the perception of emotion intensity. In view of these findings, I will discuss the functionality of inner speech and propose that inner speech serves as a simulation that maintains form and that this form serves different aspects of thought – both cognitive and socio-emotional.

2:30 – 14:00: Poster Session 2 (P-02)

Robotics & AI

Age Related Differences in Cognitive Bias by Developing a Scenario-Based Questionnaire Using Deep Learning

Rui Cheng Zhou, Lingnan University; Fai Hong Lui, Lingnan University; Yi Huang, Lingnan University

Introduction and Objectives: This study examines cognitive biases in decision-making and the need for a psychometrically robust assessment tool. Existing measures lack scope and reliability. To address this, we developed a scenario-based questionnaire grounded in the dual-system model, emphasizing intuitive and analytical reasoning. **Methods:** A systematic literature review identified 230 biases, refined to 79 items via expert Q-sort, EFA, and CFA. Psychometric properties were evaluated through pilot testing and validation. Cross-validation employed the CRT, Decision-Making Competence, and DOI. Machine learning classified and validated the scale's

structure. Results: Deep learning networks identified five factors—Belief, Social, Memory, Information, and Calculation—explaining 75% of variance. The scale demonstrated strong reliability ($\alpha > 0.7$) and construct validity. The "sunk cost" bias showed significant age-related sensitivity. Conclusion: This study introduces a validated tool for assessing cognitive biases, integrating deep learning to enhance construct validity. Additionally, we developed a robot agent that provides targeted interventions, offering real-time recommendations to mitigate biases and improve decision-making.

Enhancing Inclusive University Teaching With Immersive Virtual Reality: A Work in Progress

Antonella Ferrara, Université Claude Bernard Lyon 1 (UCBL1); Clément Desoche, Université Claude Bernard Lyon 1 (UCBL1); Valentin Clement, Neuro-Immersion, Lyon Neuroscience Research Center (CRNL); Anna Clavel, Institut Français de l'Éducation (IFE), École Normale Supérieure (ENS); Yuliya Kostyleva-Leborgne, Institut Français de l'Éducation (IFE), École Normale Supérieure (ENS); Stéphanie Mazza, Université Claude Bernard Lyon 1 (UCBL1); Amandine E. Rey, Université Claude Bernard Lyon 1 (UCBL1); Alice Gomez, Université Claude Bernard Lyon 1 (UCBL1)

Despite the growing emphasis on inclusive education, university teachers often lack training in supporting students with cognitive difficulties. This ongoing study investigates whether immersive virtual reality (IVR), combined with an online training program, can enhance inclusive teaching practices. We aim to assess how IVR simulations that replicate students' challenges (e.g., reading difficulties, visuospatial impairments, cognitive overload and learning helplessness) and inclusive solutions that can be adopted, influence university teachers' awareness and teaching strategies. Ninety university teachers will be recruited for this study and divided into three groups: IVR + online training, online-only training, and a control group. Pre- and post-intervention assessments will measure knowledge of inclusive practices and stress and self-esteem responses during IVR immersion. Preliminary findings will inform how digital simulations can support pedagogical innovation and highlight ethical considerations in disability simulations.

Trust in Generative AI: The Influence of Verbosity and Accuracy

Nicolo Ciarrocchi, Department of Psychology, Sapienza University of Rome; Pierpaolo Zivi, Department of Psychology, Sapienza University of Rome; Stefano Sdoia, Department of Psychology, Sapienza University of Rome; Fabio Ferlazzo, Department of Psychology, Sapienza University of Rome

Large Language Models are often employed as support tools in decision-making, although they may show decisional bias similar to human beings. Noting that people tend to have a positive bias toward new technologies, it is crucial to examine the factors affecting people's trust judgments toward generative artificial intelligence (AI). This study analyzed whether individuals use response correctness or verbosity as a proxy for response reliability. We presented decision-making scenarios from the heuristics and biases research program and the Cognitive Reflection Test paired with a response, and evaluated individuals' trust in AI through the Trust in Automation scale. The responses' verbosity and formal accuracy were manipulated to be either verbose or concise and either correct (deliberate) or incorrect (intuitive). According to the preliminary results, participants rated verbose responses as more reliable than concise ones and correct responses as more reliable than incorrect only for CRT items. Trust in AI showed interacting effects with the scenario typology and response verbosity. These findings suggest a complex interplay between individual trust and response characteristics in influencing users' perception of reliability.

Nested Resampling in Machine Learning: The Effects of Number of Iterations, Sample Size and Classification Complexity

András Matuz, Department of Behavioural Sciences, Medical School, University of Pécs; László Péczely, Institute of Physiology, Medical School, University of Pécs

The use of machine learning (ML) in cognitive psychological experiments has gained popularity in recent years. ML typically involves a form of random resampling, which introduces variance across model performances. To address this variance, nested resampling methods are often used. However, it remains unclear which factors influence their reliability and to what extent. To fill this gap, we employed a data simulation procedure in which binary supervised classification problems were simulated. Our main aims were (1) to observe how model performance changes as a function of the

number of iterations set for resampling, and (2) to explore the moderating effects of sample size and classification complexity. Models were evaluated on the entire generated population ($N = 100,000$). In general, model performance improved with an increasing number of iterations. However, the number of iterations had the strongest effect on model performance when the sample size was low and when the separating function was a quintic polynomial (i.e. highest level of complexity). In conclusion, our findings indicate that the effects of random fluctuations in the data are stronger when the training set is small and the classification problem is complex.

A Literature Review of Implicit Bias in Language Models: What Can Language Models Teach Us About the Psychological Attitudes We Hold?

Kevin Kiy, Maynooth University, Department of Psychology; Dermot Lynott, Maynooth University, Department of Psychology; Diarmuid O'Donoghue, Maynooth University, Department of Psychology

Implicit biases are a common source of prejudicial decision-making in society. Despite most societal biases being commonly known and acknowledged within the community they appear in it is difficult to quantify how biased attitudes form and develop on an individual- and group-level. However, the occurrence of bias in machines provides researchers with a unique opportunity to better understand the relationship between the linguistic information we consume and the psychological attitudes we hold. We conducted a literature review of implicit attitudes in language models, drawing on publications from artificial intelligence, social psychology, and cognitive science. Stemming from experimental data, our findings suggest an important link between statistical patterns in language and the implicit biases displayed by people. While several efforts have been made to capture or reduce the levels of bias in language models, there is no contribution yet that focuses on the causal nature of the relationship between language and implicit bias in language models. This literature review highlights the state of the art in this growing field, identifies gaps in the literature, and underscores challenges for future research.

Numerical & Mathematical Cognition II

Finding Their Way: Examining Changes in Fraction Misconceptions Over Two Years Among Emergent Fraction Learners

Sabrina Di Lonardo Burr, University of Sheffield; Chang Xu, Queen's University Belfast; Jiwei Si, Shandong Normal University; Hongxia Li, Shandong Normal University

Fractions are challenging, with misconceptions arising during the initial stages of instruction and continuing into adulthood. In the present study, we investigate how misconceptions differ across subconstructs of fractions and how they change over the course of fraction learning. Students ($N = 1,055$; 546 boys; Mage = 9.8 years) completed fraction mapping, comparison, arithmetic, problem-solving and conceptual tasks at four time points (Term 1 and Term 2 of Grades 4 and 5). For each task, based on a pre-registered coding scheme, we examined the types of errors and patterns of transition. We found that fraction misconceptions varied dependent on the type of task. Moreover, for some tasks, like fraction arithmetic, misconceptions varied across representations (i.e., symbolic vs. non-symbolic) and operation (i.e., addition vs. subtraction). For nearly all tasks, after two years of formal instruction most students continued to hold misconceptions. Misconceptions also changed over time, sometimes reflecting interference from new topics of instruction, such as decimals and measurement. Overall, this study highlights the challenges in developing fraction understanding and the need for tailored support aimed at refuting misconceptions.

Predictors of Reading and Arithmetic: A Longitudinal Study From Grade 1 to Grade 3

Karin Landerl, University of Graz; Chiara Banfi, University of Graz; Silke M. Göbel, University of York

This longitudinal study investigated predictors of associations and dissociations between reading and arithmetic throughout the first three years of formal instruction. In a sample of 357 English- and German-speaking children, domain-general and domainspecific predictors of reading and arithmetic were assessed in Grade 1. Reading fluency, arithmetic fluency, and arithmetic accuracy were assessed in Grades 1, 2, and 3. RAN and number knowledge explained most of shared variance between skill domains, and phonological awareness explained additional covariance with arithmetic accuracy.

Domain-general predictors played a less important role. Phonological awareness and RAN predicted specific variance in reading, magnitude processing contributed specific variance to arithmetic. Our findings are consistent with the notion of partial overlap, as they suggest that reading and arithmetic share a common basis, related to the integration of verbal, visual and semantic information and symbolic processing. However, these two skill-domains also relate to unique cognitive factors that explain their dissociation.

Sharpening the Number Sense: Developmental Trends in Numerosity Perception

Irene Oeo Morín, KU Leuven; Fien Depaepe, KU Leuven; Bert Reynvoet, KU Leuven

Numerosity perception allows people to approximate the number of objects in a set without counting. A well established finding is that accuracy improves with age, but the underlying cognitive mechanisms remain debated. The sharpening hypothesis attributes this improvement to increased numerical precision, whereas the filtering hypothesis suggests that it results from better inhibition of non-numerical features (e.g., object size, spacing). We examined the developmental course of numerosity perception in three age groups ($M = 5.65$, $M = 11.03$ and $M = 20.10$ years old). Accuracy increased with age. Regression and ANOVA analyses revealing the contribution of numerical and non-numerical predictors in performance, showed that performance in all age groups was primarily driven by numerical information and that its contribution increased with age. A consistent bias toward non-numerical features was observed across all groups. These results support the sharpening hypothesis from five years old to early adulthood. We will soon collect longitudinal data on a subset of kindergarten children to support these results.

Investigating the Operational Momentum Effect in Arithmetic Problems in Children and Adults

Tabea-Maria Haase, Department of Psychology, University of York; Martin H. Fischer, Psychology Department, University of Potsdam; Tom Hartley, Department of Psychology, University of York; Silke M. Göbel, Department of Psychology, University of York

For arithmetic problems with the same result size, we often overestimate the outcome for addition and

underestimate the outcome for subtraction problems. This bias is known as the Operational Momentum (OM) Effect. However, reverse OM (overestimation in subtraction, underestimation for addition) has also been observed across children and adults. The AHAB (arithmetic heuristics and biases) theory predicts both directions of OM, depending on how the operands ‘anchor’ us cognitively. Yet, the role of anchoring in the development of OM has not been investigated using symbolic digits. We asked primary school children and adults to solve single-digit arithmetic problems (e.g. $3 + 1$, $6 - 0$) by indicating their response via touch on a visually presented number line (e.g. $0 \text{ --- } 10$). We predict a normal OM for problems involving a zero operand and reverse OM for problems with operand sizes larger than zero, measured via horizontal/vertical landing coordinates and pointing time, for all age groups. This ongoing study improves our understanding of how the size and directionality of the symbolic OM varies between age groups and fits with existing OM theories.

Linguistic Processing in Multi-Digit Number Magnitude Comparison – The Base-20 Effect in French-Speakers

Elise Klein, Université Paris Cité, CNRS, LaPsyDÉ; André Knops, Université Paris Cité, CNRS, LaPsyDÉ; Arnaud Viarouge, Université Paris Cité, CNRS, LaPsyDÉ; Silke M. Wortha, Centre for Early Mathematics Learning, Loughborough University; Roman J. Janssen, Université Paris Cité, CNRS, LaPsyDÉ

Studies on languages with inverted number word syntax suggest that language influences Arabic number processing. Yet, the exact mechanisms behind this modulation are still unclear. We studied the unit-decade compatibility effect (UDCE) in French, where number words for numbers larger than 60 follow a vigesimal system ($72 = \text{“}60\text{-}12\text{”}$). If the number word is accessed, we expected not only a decimal UDCE but also a vigesimal equivalent. 60 French native speakers completed a two-digit number magnitude comparison task with 45% within-decade items. We found not only a decimal UDCE for numbers larger than 60, but also a vigesimal UDCE equivalent. Additionally, responses to within-decade items (62 vs. 65) were as fast as their vigesimal equivalents (68 vs. 75), which can only be explained when participants accessed the number word so that the decades were identical ($\text{“}60\text{-}8\text{”}$ vs. $\text{“}60\text{-}15\text{”}$). The vigesimal UDCE indicates that number words were

indeed accessed. Yet, this could be due to an (inevitable) confound of the vigesimal UDCE with decade distance. But we additionally found a within-vigintade effect unaffected by this confound. Our data suggest that number processing might be more closely associated with language than previously assumed.

Language & Bilingualism II

The Role of Proactive Control During Adjective Online Processing in L2 Spanish

Marta Rivera, University of the Balearic Islands; Pedro Guijarro-Fuentes, University of the Balearic Islands

This study examines the factors influencing the processing of features linked to adjective position in Spanish. Previous studies report that learners face challenges in learning the formal characteristics of adjectives until they attain an advanced level, especially when their first language has a fixed adjective order as compared to those similar to Spanish. Thus, we explore the online processing of L2 Spanish - L1 English/Italian speakers living in Spain. Participants complete a Self-Paced Reading task with sentences including adjectives that can go on a fixed position (prenominal/postnominal), and adjectives whose interpretation vary depending on whether they are in a prenominal – non-restrictive or in a postnominal- restrictive position. Additionally, we explore the role of individual differences in proactive control with the AX-CPT task. We expect differences in the pattern of reading between adjectives in the prenominal and postnominal position. We expect to find proactive control to be a significant modulator of the reading effects: as more proactive control strategies predicting shorter RTs when reading words after the adjective. 94 participants are being recruited based on a power analysis to achieve 80% of power (0.4 α).

Enabling Multilingual Eye-Tracking Data Collection for Human and Machine Language Processing Research: Presenting the Cost Action Multipleye

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Eye-tracking-while-reading data provide valuable insights across various disciplines, e.g. psychology, linguistics, NLP. However, progress in cross-linguistic fundamental research on reading and advancements in applications is constrained by the scarcity of large, high-quality, multilingual datasets. The MultipleYE project addresses this gap by launching a large-scale, international eye-tracking data collection initiative. Within the project, we are creating a multilingual dataset of eye movements during reading, striving for linguistic diversity, while ensuring methodological consistency for reliable cross-linguistic comparisons. The dataset adheres to rigorous procedural, documentation, and data pre-processing standards, enhancing transparency and reproducibility. A novel data-sharing framework (see <https://rdc-psychology.org/en/eyestore>) alongside comprehensive meta-data and data quality reports enable researchers to filter data based on their needs. MultipleYE seeks collaboration from labs worldwide. By promoting standardized methodology and data sharing, it fosters interdisciplinary research and drives advancements in reading research. We will present the MultipleYE structure, data collection principles and data usability.

Surprisal and Locality in Sentence Processing – The Role of Working Memory and Cognitive Flexibility

Eva Pavlinušić Vilus, University of Zagreb; Ana Matić Škorić, University of Zagreb; Kristina Cergol, University of Zagreb; Marijan Palmović, University of Zagreb

Typological and individual differences affect sentence processing. In this study we examined the effects of surprisal and locality in sentence reading, as well as the effects of working memory (WM) span and cognitive flexibility (CF) on processing long-distance dependencies and high-surprisal words. An eye-tracking experiment was performed, with surprisal (high/low) and locality (short- /long-distance dep.) as factors. We tested 60 Croatian speaking participants with an Eyelink Portable Duo eye-tracker. They completed the WM battery and the Berg's card sorting task for CF. Early and late measures were analyzed on two Aols (NP and Verb region), and linear regression modeling in R was performed. The preliminary results (N=15) show the effect of surprisal at the NP Aol (DT; $F(1,15)=21.14$, $p<.05$; FFD;

$F(1,15)=5.84, p<.05$; FPR; $F(1,15)=5.11, p<.05$) and the effect of distance at the verb AoI (DT; $F(1,15)=11.59, p<.05$; FFD; $F(1,15)=9.65, p<.05$). Speakers create strong expectations on the incoming word, and processing long-distance relations is more cognitively demanding than processing short-distance relations. Lower WM seems to increase regressions in long-distance conditions. The effects of WM or CF on surprisal are being inspected.

Can Grammatical Gender Override Gender Stereotypes? The Impact of Cognitive Flexibility and Stereotypical Thinking

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Empirical evidence shows that gendered languages influence speakers' perception of the gender of inanimate nouns. Within this framework, our study explores how people process conflicts between grammatical gender and gender stereotypes, and how this is influenced by language structure, cognitive flexibility and stereotypical thinking. A group of native Greek speakers and a group of native English speakers were presented with abstract words in Greek and English, respectively, manipulated for their (i) conceptual gender association and (ii) grammatical gender, and then made an implicit decision on a target face. They also completed scales on cognitive flexibility and gender stereotypes. The results to be presented will focus on how gender stereotypes impact responses of gendered language speakers comparing to non-gendered language speakers, with an emphasis on Greek noun combinations where grammatical and conceptual gender don't match. Furthermore, we aim to show how the processing of this incongruence is affected by stereotypical thinking and cognitive flexibility. Overall, this study provides new evidence on the combined influence of language structure, cognitive flexibility, and stereotypical thinking on conceptual gender judgments.

Cross-Linguistic Communication via Pseudowords

Fritz Günther, Humboldt-Universität zu Berlin; Aliona Petrenco, Humboldt-Universität zu Berlin; Daniele Gatti, University of Pavia

In a recent study, Pugachva and Günther (2024) presented words to participants and asked them to express their meaning using novel words (e.g., “elefluff” for “mammoth”). When these novel words were presented to new participants, they were able to guess the original targets above chance level. In the present pre-registered study, we investigated whether such a transmission of information via novel words is also possible across languages. We presented Italian speakers without knowledge of German with Italian words, and instructed them to come up with a German translation. The generated words – for all intents and purposes, German pseudowords – were then presented to German speakers without knowledge of Italian, who had to guess the originally presented word. We find that participant guesses are significantly semantically closer to the original targets, according to a word embedding model, than would be expected by chance. This even holds when the most similar responses in the dataset (such as completely correct guesses) are excluded from analysis. These results indicate that speakers can use purely verbal signals to share some meaning even across linguistic borders, likely relying on iconicity and traces of systematicity.

Gestural and Vocal Communication in Deaf and Non-Deaf Infants During Play With Their Parent

Rosemary Wareham, University of Sheffield; Danielle Matthews, University of Sheffield; Sabrina Burr, University of Sheffield; Colin Bannard, University of Manchester; Evelyne Mercure, Goldsmiths, University of London

Communication begins early in infancy, long before the emergence of words. During this period, infants engage in prelinguistic communication—using gestures, vocalisation and gaze—that lay the groundwork for later language development. However, early deafness can disrupt prelinguistic communication and this may put children at risk of language delays (Lederberg et al., 2013). Kelly et al. (2020) found that deaf infants of hearing parents (DOH) produced fewer prelinguistic behaviours than hearing infants of hearing parents (HOH) during parent-infant interactions. In this pre-registered conceptual replication and extension of Kelly et al. (2020), which included children with mild hearing loss, preliminary results ($N = 12$) support Kelly et al. (2020), suggesting that DOH infants use a lower frequency of both prelinguistic and also linguistic behaviours. The extension including infants with

milder hearing loss does not indicate any differences to HOH infants. Overall, this suggests both that prelinguistic communication is experience dependent and that therapeutic support is needed for hearing families with deaf infants from early in the first year.

Tracking the Trajectory of Crossmodal Integration of Novel Words

Nini Chrispeels, BCBL – Basque Center on Cognition, Brain and Language; Arthur Samuel, BCBL – Basque Center on Cognition, Brain and Language; Efthymia Kapnoula, BCBL – Basque Center on Cognition, Brain and Language

Previous research shows that novel words are integrated into the mental lexicon even when they are trained and tested in different modalities (Bakker et al., 2014). However, in that study, phonological training led to orthographic integration after 24 hrs, whereas orthographic training only led to phonological integration a week later. These results may point to an advantage of auditory input or they could be caused by the use of different tasks to test phonological versus orthographic integration. The present study aims to investigate this asymmetry by using the same task to test integration in both modalities. Participants are trained on 12 novel words (6 in each modality) and their integration is tested with a visual world paradigm in both modalities, using neighbors of trained and untrained novel words as targets. Data collection is ongoing. We predict slower recognition of targets that are neighbors of trained words (due to lexical competition), within and across modalities; within-modality competition effects should be stronger. The key question is whether there will be an earlier cross-modal effect for phonologically trained words. The data collected in this project will deepen our understanding of crossmodal word learning.

The Effect of Lexical Co-Activation During Learning on Integration of New Words

Daphne Weiss, Basque Center on Cognition, Brain, and Language; Arthur Samuel, Basque Center on Cognition, Brain, and Language; Efthymia Kapnoula, Basque Center on Cognition, Brain, and Language

Learning a new word involves linking it to other lexical items. We asked if co-activation of familiar and new words boosts lexical integration in auditory word learning. Participants learned words in two training

conditions differing in co-activation demands. In Exp. 1, novel words were interleaved with tones (non-lexical) or real words (lexical). In Exp. 2, we manipulated the phonological similarity of novel and real words; novel words were interleaved with phonologically similar or dissimilar words. In Exp. 3, we manipulated the time-course of co-activation. A similar word occurred either in the next trial or after 3+ trials. In a visual world paradigm, participants were significantly more likely to look at the correct referent when the word was learned with lexical vs. non-lexical interleaving (Exp.1), but there was no effect of phonological similarity (Exp.2) or co-activation time-course (Exp.3). Lexical decision tasks revealed no robust training-driven differences in interference from the new words, our index of immediate integration. Overall, we find no evidence that co-activation benefits immediate integration, and limited evidence that it benefits word learning. Ongoing work asks whether differences emerge after sleep.

Centroid Analysis: Inferring Mental Representations From Open-Ended Word Responses

Aliona Petrenco, Humboldt-Universität zu Berlin; Fritz Günther, Humboldt-Universität zu Berlin

The present research proposes and evaluates a novel method - centroid analysis - for measuring representations and concepts at both individual and group levels by mapping open-ended responses onto a pre-existing semantic vector space. Centroid analysis allows to retrace the target concept as the geometric center of the semantic vectors of the responses generated by this concept. We evaluate this method using two distributional semantic models across several calculation methods, reference lexicon sizes, response types, and datasets with tasks ranging from single word substitutions to single and multiple free associations and multiple feature generation. At the group level, our findings indicate that the optimal approach is to collect multiple free associations (70 unique & 245 total responses per cue), use fastText for meaning-to-vector mapping for responses and cues, and to consider each response in the centroid calculation as often as it occurred in the data. At the individual level, the best results are achieved by employing fastText and considering at least 8 responses per item per participant in centroid calculation.

Does "Dinsy" Refer to Something Small? Sound Symbolism of Pseudowords From the Perspective of Computational Models and Human Intuition

Iva Šaban, University of Milano-Bicocca; Luca Rinaldi, University of Pavia; Marco Marelli, University of Milano-Bicocca

Sound symbolism is the phenomenon in which certain letters/phonemes are associated with specific physical features. A well-studied example is “size sound symbolism”, where speech sounds are associated with perception of largeness or smallness. Even pseudowords (out-of-lexicon strings) can be assigned to semantic categories based on their surface features. Beyond phonology, pseudoword meaning can be determined by summing the semantic vectors of their (sub)lexical units; an approach implemented in the fastText model. We analysed human judgement data from Westbury et al. (2018), who assessed the semantic category membership of 8000 pseudowords. From this dataset, participants classified 115 pseudowords as small and 84 as large. Using two fastText models, we derived semantic representations for each pseudoword and computed their semantic similarity to words denoting smallness and largeness. Results showed that human-judged small pseudowords align closely with words denoting smallness, but findings are less consistent for large pseudowords. In the next phase, the most representative small and large pseudowords (based on model predictions) will be evaluated by participants using explicit and implicit tasks (data is yet to be collected).

Creating Novel Words With a Desired Meaning: Human Evaluation of a Semantic Pseudoword Creator

Rolando Bonandrini, Department of Psychology, University of Milano-Bicocca; Marco Marelli, Department of Psychology, University of Milano-Bicocca

Recent findings have shown that, just like words, also unattested letter strings (pseudowords) convey semantic information. This qualifies pseudowords as an ideal proxy to study the processing of unfamiliar words. Here we present and evaluate a Semantic Pseudoword Creator, which produces a novel word based on the average meaning of two prompts. We built on the Linear Discriminative Learning approach to estimate the mapping between semantics and orthography in Italian, so as to produce a novel word

form given the average of the semantic representation of two existing words. We then tested experimentally whether human participants are able to associate the novel strings to the original prompt words. Participants were able to indicate which prompts generated the novel words with an accuracy that was significantly above chance level. In addition, we observed that, on top of prompts-novel word orthographic similarity, prompts-novel word semantic similarity significantly contributed to explaining human performance. The present findings suggest that it is possible to generate novel words with a desired meaning. More broadly, these data add to the increasing evidence suggesting that pseudowords are not devoid of semantic information.

Exploring the Multimodal Neural Representations of Words

Laura Anna Ciaccio, University of Pavia; Silvia Angela Mansi, University of Pavia; Marco Petilli, University of Milan Bicocca; Marco Marelli, University of Milan Bicocca; Luca Rinaldi, University of Pavia

Recent studies investigating word processing highlighted the role of both linguistic (Anceresi et al. 2024) and sensory information (Petilli et al., 2021) in shaping semantic representations. The present study aims to elucidate the relative contribution of linguistic and visual information to the neural representations of words, by re-analyzing a series of existing EEG/ERPs datasets covering different tasks. Using Representational Similarity Analysis (RSA), we test whether similarity patterns of brain activation to words can be predicted by their linguistic similarity and by the visual similarity of the corresponding concepts, as extracted from computational models (Petilli et al., 2021). Key questions include: i) does visual information contribute to semantic memory over and above linguistic experience? ii) do these effects have similar timing and topographies? iii) is visual information accessed even in the absence of a semantic task? iv) do we get similar results when using an approach based on sensorimotor norms (Binder et al., 2016)? Findings across all datasets, tasks, and approaches will be transparently reported.

Sensation & Perception II

Temporal Differences in Non-Linguistic Stimuli Are Better Discriminated in the Audiovisual Modality, but Show No Association With Reading Ability

Stephanie Armstrong, *Instituto de Informática Educativa, Universidad de La Frontera*

Reading skill builds on grapheme-phoneme associations, which are language-specific audiovisual associations. The current study investigated whether non-linguistic audiovisual neurobiological processes are associated with reading ability as well. The mismatch negativity (MMN) has proven to be a relevant indicator of the brain's automatic sensory discrimination processes. We investigated the presence of an MMN in typical adult readers evoked by duration differences of non-linguistic auditory, visual, and audio-visual stimuli, and its association with reading proficiency. Participants displayed an MMN response at Fz for auditory and audiovisual modalities in shorter duration differences. The smallest significant difference detected was 20% deviation from the standard. Critically, the audiovisual stimuli yielded a stronger MMN compared to the audio stimuli, suggesting that the combination of modalities facilitates discrimination. None of the electrophysiological responses explained the variance in reading proficiency. The results suggest that the perception of duration differences of non-linguistic cues is improved in congruent multisensory settings but has no association with reading for typical adults.

Characterising Time-On-Task Effects on Oscillatory and Aperiodic EEG Components and Their Co-Variation With Visual Task Performance

Martina Kopčanová, *University of Dundee; Gregor Thut*, *Centre de Recherche Cerveau et Cognition; Christopher Benwell*, *University of Dundee; Christian Keitel*, *University of Dundee*

Research on brain-behaviour relationships often assumes that these derive from a co-variation of stochastic fluctuations in brain activity and performance. However, both brain activity and behaviour can show systematic trends with time on task. We tested whether time-on-task explains relationships between oscillatory EEG activity and reaction time (RT), accuracy, and decision confidence. 36 participants performed a visual discrimination task with confidence ratings. Spectral power (1-40Hz) was compared across blocks of the experiment and tested for relationships with behaviour. We found that time-on-task effects on

oscillatory EEG activity were primarily localised within the alpha band, with power increasing and peak frequency decreasing over time, even when controlling for aperiodic contributions. Time-on-task effects in alpha band explained variability in single-trial RTs, and controlling for time-on-task removed these relationships. However, time-on-task effects did not affect EEG signatures of decision confidence. Our results dissociate alpha-behaviour relationships that can be explained away by time-on-task from those that cannot - further specifying the potential functional roles of alpha in human visual perception.

The Role of Interoceptive Sensitivity in Music Tempo Preference: Influence of Pseudo-Heartbeats

Kyoko Hine, *Toyohashi University of Technology; Keita Tsuchiya*, *Toyohashi University of Technology; Shigeki Nakauchi*, *Toyohashi University of Technology*

Preferred music tempo varies among listeners and may be influenced by bodily state, though how bodily state affects it remains unclear. Previous research has shown that, the same as real heartbeats, pseudo-heartbeats (vibrations that simulate heartbeats) can influence emotions, but only in individuals with high interoceptive sensitivity, which is the ability to perceive internal bodily signals. This study investigated whether pseudo-heartbeats also affect preferred music tempo. In our experiment, participants (18 university students) listened to a piece of music and adjusted the tempo to their preference while experiencing a pseudo-heartbeat delivered via smartwatch vibrations, either at their resting heart rate or at a rate increased by 20%. This procedure was repeated for 15 pieces of music. On separate days, participants completed a heartbeat counting task to assess their interoceptive sensitivity. The preferred music tempo with the pseudo-heartbeat at the increased rate was faster than that at the resting heart rate, but only for individuals with high interoceptive sensitivity. These findings suggest that the influence of bodily state on music tempo preference depends on interoceptive sensitivity.

Assessing Chronic Opioid Risk Using Neurobiology (Acorn): The Predictive Value of Peak Alpha Frequency for Post-Surgical Pain and Opioid Use

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University of Birmingham; Fang Gao Smith, University of Birmingham; Babu Naidu, University of Birmingham; Ali Mazaheri, University of Birmingham

Background Postoperative pain management is a critical challenge, especially in identifying patients at risk for heightened pain sensitivity and prolonged opioid use. The Peak Alpha Frequency (PAF), the frequency within the alpha-band (8-14Hz) with the maximum power measured by EEG, has emerged as a promising biomarker for pain processing. Slower PAF is linked to greater pain sensitivity and acute and chronic pain. **Methods** Part of the ACORN Project investigates whether pre-surgical PAF can predict acute and chronic pain severity and opioid consumption following major surgery. We will recruit 500 participants undergoing major surgery at University of Birmingham Hospitals. 3 minutes of resting-state EEG data will be collected before surgery and within 72 hours after surgery. Pain intensity will be assessed at 72 hours, 3 months, and 6 months postoperatively using the Brief Pain Inventory. Opioid use will also be monitored. We hypothesise that lower pre-surgical PAF (<9 Hz) will be associated with greater pain severity and prolonged opioid use. **Conclusion** If validated, PAF could serve as a clinically useful biomarker for pre-emptive pain management strategies, allowing for targeted interventions and personalised analgesic approaches.

A Steady-State Visual Evoked Potential Approach in Low-Level Adaptation Control: A Visual Mismatch Negativity Study

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Since our visual system is continuously connected to the visual environment in vigilance, ecologically valid paradigms are required to simulate this relationship. Research on visual mismatch response, the ERP difference between deviant and standard events, has shown that the OFF-ON paradigm is an effective approach. This method presents task-irrelevant full

objects (ON) with frequently (OFF standard) or infrequently (OFF deviant) disappearing parts. Studies using transient ERP stimulation found that OFF deviants elicit visual mismatch negativity. Our aim was to test whether this paradigm, which reduces low-level adaptation effects, is effective with another method. We utilized steady-state visual evoked potentials (SSVEPs) where periodic stimulation evokes frequency-specific neural responses. So far SSVEP has been rarely used in automatic change-detection studies, yet its advantage is the reliable signal-to-noise ratio and the short stimulation time. Our preliminary results (N=28, 22.8±6.1 yrs) show visual mismatch responses emerge to infrequently disappearing parts, supporting SSVEP's potential in studying automatic visual change detection.

Social Cognition II

Executive Function Mediates the Impact of Trauma on Emotion Recognition

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Objective: Trauma may harm brain structure and cause impaired executive function (EF). Trauma also hampers emotional processes, such as poor emotional recognition. Evidence indicates that impairments in EF may contribute to difficulties in accurately recognizing facial and prosodic emotional expressions. Thus, the current study aimed to examine the possible mediating role of EF in the association between posttraumatic symptoms and poor emotional recognition. **Methods:** In a cross-sectional study, we recruited 179 Taiwanese adults from the community (18-61 years old; 124 female) who were exposed to trauma. All completed a self-report questionnaire of posttraumatic symptoms and two computerized tasks to assess EF and emotion recognition. **Results:** Posttraumatic symptoms directly predicted impaired EF and emotional recognition; in addition, posttraumatic symptoms indirectly predicted poor emotional recognition via the mediating role of EF. **Discussion:** The finding revealed that EF plays a critical role in emotion processing, and targeted cognitive training may improve emotion recognition abilities in trauma-exposed individuals.

Neural Correlates of Mechanisms Involved in Observation of Performance of Others

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Motor inhibition plays a crucial role in action planning. While extensive research has investigated motor inhibition in individual actions, less is known about it in social contexts. This study investigated motor inhibition in a dyadic turn-taking task. The analysis presented here focused on neural correlates related to observation and possible prediction of errors in motor inhibition. Thirty-three pairs completed a turn-taking Stop Signal Task, while we recorded dual EEG. In each trial, one participant acted as Player, performing a Go task by pressing a button as quickly as possible, and inhibiting their response when a Stop signal occurred, while the Observer monitored the performance. EEG data were analyzed to determine whether the Observer exhibited early neural markers predicting the Player's failure. We also examined ERN and FRN. Preliminary results suggest that Observers engage early neural markers to predict the Player's failure, enabling timely intervention before an error fully unfolds, and later evaluative processes that contribute to long-term behavioral adaptation.

EEG Evidence of Early Partner-Specific Lexical Entrainment in Lexical Access During Speech Production

Isabella Boux, *RWTH Aachen University*; **Anna K. Kuhlen**, *RWTH Aachen University*

In conversation, people often re-use each other's words. Experiment 1 (N=34) tests if this tendency is partner-specific or driven by general recency effects. During training, confederate task partners named ambiguous figures (tangrams) for participants, who selected the correct tangram among distractors. Each partner named half of the tangrams, allowing participants to associate tangrams with specific labels and partners. In the test phase, roles reversed: participants named tangrams for both partners. Crucially, some figures were named for the same partner as in training while others are for a different partner. Naming latencies were shorter, and label maintenance was higher when naming tangrams for the same partner as in training, indicating partner-

specific adaptation. Experiment 2 (N=48) investigates how partner identity influences early vs. later stages of speech production using EEG. Early ERP components linked to lexical access were modulated depending on whether participants named tangrams for the same or a different partner. These findings suggest that speech production is shaped by the interaction partner in a partner-specific and early manner, as evidenced by both behavioral and neural measures.

Long-Term Effects of Childhood Trauma on Facial Emotion Recognition in Healthy Young Adults: An ERP Study

Veronica Debora Toro, *University of Foggia*; **Madia Marika Biasi**, *University of Foggia*; **Gianluigi Serio**, *University of Foggia*; **Diletta Decarolis**, *University of Foggia*; **Paola Palladino**, *University of Foggia*; **Tiziana Quarto**, *University of Foggia*

Previous electroencephalography (EEG) studies suggest that childhood trauma (CT) impacts facial emotional recognition (FER) in terms of larger event-related potential (ERP) components in response to angry faces. However, most studies concerning children and those on adults use a very broad concept of maltreatment and are not specific in terms of sexual, physical or emotional abuse. Our study aims to study how different kinds of CT affect behavioral and ERP responses of healthy young adults during a FER task. We used EEG with an ERP approach, focusing on P100, N170, and LPP components. Moreover, information about different kinds of CT events were acquired by the Child Trauma Questionnaire (CTQ). Preliminary results show that the emotional abuse score is associated with the N170 amplitude for emotional faces while emotional neglect scores correlate with LPP amplitude. These results suggest that CT may impact FER in adulthood at different stages of this complex process, basing on the type of trauma experienced, thus providing more specific insights into the long-term effects of these events on a key component of social competence.

Late Event Related Potentials as Prediction Error Signals That Determine the Updating of Prior Information With Sensory Evidence

Michail Ntikas, *University of Aberdeen*; **Patric Bach**, *University of Aberdeen*; **Eleonora Parrotta**, *La Sapienza University of Rome*; **Giorgio Ganis**, *University of Plymouth*

Recent proposals argue that understanding others' behaviour emerges from a predictive process of integrating expectations with sensory evidence, implementing Bayesian-like hypothesis testing and revision. We present EEG data from two experiments investigating how perception of others' behaviour is influenced by anticipated actions. Participants observed hands moving toward or away from objects after hearing stated intentions to take or leave them. Hands disappeared mid-motion, and participants reported the perceived disappearance points. Consistent with Bayesian integration, reports were biased toward motion direction, with larger biases when motion matched intention. As expected, late ERPs, P2 and P3b, were larger when motion and expectation mismatched with the opposite being the case for early ERPs (N1). Trial-by-trial modelling confirmed that only late ERP amplitudes underpin expectation revision, reducing the motion-direction bias. Our results therefore reveal that late ERPs reflect the prediction error process, which revises prior expectations towards the sensory evidence. These findings argue for a framework in which prior expectations, and their revision through stimulus processing, shape social perception.

Individual Differences I

Non-Visual Working Memory Strategies in Aphantasia: An Objective Assessment

Maël Delem, Université Lumière Lyon 2; Charline Favier, Université Lumière Lyon 2; Gaëlle Plancher, Université Lumière Lyon 2

Aphantasia—the inability to generate visual mental images—presents a paradox: individuals with aphantasia perform well on visual working memory tasks previously thought to require imagery. Literature suggests aphantasics employ alternative spatial or verbal strategies, yet without objective validation. We developed an online working memory task for a large-scale study, for which data are currently being collected. Participants memorized items with three features: colour (visual), orientation (spatial), and word (verbal). Our independent variable was the presence/absence of aphantasia (based on imagery questionnaires); dependent variables included accuracy scores for each feature type and prioritization patterns. The task's difficulty forces strategic prioritization of features to maximize

performance. We hypothesize aphantasics will show lower colour recall accuracy while compensating through enhanced word/orientation memory. If feature preference patterns correlate with subjective imagery assessments, this paradigm would offer an objective measure of representational strategies. Beyond methodology, this approach could clarify cognitive mechanisms underlying memory processes in aphantasia and across the visual imagery spectrum.

The Impact of Mental Images on Reasoning: A Study on Aphantasia

Maël Delem, University Lyon 2; Damien Le Clézio, University Lyon 2; Gaëlle Plancher, University Lyon 2

There is a long-standing debate on the role of visual mental images in reasoning. Knauff & Johnson-Laird's (2002) Visual Imagery Impedance Hypothesis (VIH) suggests visual imagery can hinder abstract reasoning, as evidenced by slower responses to visual compared to spatial and abstract problems. Aphantasia—the inability to generate visual imagery—offers a unique opportunity to test this hypothesis. We developed an online version of the reasoning paradigm used in VIH studies for a large-scale experiment for which data are currently being collected. Aphantasic and control participants completed three problem types (visual, spatial, abstract) while reaction time and accuracy scores were measured. All participants also completed visual imagery and cognitive style questionnaires to assess their subjective representations. If the VIH holds, we expect controls to show increased reaction times for visual problems compared to spatial/abstract problems, while aphantasics should show no such difference. This study will provide substantial data on reasoning processes in aphantasia and may clarify the causal relationship between visual imagery and reasoning performance across the imagery spectrum.

Searching for Remote Associations: A Process-Oriented Analysis of Errors in the Remote Associates Test in Schizophrenia Patients and Healthy Controls

Hanna Kucwaj, SWPS University; Bartłomiej Kroczyk, Jagiellonian University

The Remote Associates Test (RAT) measures creative thinking by assessing the ability to find a word that connects three seemingly unrelated words. We used the RAT to compare schizophrenia patients (SZ) and healthy controls (HC). We hypothesized that SZ would show lower accuracy, struggle to reject incorrect responses, and produce more idiosyncratic errors due to cognitive deficits. 74 SZ and 86 HC completed the RAT. We analyzed incorrect response rates (the ability to reject incorrect responses) and error types using ChatGPT. General reasoning ability was measured, and in SZ, symptom severity and cognitive functioning. SZ showed lower accuracy and higher incorrect response rates, but only accuracy remained significant after controlling for reasoning ability. Error patterns slightly differed, but SZ did not produce more idiosyncratic errors. RAT performance correlated with cognitive functioning but not symptom severity. In summary, we did not confirm the hypothesis that SZ produce more idiosyncratic errors. We concluded that SZ follow a similar association search pattern as HC but are less effective in reaching correct solutions. RAT performance in SZ relates to cognitive functioning, highlighting broader cognitive deficits.

Spontaneous Thought Dynamics: Identifying the Characteristics and Correlates of Thought Transitions Using the Think-Aloud Method

Arya Gilles, University of Liège; Arnaud D'Argembeau, University of Liège; David Stawarczyk, University of Liège

The human mind continuously generates spontaneous thoughts (STs) that move fluidly from one topic to another. Although this dynamic is a key feature of STs, it remains understudied. Research suggests that STs follow a structured pattern in which clusters of related thoughts are interspersed with abrupt topic shifts. However, the characteristics of these transitions and their links to individual differences in STs are not well understood. To investigate this question, 44 undergraduate students verbalized their STs for 5 minutes using the Think-Aloud method. Then, they segmented their thought transcript into coarse- and fine-grained units, and rated thought transitions on dimensions such as topic change, and affective shifts. Participants also completed personality and psychological well-being questionnaires. Results showed that fine-grained transitions were more interconnected, while coarse-grained ones involved greater content and emotional shifts. Higher ADHD scores and frequent

daydreaming were associated with more transitions, while mindfulness correlated with fewer transitions. These findings support a hierarchical organization of ST transitions, with implications for mental well-being.

Metacognition

Metacognition in the Face of Distraction

Sandra Nowak, Adam Mickiewicz University; Maciej Hanczakowski, Adam Mickiewicz University; Katarzyna Zawadzka, Adam Mickiewicz University

Auditory distraction is known to negatively impact memory performance. To mitigate its negative effects, accurate metacognitive monitoring is necessary. Recent research shows that in a serial recall task people can accurately assess the negative impact of different kinds of auditory distraction on memory, correctly ranking them from the most to the least disruptive. But are those assessments general – people perceive different kinds of auditory distraction as more or less disruptive – or are they task specific, correctly reflecting that distraction affects memory performance differently depending on test type? To investigate this, we used a missing item task that produces a different pattern of distraction-related impairment, and a probe serial recall task which is similar to serial recall task. We are contrasting them to examine changes in perceived disruptiveness of distraction between the tasks. To measure metacognition, we collected predictions and postdictions before and after the memory task. Our results seem to indicate that people's metacognitive appraisals of distraction are general rather than attuned to a particular memory task.

Confidence in Source Memory: When External Cues Fail to Sway Judgment

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Although confidence in memory decisions usually aligns with accuracy, exceptions exist. One such case occurs when external cues (such as information from other people) influence responding in memory tasks. These cues impact accuracy depending on their reliability. However, their impact on confidence judgments (CJs) is selective. In recognition tests, external cues influence CJs for “new” responses but

for not “old” responses, and have no impact on CJs in source memory tests. To investigate the reasons for this imperviousness of CJs to external cues in source memory tasks, we conducted a series of experiments in which we manipulated source strength at encoding. We then assessed whether the influence of external cues on CJs in the source memory test would vary with source strength. Our results indicate that confidence in source memory tests remains unaffected by external cues independently of source strength. It remains an open question whether CJs in source memory tasks reflect true source memory or if participants base their responses on item memory instead.

The Role of Location in Visual Short-Term Memory Comparison Processes

Lauren Hebburn, Oxford Brookes University; Olivia Afonso, Oxford Brookes University; Michael Pilling, Oxford Brookes University

Location has a privileged role in VSTM comparisons, even when task-irrelevant. Two experiments explore this role by manipulating spatial overlap between memory and test displays in a colour change detection task. There are 3 location conditions: Unchanged (test items maintain same locations); New (test items in previously unoccupied locations); Shuffled (test items in same locations, colour allocation to position shuffled). In Exp.1, 3 time conditions are given: a) long-gap (0.2s mem. array, 3s interval); control (0.2s mem. array, 0.2s int.), and long-memory (3s mem. array, 0.2s int.). Results showed only evidence for differences between configurations in the long-memory condition, suggesting that loss of spatial influence is due to decay not inhibition. Exp. 2 investigates the effect of delay and configuration on metacognitive performance, to determine whether irrelevant spatial factors influence awareness as well as performance. Preliminary results suggest participants have stable awareness of performance associated with spatial manipulations, indicating conscious access to internal signals associated with such manipulations.

Monitoring One's Own Performance: The Case of Math-Anxious Individuals

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Highly math-anxious individuals (HMA) feel apprehension when dealing with mathematical situations and often perform worse than their low math-anxious (LMA) peers. Cognitive monitoring allows individuals to assess their mental processes and adjust them to achieve their objectives. This study aimed to investigate monitoring skills in HMA participants. Two groups of 30 participants with extreme scores in math anxiety performed a number bisection task. They had to decide whether the middle number in a triplet was the average of the outer ones, judge whether they had made an error and report their confidence in their response to the triplet. General anxiety and arithmetic skills were controlled for. HMA and LMA participants did not significantly differ in their bisection performance. However, the HMA group reported more feeling of errors and were less confident in their responses. Importantly, HMA participants showed less correspondence between their actual performance and monitoring judgments, as measured by the Gamma index. Given the importance of proper error detection in adjusting performance, weaker monitoring skills may be one factor contributing to the difficulties HMA individuals face when learning and performing mathematics.

Is There Relative Accuracy in Participants' Metamemory Judgments for Context?

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Metamemory research has mainly focused on people's ability to predict their item memory. The aim of this study is to assess the relative accuracy of Judgements of Source (JOS) using multinomial processing tree (MPT) modeling, which provides a measure of source memory independent of item memory and corrected for the influences of guessing, allowing a better assessment of the relationship between source memory and JOS. We will report results from three experiments conducted in parallel with random assignment. Participants (n = 30 per experiment) study words either presented by two speakers (external), instructed to imagine themselves or a famous person saying the words (internal) or the combination – listening to one speaker or imagining

themselves saying the word (reality-monitoring). We use the two-high-threshold model of source monitoring (2HTSM) to estimate source memory parameter (d') for different JOS levels (low to high predictions). Relative accuracy is given when source memory d' increases with increasing JOS level. Preliminary analyses ($n=24$ per experiment) support relative accuracy in the external experiment but not in the internal and reality-monitoring experiments.

The Impact of External Cues on Metamemory Monitoring During Learning

Aleksandra Krogulska, Faculty of Psychology and Cognitive Sciences, Adam Mickiewicz University; Maciej Hanczakowski, Faculty of Psychology and Cognitive Sciences, Adam Mickiewicz University; Katarzyna Zawadzka, Faculty of Psychology and Cognitive Sciences, Adam Mickiewicz University

Our experiments aimed to examine how external cues indicating to-be-learned material difficulty influence one's predictions about future recall. Participants studied intermixed lists of related and unrelated word pairs. For each pair, they provided judgments of learning (JOLs) on a 5-point scale (Experiment 1) or in a binary format (yes/no, Experiment 2), estimating whether they would recall the second word at test when given the first. Before providing their JOLs, participants received information ostensibly reflecting performance of a yoked participant (whether they recalled the second word, did not recall it, or did not see it). Participants correctly believed that they would remember related pairs better than unrelated pairs. Their JOLs were also inflated when they received a positive cue about the other participant's outcome (compared to the 'did not see it' cue), but negative cues had no impact on JOL magnitude. These effects did not interact, suggesting that conflict between external cues and internally perceived task difficulty does not affect people's predictions.

Learning & Memory II

Profiling Everyday Memory Functioning Across the Autism and ADHD Spectrums

Joanna Kubiak, Northumbria University; Michael Craig, Northumbria University; Kristofor McCarty, Northumbria University; Joanna Greer, Northumbria University

While alterations in attention and executive functions are well-established in neurodiverse individuals, possible effects in declarative long-term memory (LTM) across the autism and ADHD spectrums remains under-researched. ADHD-related declarative memory deficits are often linked to encoding difficulties, whereas autism-related deficits are associated with retrieval. Interestingly, sensory processing sensitivity (SPS) and problems with attentional control, traits strongly associated with both conditions, have also been linked to memory deficits. This study examines the impact of autism and ADHD traits on LTM across the general population, exploring how different domains (episodic vs. semantic) and modalities (verbal vs. visual) are affected. A quantitative correlational design in adults aged 18+ years will assess these relationships using validated questionnaires. An exploratory approach, including series of regressions, will provide insight into the complex dynamics between autism/ADHD traits and self-assessed memory. Data collection is ongoing, and findings will be reported during the conference.

Argumentative Writing Development in 3rd & 5th Graders in Dutch Primary Education

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Writing is a dynamic and multidimensional process that can be assessed from various angles. The present study investigated the influence of age group (3rd versus 5th grade), parental education, passive vocabulary knowledge, reading comprehension ability, and print exposure on growth in quality of Dutch children's argumentative writing, as measured by topical coherence (CBOW), syntactic complexity, spelling accuracy, lexical diversity and quality of argumentation. The data were collected from eleven primary education in the Netherlands. In our study, 413 children (202 3rd grade, 215 5th grade at study onset) were prompted to write a fictitious letter at two time points (approximately twelve months in between) advising the prime minister on whether to introduce school milk in Dutch primary schools. Before writing their letter, children read four age-appropriate argumentative texts, two in favor of and two against cow's milk. All data have been collected

and are currently being processed and analyzed. The results will be presented during the conference and will reveal which cognitive, linguistic and environmental factors influence argumentative writing ability.

How Do Spontaneous Thoughts Come to Mind, and How to Change Them: Testing the Interaction Between Type of Cues and Priming Mechanisms

Magda Jordao, Leeds Beckett University; Kata Pauly-Takacs, Leeds Beckett University; Chris Moulin, Université Grenoble Alpes; Krystian Barzykowski, Université Grenoble Alpes

Spontaneous thoughts come to mind with reduced effort, intention and control, and are frequent in everyday life. These are linked with both positive and negative consequences, highlighting the importance of understanding the mechanisms involved and how to change them. Cue-item discriminability and semantic-to-autobiographical memory priming are among previously explored mechanisms, but their interaction is poorly understood. We explore this based on previous theoretical work (Jordao & St. Jacques, 2022) predicting a smaller priming effect when cues presented to participants have greater cue-item discriminability (word-phrases with situational detail vs single words). The study follows a 2x2 between-subjects design including 20 participants randomised for each of the conditions (80 participants in total). The independent variables include priming status (priming or control) and type of cue (word-phrases or word-only) embedded in a vigilance task widely used to capture spontaneous thought. The dependent variable is the frequency of priming-related spontaneous thought. Data collection is ongoing. Results will be discussed in relation to spontaneous thought mechanisms and implications for the episodic-semantic memory interaction.

Memory in Your Hands: Note-Taking Enhances Card Memory in a Concentration Game

Anna-Lena Finkler, University of Erfurt; Hannes Thomas, University of Erfurt; Hauke S. Meyerhoff, University of Erfurt

Note-taking is a very common form of cognitive offloading as it typically enhances immediate performance. However, it has been controversially discussed whether offloading is beneficial or harmful

for subsequent memory. Here, we study this question with a concentration game paradigm in which participants solve five different decks of the game either with or without note-taking (N= 132). Critically, we probed three different indicators for (unaided) memory performance after a brief break. A free recall test as well as a position recognition test indicated more accurate memory for participants who were allowed to take notes during the gameplay than those who solved the games without notes. However, there were no such differences in a recognition test. Thus, note-taking was beneficial for the seemingly more difficult memory tasks. The overall pattern therefore suggests that note-taking triggered elaborative processing which strengthened the memory strength thus improving memory performance. Our study therefore shows that – contrary to most findings in the literature – offloading could have beneficial effects on memory, and we discuss the necessary circumstances for such beneficial effects.

Subtle Effects of Synchronous Learning on Memory and Skin Conductance

Michèle Muhmenthaler, University of Bern; Beat Meier, University of Bern

In two experiments, we examined whether synchronous learning - watching identical podcasts at the same time - enhances memory performance, compared to asynchronous learning. The hypothesis was based on shared attention theories, which suggest that attending to the same stimulus can heighten emotional responses and arousal. Since increased arousal enhances focused attention, co-attended items may be better remembered. Groups of four participants watched podcasts together, on separate computers and headphones; they were unaware of the synchrony condition. After the study phase, participants completed a multiple-choice test on the podcast contents. In Experiment 1 (N = 980), the results indicated that synchronous learning led to a slight improvement in memory performance compared to asynchronous learning. However, this effect was small and driven by female participants. In Experiment 2, with only female participants (N = 620), the memory effect did not replicate. Nevertheless, participants in the synchronous condition showed a greater increase in skin conductance, suggesting heightened arousal due to shared attention. Overall, our findings suggest that synchronous learning may subtly influence arousal, attention, and memory.

Exploring Cognitive Aging in Autism: A Lifespan Perspective

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The global population of autistic individuals over the age of 60 is expected to reach 21 million by 2050. However, research focusing on aging in autism is still very limited. The few studies on cognitive aging in autism have shown contradictory results, suggesting that aging may be accelerated, parallel, or slowed down compared to neurotypical aging. This study aims to examine the evolution of cognitive functions in autism across aging. So far, 45 autistic and 76 neurotypical adults (19–62 years), matched on sex-ratio and education participated in this study. Questionnaire and cognitive tests assessing processing speed, executive functions (inhibition, flexibility, subjective executive functioning), and memory (episodic, verbal-short term and verbal working memory) have been proposed. Preliminary results show that autistic adults perform worse in processing speed, episodic memory, flexibility, and self-report more executive difficulties. Despite these

differences, the aging process appears to be relatively similar between autistic and non-autistic adults across all cognitive functions. These findings support recent studies suggesting a parallel rather than accelerated aging process in autism, and thus encourage further study.

Nature and Reliability of Task-Evoked Pupil Responses With Respect to Performance in N-Back Tasks

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Pupil dilation (PD) is a sensitive measure of mental effort and neural activity underlying cognition. Nevertheless, it is not clear whether pupillometry can be used as a valid and reliable measure of individual differences in information processing. Our aim was to investigate this issue by measuring PD during working memory updating in a 2-back task. In our first study, we assessed the validity of PD by investigating the link between PD and task performance. The task was repeated three weeks later, to assess reliability of PD indices. In our second study, we targeted different information processing components of the task by constructing a blocked n-back design, which differentiates between encoding&storage and the updating components, respectively. A second n-back task without PD measurement was also administered to further test the validity of PD. Our results show that using sophisticated designs separating different cognitive processes, significant correlations can be obtained between individual variability in pupil dilation and task performance, and that there is also an appropriate test-retest correlation over a delay of weeks. Our results suggest that pupillometry can be used to assess individual differences in cognition.

All the Same, Less to Maintain: Electrophysiological Evidence for Late-Stage Optimization in Visual Working Memory

Qianru Xu, University of Jyväskylä; Lijing Guo, University of Jyväskylä; Dan Nie, University of Jyväskylä; Chaoxiong Ye, University of Jyväskylä

Visual working memory (VWM) is critical for temporarily storing and manipulating visual information but is limited in capacity. Perceptual

organization, such as grouping identical objects, may alleviate these constraints, yet underlying mechanisms remain unclear. This ongoing study investigates whether identical orientation stimuli reduce VWM resource consumption and whether this reduction occurs during the encoding or maintenance phase. Using contralateral delay activity (CDA), an event-related potential (ERP) component indexing VWM load, we test three conditions: all-same (four identical orientations), partial-same (two pairs of identical orientations), and all-different (four distinct orientations). Preliminary behavioral results show better VWM performance as identical orientations increase, peaking in the all-same condition. ERP results show no early CDA differences, but late CDA amplitudes are lower in the all-same condition, suggesting that the benefits of identical objects emerge during late maintenance. Partially identical stimuli do not reduce VWM load, highlighting the complexity of integrating partially redundant information. Further analyses using decoding techniques are underway to refine these findings.

Long-Term Memory Contributions to Working Memory: Insights From the Contralateral Delay Activity

Ana Rodriguez, University of Zurich; Peter Shepherdson, University of Akureyri; Lea Bartsch, University of Zurich

How do people leverage long-term memory (LTM) to enhance working memory (WM) performance? Proposed mechanisms include offloading (LTM substitutes for WM storage), chunking (WM holds references to LTM), and boosting (LTM enhances WM representations through additional activation). To distinguish between mechanisms, we measured the contralateral delay activity (CDA)—a well-established neural correlate of WM load—during a multi-alternative forced-choice task where a subset of memoranda (color-object bindings) were pre-learned. Our preliminary findings confirm the typical set-size effect: CDA amplitude increases with more items. Notably, at set size 2, CDA was lower when one binding was pre-learned compared to two new bindings, but remained higher than when maintaining only one new binding. However, at set size 3, including a pre-learned item did not reduce the CDA amplitude. This suggests that at low loads, pre-learned information reduces efficiently WM load. However, as overall WM demands increase, this advantage seems to be constrained.

Image Memorability Facilitates Visual Working Memory Formation: An ERP Study

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Some images, such as faces and scenes, reliably embed themselves in memory, while others are easily forgotten. This phenomenon is often attributed to image memorability, a stimulus-driven property that predicts consistent memory responses across individuals. Recent research suggests that image memorability can influence visual working memory (VWM). However, it remains unclear whether this influence stems from facilitated VWM formation or enhanced maintenance that extends VWM storage capacity. To address this, we asked participants to perform a change-detection task involving images of faces with varying memorability (high vs. low). The behavioral results showed that high-memorability faces were associated with better performance. We further analyzed the contralateral delay activity (CDA), an ERP component associated with VWM maintenance. Our results showed that CDA amplitudes were significantly larger for high-memorability stimuli during the early retention period. However, this difference diminished during the later retention period. These findings suggest that high-memorability stimuli enhance early-stage encoding processes, resulting in more robust memory representations without altering the overall storage capacity of VWM.

Extending the Theta Cycle Enhances Visual Working Memory in Individuated- but Not Fixed-Frequency Transcranial Alternating Current Stimulation

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We tested whether extending the theta cycle (slowing down the theta rhythm) in a given hemisphere using transcranial alternating current stimulation (tACS) could enhance working memory maintenance of stimuli presented to the contralateral hemifield during the change detection task. In Experiment 1, 30 young, healthy adults received tACS at a fixed frequency of 4 vs. 7 Hz, but no changes in change detection accuracy

were observed. In Experiment 2, individual theta frequency was estimated first for each of 47 young, healthy adults. Then, they received tACS at this individualized theta frequency, which either decreased or increased by 1.5 Hz. Targeting the decreased frequency led to a significant increase in change detection accuracy for the contralateral but not the ipsilateral hemifield. These differences were consistently matched by the tACS effects on Phase-Locking Value (cross-channel synchrony) and Modulation Index (within-channel cross-frequency synchrony) derived from the resting-state EEG data. No analogous enhancement of working memory performance were observed for the n-back task.

Different Patterns of Activation for the Recognition of Visual Vs Auditory Verbal Information in the SPoARC Effect

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The SPoARC (Spatial Positional Association of Response Codes) effect refers to the mental spatialization of non-spatial ordinal information in working memory. Although this effect has been observed for both visual and auditory stimuli, no direct comparison has yet been made between these two types of material. To shed light on the contribution of visualization to this phenomenon and its neural correlates, fifty participants performed two spatialization tasks involving the memorization of a visual vs. auditory material using functional magnetic resonance imaging (fMRI). Whole-brain analyses revealed a similar dorsal frontoparietal network across conditions. However, direct comparisons revealed transverse temporal and inferior occipital activation for the visual modality, whereas the auditory modality showed activation only in the lingual gyrus (also in the occipital cortex). Finally, we performed representational similarity analysis (RSA), showing modality-specific activation patterns in the middle frontal gyrus, in the anterior intraparietal sulcus, and in the hippocampus. These findings suggest that both modalities engaged a common frontoparietal network, although in slightly distinct ways, while both relying on visual imagery.

The Impact of Label Specificity on Visual Memory

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Research on visual short-term memory shows that using verbal labels enhances retention by directing attention to named features, with specific labels ("RED") being more effective than general ones ("WARM"). This study examines whether label specificity influences how category commonalities affect long-term visual memory. The task is to memorize 15 colored objects from five categories (e.g., fruits, animals) under two conditions: similar-color (same-category items are presented in hues of the same color category) or dissimilar-color (no color overlap for same-category objects). We manipulate the presentation of labels in three conditions: no labels, specific labels ("green APPLE"), and general labels ("green FRUIT"), with color memory probed in a delayed color-reproduction test. We predict a general labeling benefit (better memory in the label than no-label conditions), with an interaction between label specificity and color similarity: general labels should enhance memory in the similar-color condition by highlighting categories allowing the exploitation of their commonalities, while specific labels should be more beneficial in the dissimilar-color condition. These findings will help us clarify how language affects visual learning

Benefits and Costs of Encoding Variability for Item and Relational Features

Mikołaj Wieczór, Adam Mickiewicz University; Maciej Hanczakowski, Adam Mickiewicz University; Katarzyna Zawadzka, Adam Mickiewicz University

The encoding variability hypothesis posits that memory improves when materials are learned across multiple cycles, with different features emphasized during each presentation. Variability may target individual item features or relational features linking items, with memory benefits emerging on tests reliant on either item-specific or relational features, respectively. To investigate this postulated interplay of targeted features and test demands, we employed item-specific (semantic orienting questions) and relational (story creation) encoding tasks in both constant and variable formats, assessing their influence on cued- and free-recall tests. Our findings indicate that encoding variability enhances memory

for item-specific features in a cued recall test but may impair memory for relational features in a free recall test. These results demonstrate that encoding variability differentially impacts memory depending on the type of information processed and the administered test, yielding benefits for item-specific information while imposing costs on relational information.

The Unity and Diversity of Binding and Its Relation to Fluid Intelligence

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Binding refers to the mental connections between representations and their contexts. Binding may explain the relationship between working memory and fluid intelligence (Gf), but evidence supporting this claim is inconsistent, possibly due to inconsistent operationalizations of binding and because binding might represent multiple independent processes. We will address these possibilities by examining the relationship between Gf and different binding tasks. Local recognition tasks test bindings between memoranda and serial position. Associated pairs tasks test bindings between memoranda (e.g., a word) and other similar memoranda (e.g., another word). The monitoring task may require integrating and additional processing of bindings. The relational representation task measures the ability to match identical bindings. The rapid serial visual presentation task from research on perception measures temporal binding (the binding of stimuli across time). Using structural-equation modelling we will compare these tasks to determine whether they measure the same ability and differentially relate to Gf. Data collection is ongoing.

Item-Specific Processing for Real-World Objects in Visual Working Memory: Effects of Presentation Time

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Visual working memory (VWM) performance for real-world objects is higher in sequential presentation than in simultaneous presentation. The advantage of the sequential presentation is assumed to be based on an efficient item-specific processing for that

presentation format, enabling semantic encoding of the objects. In our previous study, the item-specific processing benefits were observed even in simultaneous presentation with instructions of item-specific processing, but only when participants were provided enough processing time. This finding gave rise to a new question whether processing time also matters in item-specific processing in sequential presentation. To address this question, we conducted an experiment of VWM task in which participants remember six objects presented one by one (i.e., sequential presentation) with long (200ms) or short (100ms) duration and perform a two-alternative forced choice recognition of one of the six objects on each trial. A preliminary analysis indicated that item-specific processing benefits were observed only when objects were presented with long (200ms) duration. This study demonstrated the critical role of processing time in determining the efficacy of item-specific processing in VWM.

Is Working Memory Updating Costly or Obligatory? The Role of Task Relevance and Response Selection

Noga Rotshtein, Ben-Gurion University; Yoav Kessler, Ben-Gurion University

Working memory (WM) updating is commonly considered an effortful and costly process requiring cognitive control. Our study examines whether updating can occur as an obligatory consequence of attending to goal-relevant information. Participants performed a task in which they processed stimuli and needed to update some of them into WM for a future recall test. Experiment 1 manipulated the processing task to be either a simple reaction time (RT) or a choice RT task. Results showed that updating incurred an RT cost in the simple RT condition but not in the choice RT condition, suggesting that response selection may already involve updating. Experiment 2 further examined whether the relevance of the updated information to the categorization task modulated this effect. When the recall requirement matched the categorization-relevant dimension, updating was facilitated, whereas a mismatch led to an updating cost. Experiment 3 aimed to replicate this results. These findings suggest that WM updating may not always require controlled processing but can result from attentional selection during response execution.

The Role of Attention in Verbal Working Memory for Serial Order

Robin Remouchamps, University of Liège; **Johanna Hein**, University of Geneva; **Evie Vergauwe**, University of Geneva; **Steve Majerus**, University of Liège

The attentional account of working memory for serial order proposes that memory for order information is more attention demanding than memory for item information (Guitard et al., 2021). The present study examined this hypothesis in verbal working memory by manipulating attentional load in a working memory task via a dual-task paradigm. In Experiments 1-2, participants were administered item and serial order probe recognition tasks while conducting a concurrent easy vs. hard sound detection task. If order memory is more attention demanding, then we expect it to be more affected by the increase of the attentional load of the secondary task than item memory. In Experiments 1-2, we observed a negative impact of attentional load but no interaction with memory type. Next, we used an immediate serial recall task instead of probe recognition in Experiments 3-4. Here, the impact of attentional load was larger for item memory than for order memory, item memory being also the most challenging aspect of the task. Together, our results do not support the notion of increased attentional demands on order memory per se but rather suggest increased attentional involvement for the most challenging information type, depending on task context.

The Effect of Word Length on Chronometric Measures in Handwritten and Typed Spelling Productions

Yasmin Arnould, Oxford Brookes University; **Anna L. Barnett**, Oxford Brookes University; **Michael Pilling**, Oxford Brookes University; **Olivia Afonso**, Oxford Brookes University

Working memory (WM) processes are implicated in the well-documented length effect, where longer sequences are more difficult to recall. WM is also known to play a key role in spelling; however, its exact contribution is still unclear. This study aims to shed light on the influence of word length on spelling processes. We examined inter-letter interval durations during spelling of target words varying in length (4 vs. 8 letters) while maintaining the identity of the initial three letters (bash vs. basement).

Participants copied words by handwriting ($n = 42$) or typing ($n = 27$) to assess whether length has different effects in each modality. This gives insight into whether or not these are modality-general. In handwriting, inter-letter intervals increased for longer words, particularly in the second and third intervals in the word, showing the presence of the length effect. Preliminary typing results also show increased inter-letter intervals for longer words, especially in the first and third intervals. These findings suggest that the length effect in spelling involves more than time-based limitations, since the length effect is still present despite typing being a faster modality.

Investigating the Impact of Cognitive Offloading on Serial Position Effects in Working Memory

Millie Smith, University of Leeds; **Amanda Waterman**, University of Leeds; **Luísa Superbia Guimarães**, University of Leeds; **Jonathan Redshaw**, University of Queensland; **Richard Allen**, University of Leeds

Research shows that adults use cognitive offloading to manage high memory loads, externalising internal processes onto the environment to circumvent working memory (WM) constraints. It remains unclear how individuals offload information based on an item's position within a sequence, and the impact of offloading on recall patterns. We examined this in a digit serial recall task. In the critical offloading condition, participants can "store" (offload) one item during encoding, with the selected item remaining on screen during recall. Moreover, we investigate how cognitive offloading influences serial recall according to task complexity (forward vs. backward digit recall). Preliminary findings ($n = 35$) indicate a pattern of offloading middle-position items in both forward and backward recall. Offloading does not seem to affect forward recall across serial positions; however, offloading middle-position items in backward recall seems to enhance recall accuracy for the earlier-encoded items. We discuss our results in terms of offloading being useful to alleviate the storage burden of WM, only when processing demands are high.

Switching Without Memory and Control: Testing the Impact of Working Memory and Proactive Control in Task Switching

Aharon Oppenheim, Bar Ilan University

Executive functions (EFs) including working memory (WM), and task switching are critical for goal-directed behavior. Typical task-switching paradigms inherently involve high WM demands, making it challenging to isolate the role of proactive control. We aimed to directly examine how reducing WM load affects task-switching performance and reliance on proactive control. We conducted an experiment systematically reducing WM demands by simplifying stimuli and response mappings. Participants performed task-switching trials under two WM conditions (high vs. low) with and without proactive control cues. Pilot results demonstrated improved task-switching performance under reduced WM load. Notably, proactive cues did not facilitate performance; instead, they increased switch costs specifically in low WM conditions. These results indicate that simplifying task-switching paradigms reduces WM demands and decreases reliance on proactive control cues, highlighting distinct contributions of WM and proactive control in task switching.

Decision Making & Reasoning

Beyond Cognitive Sophistication: Why Conspiratorial Thinking Endures

Ivana Hromatko, Faculty of Humanities and Social Sciences; Mirjana Tonković, Faculty of Humanities and Social Sciences; Andrea Vranić, Faculty of Humanities and Social Sciences; Nebojša Blanuša, Faculty of Political Science; Bartul Vuksan-Ćusa, Faculty of Political Science

Conspiratorial thinking has often been pathologized as dysfunctional. This study investigated three categories of predictors—demographic, ideological, and cognitive—associated with conspiratorial thinking style. In a correlational analysis (N=924, probabilistic national sample), we found that younger, less-educated participants with lower trust in science and stronger populist or right-wing beliefs were more inclined to endorse CTs. Cognitive factors, including low cognitive reflection and high pseudo-profound bullshit receptivity also contributed to CT endorsement, though to a lesser extent. We also conducted an online experiment, (N=799), in which we examined whether cognitive engagement, either through reading about CTs or actively generating one, could diminish conspiracy beliefs. The findings revealed that neither passive learning nor active engagement significantly altered conspiracy beliefs. The persistence of conspiratorial thinking, despite

interventions aimed at enhancing cognitive sophistication, suggests that identity-driven motivated reasoning may overshadow rational thought processes. While this mode of thinking is epistemically flawed, it is not inherently dysfunctional, which may explain its resilience.

The Impact of Aerobic Exercise on Rational Decision-Making

Michał Remiszewski, Jagiellonian University; Gabriela Rajtar, Jagiellonian University; Marcin Maciejczyk, University of Physical Education; Tomasz Ligeza, Jagiellonian University

Physical activity (PA) not only improves overall health but also positively impacts cognitive functions, such as working memory, attention, and inhibitory control. An intriguing yet underexplored research area is the influence of PA on decision-making. In this study, we investigated the effects of aerobic exercise on performance in the Rational Decision-Making Task (RDM; De Martino et al., 2006). Participants were randomly assigned to either an exercise group (n = 32) or a passive group (n = 32). The exercise group cycled for 20 minutes at 65–75% of their maximum heart rate, while the passive group sat on a stationary bike for 20 minutes without exercising. Both groups completed the RDM in the pre-test and post-test. During the task, participants gambled for money, with a larger win associated with making more rational decisions. The results revealed that the passive group won more in the post-test than in the pre-test ($t = 3.475$, $p = 0.006$), while the results of the exercise group remained the same between the tests ($t = 0.317$, $p = 1$), suggesting that exercise negatively influences performance in the RDM. We will discuss the possible mechanisms behind this result, including the influence of the affect heuristic.

Interoceptive Awareness and Veracity Assessment Accuracy: Heartbeat Evoked Brain Potentials (HEP) Study

Joanna Ulatowska, Nicolaus Copernicus University; Wiktoria Gucińska, Nicolaus Copernicus University

Previous studies revealed that individuals with greater interoceptive awareness may use their own bodily signals to make affective evaluations of external stimuli. However, research has rarely focused on the effect of interoception on the decision-making

process related to veracity assessment. This study uses HEP analysis to explore the relationship between interoceptive awareness and veracity assessment accuracy, which provides a novel approach to testing this phenomenon. We hypothesized that veracity assessment accuracy would be positively related to interoceptive awareness expressed in HEP amplitude and self-report. Participants (N = 66) assessed the veracity of 20 statements (10 truthful, 10 deceptive) while their EEG and ECG data were collected and completed the MAIA questionnaire. The ongoing analysis will assess HEP amplitude across different brain regions (frontal, central, parietal, occipital) during veracity assessment performed by good and poor detectors. Furthermore, the study will explore the neural markers associated with interoceptive awareness and its role in decision-making.

What Do People Expect From Expected Value?

Tomasz Smoleń, Jagiellonian University; Paweł Basoń, Jagiellonian; Bartłomiej Krocze, Jagiellonian University; Hanna Kucwaj, SWPS University; Konrad Sak, Jagiellonian University

This study examined how distinct instructional framing strategies influence probability distortions in decision-making scenarios. A total of 136 participants were asked to estimate lottery values under four instructional conditions: direct calculation guidance, estimative averaging, and narrative framing in first- and third-person perspectives. Results showed that skewness, rather than variance, emerged as the principal predictor of estimation errors. Notably, the estimative instruction condition markedly reduced probability neglect, whereas the direct calculation condition introduced unexpected bias. Both narrative approaches—irrespective of first- or third-person perspective—significantly elevated probability neglect. These findings challenge the conventional emphasis on variance in decision-making models and underscore how carefully designed instructional framing can meaningfully mitigate or exacerbate probability distortions, with important implications for tasks requiring accurate probability assessments. Fig 1. Decision scenario presented to participants. Uncertain Table depicts the gamble option while Certain Table (single card) representing the certain option, indicating that participants were asked to determine its value.

Deontic Reasoning and Wason's Selection Task: State of the Art

Montserrat Martín, University of Santiago de Compostela; María Dolores Valiña, University of Santiago de Compostela

Deontic selection task is a metainference problem in which subjects reason from a conditional rule involving deontic terms (must, should). These statements express obligations or permissions. Research have shown that subjects' reasoning is frequently better with the deontic than with the indicative task. The aim of this paper is to analyze the state of the art on deontic reasoning and the Wason selection task. Method: a bibliographic search was conducted in the databases PsycINFO and Scopus, from 2010 to 2024. Results: 1) deontic and indicative versions are qualitatively different and both require distinct cognitive strategies, 2) the more complete theoretical explanations on this topic are the Mental Models Theory and the Dual-Process Theory, 3) "must" could be interpreted in an indicative sense. Therefore, it is necessary to analyze pragmatic keys that can explain the deontic or factual interpretation (the conversational rules of communication, the antecedent-consequent relationship, the instructions, etc.). Conclusion: it would be interesting to further investigate which factors modulate subjects' reasoning in the deontic selection task. This research could help to learn more about everyday human reasoning mechanisms.

Developing and Validating an Experimental Task for Crisis Negotiation

Geoffrey Duran, Université Lumière Lyon 2; Aya Chahboun, Université Lumière Lyon 2; Maurane Berteau, Université Lumière Lyon 2; Célie Marino-Marienneau, Université Lumière Lyon 2; Melis Yildirim, Université Lumière Lyon 2

This study presents the development and validation of an experimental task for crisis negotiation, designed to simulate real-world hostage negotiation dynamics. The task follows a scripted yet flexible scenario, where participants' choices shape the interaction pathways. Trained actors, instructed in crisis negotiation techniques based on the RAVEN model, played the role of hostage takers. Two groups of negotiators participated: one without prior training and one trained with RAVEN methods, supplemented by AI-driven simulated negotiation training. The AI agent was trained on a dataset derived from RAVEN

techniques. After training, participants engaged in scripted crisis negotiations, with all interactions recorded and analyzed. This research provides insights into the cognitive mechanisms of crisis negotiation and evaluates the impact of AI-assisted training. Results will be presented at ESCAP 2025.

Motor Cognition II

How the Cognitive System Deals With Error Commission: Binding of Correct Responses in Cases of Errors in Complex Response Sequences

Maria Nemeth, Trier University; Anna Foerster, Trier University; Christian Frings, Trier University; Roland Pfister, Trier University; Birte Moeller, Trier University

Action control of more complex actions relies on the binding of individual responses, which are retrieved upon repetition and thereby influence behavior. Binding and retrieval extend beyond successful actions, with studies suggesting that features of the intended, but not executed, response are bound to stimulus features. However, it is yet unclear how erroneous actions are represented when embedded within longer action sequences and how they influence subsequent correct actions. We propose that principles of binding for discrete errors generalize for erroneous response aspects in complex actions. In a sequential task, participants responded to individually presented letters and numbers. In the case of a previous error, performance was improved when the intended correct response had to be repeated as the current critical response compared to the repetition of the erroneous response or a neutral response. The data suggest that when an action slip occurs, the intended correct response, and not the erroneous response is integrated into the representation of the action sequence. This result pattern highlights binding as an adaptive mechanism in error commission that facilitates future successful behavior even after errors.

A Systematic Review on Body Schema and Arm Size Plasticity

Anna Zigrino, Department of Psychology, Sapienza Università di Roma; Pierpaolo Zivi, Department of Psychology, Sapienza Università di Roma; Fabio Ferlazzo, Department of Psychology, Sapienza Università di Roma; Stefano Sdoia, Department of Psychology, Sapienza Università di Roma

Introduction: the Body Schema (BS) represents the body in a way that allows for dynamic adaptation and integration of motor functions. To do so, the BS temporarily alters itself, plastically adapting to different environmental requests. Yet sometimes these alterations can result in patients' maladaptation, like in the case of amputated limbs. This work aims at reviewing and categorizing the most commonly used methods in the study of BS, as an attempt to better understand its plasticity and adaptability in different circumstances. Methods: two prominent databases, namely Scopus and PsychInfo were consulted. The eligibility criteria included studies conducted on humans, wherein the population was not clinical. Finally, studies were included in which the BS was considered alone, without comparison to other body representations. Results: the selected papers were grouped into 10 different categories, illustrating the heterogeneity of tasks and paradigms used to investigate the BS. Discussion: different methods to study the plasticity of the BS are discussed. Moreover, it is hypothesized that two fundamental abilities grant the BS its functions: proprioception and sense of agency. Clinical and future research implications are discussed.

Where Do We Draw the Line Between Our Physical Bodies and the External World? A Psychophysical Analysis

Celia Blaise, University of Sheffield; Holly Clark, University of Sheffield; Hannes Saal, University of Sheffield

The ability to distinguish between our body and the external world is crucial for our sense of self, environmental interaction, and sensory processing. In this study, we developed a psychophysical protocol to directly assess how accurately individuals perceive their body boundaries. Participants were asked to determine whether the midpoint between two tactile stimuli applied on the skin was inside or outside their perceived body boundary. 3D scans of the tested regions were used to determine objective anatomical boundaries, allowing psychometric functions to be fitted. Participants showed millimeter-level precision in body boundary localization across diverse body regions, including the palm and the ankle. However, accuracy varied depending on the body region. While palm boundaries were judged almost perfectly, wrist boundaries were frequently misjudged, even when the

midpoint was located considerably outside the physical body. Perceptual judgements adapted to changes in posture, but did not simply reflect proprioceptive input: eliminating local three-dimensional structure considerably impaired localization accuracy. These findings suggest that body representations accurately reflect local body geometry with high fidelity.

Towards an Intentional Approach to the Spatial Coding of Actions

Elsa Pezet, Paris Nanterre University; Nicolas Morgado, Paris Nanterre University; Loïc Heurley, Paris Nanterre University

Understanding the neurocognitive mechanisms underlying voluntary actions is central to cognitive science. According to the ideomotor approach, action selection relies on anticipating its effects (Shin et al., 2010), which can be environment- or body-related (Pfister, 2019). While dominant views suggest environment-related effects prevail (Sutter et al., 2013), an alternative perspective argues that action effect integration depends more on the agent's intention than on effect type (Memelink & Hommel, 2013). This study investigates action representations when multiple effects occur, emphasizing intentional processes. Using the Simon effect, we designed a tool-use task, with a lever effect, contrasting environment- and body-related effects. Participants responded to stimuli by moving a tool, with instructions directing attention to either hand or tool-tip movement. Results reveal a compatibility effect depending on the instruction, highlighting the role of intention in action representation. These findings offer insights into how agent intentions influence action representation and enrich theoretical models on perceptual effect integration in action representations, emphasizing the agent's intention.

Stimulus-Driven and Response-Driven Cross-Modal Action Co-Activation

Jens Kürten, University of Würzburg; Lynn Huestegge, University of Würzburg

Coordinating multiple effectors, such as the eyes and hands, is essential in many daily activities. While using two effectors simultaneously is typically more demanding than using one (dual-action costs), a prepotent action (e.g., a saccade) can interfere with

the isolated execution of another response (e.g., a keypress). This can manifest as frequent false-positive responses in the inappropriate but prepotent effector. We examined whether such responses are primarily stimulus-driven (triggered by a suitable stimulus) or response-driven (dependent on a concurrently executed action). Participants responded to a peripheral visual stimulus with a single saccade, a single keypress, both, or no action. False-positive saccades (keypresses) occurred more often in single-manual (single-saccade) trials compared to no-action trials, with a stronger tendency for false-positive saccades compared to keypresses overall. These findings suggest that response-driven co-activation between highly compatible actions can complement automatic stimulus-driven activation in generating (unwanted) behavior.

Attention & Cognitive Control II

Preliminary Evidence for the Resting-State Theta/Beta Ratio as a Predictor of Working Memory and Emotional Regulation

Madia Marika Biasi, University of Foggia; Veronica Debora Toro, University of Foggia; Gianluigi Serio, University of Foggia; Diletta Decarolis, University of Foggia; Paola Palladino, University of Foggia; Tiziana Quarto, University of Foggia

Resting-state theta/beta ratio (TBR) is associated with both cognitive and emotional variables such as attentional control and emotional regulation (ER). In particular, lower frontal and parietal TBRs were linked to higher attentional control as well as higher tendency of use distraction as ER strategy. However, whether these two distinct findings are related to each other, and thus how TBR can inform about the way cognitive and emotional processes are integrated in the brain, remains unclear. This study aims to examine whether TBR predicts performance in WM and the use of ER strategies. Fifty participants (18-35 years) completed a resting-state electroencephalography (EEG) recording, the Operation Span Task (OS Task) to assess WM, and the Emotion Regulation Questionnaire (ERQ). Preliminary results showed that TBR was associated with both performance in WM and the use of reappraisal as ER strategy. Additionally, regression analyses confirmed that TBR plays a role in the association between WM performance and ER strategies. These findings

highlight the importance of TBR as a neurophysiological marker of cognitive and emotional control and of the link cognition-emotion.

Impact of Unliking and Unwanting Threats on Working Memory

Hippolyte Fournier, Université Lyon 2; Gaën Plancher, Université Lyon 2

It is widely recognized that the presence of threatening stimuli impairs working memory performance. According to cognitive models of emotion, this deterioration results from the allocation of attentional resources toward the appraisal of threatening stimuli, reducing the resources available for ongoing tasks. This effect would be more pronounced in anxious individuals, for whom threat relevance would be increased. However, it remains unclear whether this mechanism is differentially affected by threats that are unliking (immediately unpleasant) or unwanting (obstructive to long-term goals). To investigate this, participants will complete an anxiety questionnaire before playing a game-based complex span task, divided into three block types, each featuring a specific character that may randomly appear: a screamer (unliking threat), a character that triggers a loss of points (unwanting threat), or a neutral character with no effect. Data collection is ongoing. We anticipate a decline in working memory performance in both threat blocks compared to the neutral block, with stronger effects in highly anxious participants. The results will be discussed in light of recent cognitive-emotional models of working memory.

Neurophysiological Evidence for Emotional Attention Modulation Depending on Goal Relevance

Xiaojuan Xue, Gent University; Gilles Pourtois, Gent University

Although threat-related stimuli can capture attention automatically, recent findings suggest that goal rather than threat can be prioritized and eventually guide attentional control. In our study, we used electroencephalography (EEG) on 40 participants while emotional faces (either fear or happiness) were either goal-relevant or irrelevant during a dot-probe task. The use of peripheral vision was established by eye-tracking. Both the face-specific N170 component

and the subsequent Early Posterior Negativity (EPN) were enhanced by fear at the cue level, yet the latter one only when fear was goal-relevant. Importantly, we found that early on following target onset at the P1 level, both value and goal relevance drove spatial attention and interacted with each other such that fearful faces likely ceased to capture attention when they were goal-relevant. These results suggest that emotional attention is flexible and can be influenced by the goal relevance of emotion. Moreover, they shed light on the electrophysiological manifestations of this flexibility and dovetail with the assumption that sensory gain control effects occurring in the visual cortex depending on attentional control are multiplexed and determined by both value and goal

Reward-Driven Cognitive Control Dysfunction in Adolescents With Major Depressive Disorder: Behavioral and Neural Insights

Yiwen Qiu, Shenzhen University; Haoran Dou, Sichuan Normal University; Yi Lei, Sichuan Normal University

Reward influences cognitive control, yet its dysfunctional interactions in adolescents with major depressive disorder (MDD) remain unclear. This study examined thirty-five adolescents with MDD and twenty-nine age-matched healthy controls (HC) using the AX version of the Continuous Performance Test (AX-CPT), which included AX (target) and AY, BX, BY (non-target) cue-probe pairs. The task comprised non-reward and reward blocks, where social rewards were given for fast and accurate responses. Functional near-infrared spectroscopy (fNIRS) recorded neural activity. In the reward condition, the MDD group showed faster response times but higher error rates. The hierarchical drift-diffusion model revealed that the MDD group had a higher decision threshold and a reduced starting bias towards accuracy in the reward context. Additionally, MDD adolescents exhibited abnormal activation patterns in the DLPFC and VLPFC, along with weakened connectivity between these regions during proactive control in reward pursuit. These findings provide behavioral, computational, and neural evidence of impaired cognitive control for reward in adolescents with MDD.

Inner and Outer Balance: The Relationship Between Equanimity and Postural Stability in the Mindful Body

Petra Prof. Dr. Jansen, Universität Regensburg;
Philipp Prof. Dr. Hofmann, Universität Regensburg;
Franziska Prof. Dr. Schroter, Universität Regensburg

The main goal of this study was to examine the relation between inner (equanimity) and outer (postural stability) balance. It was expected that participants with a higher sense of equanimity, higher emotion regulation abilities, and higher executive control performance abilities would show better postural stability in an emotionally demanding situation. One hundred forty-seven young, healthy participants completed a postural sway task under emotionally demanding and neutral conditions. Emotion regulation strategies were measured using the affective style questionnaire, and attentional abilities were assessed using the attention network task. The results showed that participants with low equanimity had a higher sample entropy (higher complexity of postural stability signal) when emotion acceptance was low compared to when emotion acceptance was high. In participants with high equanimity, the effect reverses. However, the results were only obtained with one postural stability parameter, namely the parameter of sample entropy. Inner and outer balance are somehow related, and the emotional regulation strategy of acceptance might play an important role.

Motivation in Interference Resolution – Investigating the Impact of Motivational Statements on the Congruency Effect

Miriam Gade, Medical School Berlin

Goal-directed action is a hallmark of human cognition. We can easily adapt to changing goals and keep up motivation to perform even extremely boring tasks. Recent research has shown that self-instruction, that is, articulating condition-action rules, is also helpful in the common student samples. The picture is far less clear for motivational instructions. In sport psychology, motivating self-talk does not consistently help athletic performance. However, inner speech that is motivating and evaluating reduced observed conflict effects in student samples. In the present work's first series, motivational (i.e., "super") or neutral (i.e., "angled") utterances were used in combination with a flanker task. We found no influence of positive or neutral statements on performance measured by the congruency effect. In the second series, we used self-directed speech ("you champ" vs. "you loser") and

replicated the null effect seen in series 1. Thus, overall, these data add to the evolving picture that motivational self-talk does not only not consistently affect (athletic) performance. These findings seem at odds with self-regulation and clinical literature that recommends motivational self-instruction as a powerful therapeutic intervention.

Multi Negations in Information Processing

Robert Wirth, University of Würzburg; Yanick Klob, University of Würzburg

Negations, i.e., instructions on what not to do, come with severe challenges for our cognitive system. These include ironic effects, evident in people doing exactly what they are told not to do, increased errors, and significant response time costs for successfully enacted negations when compared to affirmative instructions. Here, we tested how the cognitive system enacts instructions that include multiple negations, meaning several bits of information have to be negated to select one correct response. We find that negation costs add up, evident by increasing negation costs for increasing negation demands. This suggests that every negation is processed on its own, and additional negations cannot benefit from already ongoing negation processing. Thereby, the processing of negations presents a structural limitation in action control.

Proactive Control Strategy as a Function of Reactive Inhibition Capacities and Impulsiveness: Challenging the Dual Mechanisms of Control

Adrien Lorant, SCALab; Marie Mathé, SCALab, PSITEC, ADEME; Fanny Grisetto, C2S; Clémence Roger, SCALab

The Dual Mechanisms of Control theory differentiates reactive and proactive control strategies to maintain adaptive behavior. It posits that individuals favour one strategy, measurable via the Proactive Behavioral Index (PBI) from the AX-CPT task, where a high PBI reflects the tendency to use more proactive control. This balance is shaped by individual (e.g., cognitive abilities) and contextual factors (e.g., motivation, stress), with low reactive inhibition capacities potentially promoting a more proactive strategy. We tested this hypothesis by analysing the interaction between reactive-proactive control balance (AX-CPT) and reactive inhibition capacities (Stop-Signal Task, n=38). Regression analyses modelled PBI evolution,

extracting an intercept (initial control strategy) and a slope (time-on-task adaptation). Firstly, individuals with lower initial proactive control adapted their strategy more during the task. Results showed poorer reactive inhibition, assessed by the Stop Signal Reaction Time, was associated with higher PBI. We are replicating this study with an extended design. Preliminary results (n=12) support these findings, reinforcing the counterbalance of poor reactive inhibition by a more proactive control strategy.

Control Under Pressure - the Influence of Aversive Motivation on Adaptive Control

Peter Czingraber, Eotvos Lorand University; Natalija Dokic, Eotvos Lorand University; Harangozo Julianna, Eotvos Lorand University; Alexia Kraft, Eotvos Lorand University; Andras Fazekas, Eotvos Lorand University; Miklos Bognar, Eotvos Lorand University; Balazs Aczel, Eotvos Lorand University

According to the affective signaling hypothesis, conflicting stimuli evoke a negative affect which in turn activates adaptive control mechanisms to resolve conflict. So far, research testing this theoretical framework has yielded highly inconsistent findings. Our study is a conceptual replication of the work of Yang et al. (2022) using monetary punishment in cognitive conflict tasks. Based on the affective signaling hypothesis, we expect that adaptive control will be modulated by not just the congruency of trials, but the type of monetary punishments employed. To test this hypothesis, we will use a prime-probe task in which we will manipulate two factors across blocks: the presence of evaluative feedback (whether it follows congruent or incongruent trials) and the aversive motivational context (whether monetary deductions occur for errors in congruent or incongruent trials). Additionally, we modify the original design by adding a condition where monetary punishment is not dependent on participant performance, but is randomly presented after prime-probe trials. In our data we expect an increase in the congruency sequence effect (CSE) specifically in conditions where monetary punishment is applied for making an error.

Flexibility and Stability in Cognitive Control: The Role of Reward Contingency

Larissa Walter, University of Freiburg, Freiburg Institute for Basic Income Studies; Anne Voormann, University of Freiburg, Department for Cognition, Action, and

Sustainability; Irina Monno, University of Freiburg, Department for Cognition, Action, and Sustainability; Andrea Kiesel, University of Freiburg, Department for Cognition, Action, and Sustainability

Rewards play an important role in our daily lives. Thereby, different psychological components seem to be addressed by different reward types. In two studies, we investigated the hypothesized differential effects of reward on cognitive flexibility. Using the self-organized task switching paradigm, we compared contingent, non-contingent, and no reward across blocks using a within-subjects-design. Based on Notebaert and Braem's (2015) framework, we hypothesized that non-contingent reward would lead to the highest switch rates and lowest switch costs, while contingent reward would result in the highest switch costs and lowest switch rates. However, while switch costs differed significantly across our reward type conditions, switch rates did not. To investigate whether reward only impacts switch costs or whether our manipulation simply wasn't strong enough, I will additionally present the results of a current follow-up study. Here, we added two scenario texts, validated in a pilot study, that favor or hinder performance contingent-reward expectations. We expect this to strengthen the potential impact of reward type on switch rates and switch costs.

The Cognitive Underpinnings of Language Mixing Behavior in Bilingual Aphasia

Mathilde Iserentant, UCLouvain

Bilinguals must constantly manage the activation of multiple languages, requiring them to select and maintain the target language of the interaction. It is suggested that this process relies on cognitive control. Because of their impairment, bilinguals with aphasia (BWA) may struggle to sustain the target language, leading to language mixing errors. This study investigates how cognitive control abilities in BWA predict language mixing behavior using a multiple case design. Three components of cognitive control – inhibition, shifting and updating – were assessed using tasks devoid of linguistic material. Participants also completed a picture naming task in each of their languages. Data collection is ongoing in 12 BWA and their individually matched bilingual non-aphasic controls. Analyses will examine the relationship between cognitive control components and language mixing errors, to better understand the possible origin(s) of mixing patterns in BWA. Results

will be discussed considering current theories of language control and bilingual word production in aphasia.

Investigating Associative Processes of Task Set Reconfiguration by Relearning Cue-Task Mappings

Stefanie Kellner, Department of Psychology/ ICAN – Institute for Cognitive and Affective Neuroscience, Medical School Hamburg, Hamburg, Germany; Tilo Strobach, Department of Psychology/ ICAN – Institute for Cognitive and Affective Neuroscience, Medical School Hamburg, Hamburg, Germany; Mike Wendt, Department of Psychology/ ICAN – Institute for Cognitive and Affective Neuroscience, Medical School Hamburg, Hamburg, Germany

In task cueing paradigms, tasks are presented in varying sequences, with unambiguous cues indicating the relevant task on each trial. This paradigm allows examining cue-task associations formed through practice, as reflected in performance cost when cue-task assignments are altered after a series of trials. Previous experiments using this paradigm found greater impairments in task switch than in task repetition trials. However, these studies could not disentangle task switch costs from cue switch costs because only one cue was used per task (thus task repetitions featured cue repetitions and task switches featured cue switches). Here, we applied a 4:2 cue-task mapping to assess the effects of relearning cue-task mappings. After an initial practice phase, in a final transfer phase, two cues were reassigned between tasks, resulting in two cue types: reassigned and constant. Performance was impaired in trials with reassigned cues compared to constant cues. Critically, this impairment was not smaller in task repetition trials than in task switch trials. These findings suggest that disrupted associative processes extend beyond task-set reconfiguration, highlighting the need for further investigation of cue-task association dynamics.

Lower Caution, Not Inhibitory Control, Predicts Gambling Severity – A Pre-Registered Cognitive Modelling Study

Michelle Oxtoby, Aston University; Charlotte Pennington, Aston University; Richard Tunney, Aston University; Craig Hedge, Aston University

Empirical studies and theories suggest gambling can be associated with difficulties in inhibitory control, as measured using laboratory tasks. However, studies on individual differences in inhibition often find weak correlations between different inhibition tasks. Thus, this study aimed to assess whether cognitive processes other than inhibitory control predict gambling behaviour. We initially screened 1200 individuals online using the Problem Gambling Severity Index (PGSI), from which we recruited 422 participants from across the gambling severity spectrum. Participants completed the Stroop, Go/No-go, and Stop Signal tasks alongside the PGSI questionnaire. The drift diffusion model was applied to task performance data to derive separate measures of inhibition, processing speed, caution, and non-decision time. Results from regression analyses suggest that lower caution, rather than inhibitory control, is associated with higher gambling severity. Whereas research had previously focused on inhibitory control as a risk factor for gambling behaviours and a target for potential interventions (e.g., training apps), our findings suggest that the strategic processes underlying decision making (i.e. caution) are worthy of consideration.

Individual Sensitivities to Reward and Punishment Outcomes Predict Mid Frontal Theta Activity in Approach Avoidance Conflict

Shubham Pandey, Differential Psychology and Personality Research, Institute of Psychology, University of Osnabruck; Roman Osinsky, Differential Psychology and Personality Research, Institute of Psychology, University of Osnabruck

Approach-avoidance conflict (AAC) is a fundamental aspect of decision-making, especially in situations involving competing appetitive and aversive outcomes. As individuals differ in their reward and punishment sensitivities, the degree of AAC in a given situation is also subject to inter-individual variation. This study examines AAC's neurocognitive mechanisms using EEG, emphasizing individual differences. Participants completed a task with varying reward and punishment probabilities (.25, .50, .75, 1), deciding whether to accept rewards despite potential threats. We did not find an objective condition of maximum or minimum AAC across participants. We defined subjective conflict using a conflict index based on reaction time and reward acceptance rate. Mid-frontal theta (MFT) power from EEG increased in high-conflict trials. Rescorla-

Wagner modelling revealed individual differences in learning rates and reward-punishment weighting. Behavioural Inhibition System scores moderately predicted MFT power increases. These findings suggest that MFT activity reflects AAC-driven cognitive control, shaped by learning strategies and personality traits, underscoring the need for individualized conflict definitions in studying adaptive control.

14:00 – 15:40: Regular Talks

T-11: Learning & Memory II

Following Instructions in a Working Memory Task: Does Instructed Strategy Use Improve Performance?

Amanda Waterman, University of Leeds; Asiyah Alzahrani, University of Leeds; Richard Allen, University of Leeds

The ability to retain and implement instructions is essential for a range of activities in day-to-day life, and relies on working memory processes. Traditionally, strategies have been viewed as beneficial to the encoding and retention of information, and self-reported strategy use is often associated with improved task performance. However, research is less conclusive about benefits associated with instructed strategy use. In a series of six experiments, four on-line (N=141) and two in-person (N=48), we investigated the effect of instructed strategies, compared to a baseline performance of no-instruction, on young adults' ability to complete a working memory task which involved following sequences of action-object pairs (e.g., tap-the-circle, lift-the-square). We also investigated task difficulty (sequence length) and instruction modality (written versus auditory). Across all the experiments we consistently found no benefit of instructed strategy use, with Bayes Factor analyses providing support for the null hypothesis. Instructed strategy use may impair performance by preventing participants from using preferred strategies or from switching between strategies within any given task.

Intention Offloading Across the Adult Lifespan: An Investigation Across Laboratory and Naturalistic Settings

Chiara Scarampi, University of Geneva; Sam J. Gilbert, University College London; Guido H.E. Gendolla, University of Geneva; Matthias Kliegel, University of Geneva

Prospective memory (PM) failures, where individuals forget to perform intended actions at the right time, are a common memory lapse in daily life. Although age-related declines in PM are well-documented, a paradox exists: older adults often perform as well as or better than younger adults in naturalistic settings, despite impairments on laboratory-based tasks. This study investigates whether developmental differences in intention offloading—the use of external strategies like reminders or alarms—could explain this discrepancy. Using a multi-method approach, we measure intention offloading across three age groups (younger adults: 18-30 years old, middle-aged adults: 40-60 years old, and older adults: 65-85 years old) using both laboratory-based tasks and naturalistic assessments, investigating age-related changes in the use and effectiveness of external aids. Further analyses will examine how age differences in the factors that trigger intention offloading may account for variations in reminder use and PM performance, contributing to the explanation of the paradox. Findings will advance understanding of how external strategies support PM in daily life and inform ways to enhance memory functioning across the lifespan.

The Impact of Age and Spontaneous Strategy Use on Real-World Visual Memory Tasks

Gerard Campbell, University of Strathclyde; Rebecca Hart, University of Strathclyde; Richard J. Allen, University of Leeds; Claudia von Bastian, University of Sheffield; Melanie R. Burke, University of Leeds; Mario Parra Rodriguez, University of Strathclyde; Victor Shiramizu, University of Strathclyde; Louise A. Brown Nicholls, University of Strathclyde

The strategies people use during working memory tasks can impact performance and vary with adult ageing. However, more research is needed to understand how individuals spontaneously use different strategies to aid memory, and how this changes with age, particularly using more 'real-world' tasks. In each of these pre-registered studies, 50 young (18-35 yrs) and 50 older (65-85 yrs) adults performed a novel visual binding task in which they briefly viewed everyday objects within realistic, virtual scenes. Participants were asked to recall the object-colour (Study 1) or object-location (Study 2) bindings.

Throughout the task, spontaneous strategy use was reported via free text and Likert-scale responses probing specific task-relevant strategies. Participants subsequently completed a ‘surprise’ long-term memory task testing incidental memory for the stimuli shown in the earlier task. Across both studies, we report participants’ strategies and any effects of age group. We then assess the impact of age group and strategy use on memory performance, as well as the potential interaction between the two. Overall, the study provides new insights into which strategies may support memory performance in young and older age.

Use of Everyday Memory Strategies Predicts Subjective Cognitive Difficulties Across the Adult Lifespan

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The relationship between everyday cognitive strategy use and subjective cognition suggests an active, compensatory process in response to experiencing difficulties. However, the available evidence tends to focus on specific age groups, and on general cognition or memory performance only. This pre-registered study investigated whether adult age moderates the relationship between strategy use and subjective cognitive difficulties across multiple cognitive domains. The sample comprised 606 United Kingdom-based adults aged 18-86 years. Participants completed a survey measuring specific, everyday cognitive difficulties (i.e., attention, language, visual-perceptual ability, and visuo-spatial and verbal memory) and everyday strategy use (generalised and memory-specific). Covariates included gender, depression, anxiety, stress, and the strategy scale not used as the predictor in each model. Moderated regression analyses revealed memory-specific strategy use as the most robust, unique predictor of cognitive difficulties, but no interaction effect was ever observed. The relationship between memory strategies and cognition is therefore pervasive, regardless of stage in the adult lifespan.

Memory Costs Following Cognitive Offloading in Young and Older Adults

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The use of external memory aids by older adults helps to mitigate the effects of age-related memory decline on performance. We examined whether older adults disengage from internally encoding information that they store externally, as seen in young adults. Forty older and 40 young adults studied 4 lists of 20-words across 4 blocks. In block one, participants relied solely on internal memory. In blocks two and three, they wrote down words during study and used the list at test. In block four, they wrote down words during study but were tested without the list. Half of the participants were informed that the list would be inaccessible at test and relied on internal memory, while the other half expected list access. The results showed that young adults outperformed older adults when using internal memory, yet both groups achieved perfect recall with external aids. In both groups, trust in list availability led to disengagement from internal encoding at study and reduced performance compared to participants who relied on internal memory. This study shows that when older adults save information externally, they conserve cognitive resources by refraining from encoding and maintaining the same information internally.

T-12: Attention & Cognitive Control II

Sequential Effects in Visual Search, Task Switching and Action Control: Evidence for Different Episodic-Retrieval Mechanisms

Daniel Toledano, Tel Aviv University; Tamar Alkalai, Tel Aviv University; Dominique Lamy, Tel Aviv University

Three separate lines of research (visual search, task switching and action control) have shown that when some stimulus or task aspect varies randomly, its repetition from one trial to the next strongly influences task performance. Each line has suggested different mechanisms to account for these sequential effects, but how these interact in the same complex task remains largely unknown. In 4 experiments, we examined the influence of task switching on target-location priming (documented in visual search studies) and on location-response binding (documented in action control studies). Participants searched for a target (e.g., a bottle) among distractors, and a 100%-valid precue indicated the target's identity (the task). We found that the target-location repetition benefit from trials n-1 and n-2 was strongly reduced when the task switched and entirely

disappeared when participants were highly incentivized to prepare for a task switch. These findings indicate that a proactive task-dependent episodic retrieval mechanism accounts for the attentional bias toward the previous target location. By contrast, task switches did not influence location-response binding, indicating that episodic retrieval in action control is task independent.

Evaluating the Reliability of Switch Costs in Two Different Task Switching Paradigms

Irina Monno, University of Freiburg; Jovita Brünig, Otto-von-Guericke-Universität Magdeburg; Andrea Kiesel, University of Freiburg

Task-switching abilities provide key insights into cognitive flexibility, enabling individuals to adapt behavior to internal goals and external demands. Understanding individual differences in multitasking is increasingly relevant. Here we ask whether switch costs—manifested as slower and/or more error-prone responses when switching between tasks, compared to task repetitions—might serve as suitable markers of multitasking ability. Given the limited research on switch costs as a psychometric construct, this study examines their test-retest reliability. Recently (Monno et al., in press), we found unexpectedly high correlations ($r = .81-.94$) in switch costs across conditions within a single session applying the self-organized task-switching paradigm (Mittelstädt et al., 2018). Expanding this perspective, our ongoing study examines the reliability of switch costs assessed in two different task switching paradigms varying in the timing of the repeated task and preview for the respective switch stimulus. We also assess working memory capacity using the number updating task. If switch costs reliably index multitasking ability, we expect high correlations across paradigms and associations with working memory capacity.

Examining Affective Flexibility Using the Voluntary Affective Task-Switching (Vats) Paradigm: Insights Into Self-Initiated Cognitive-Emotional Control

Lihi Cohen, Bar-Ilan University; Rotem Menachem, Bar-Ilan University; Noy Bass, Bar-Ilan University; Aharon Hauser, Bar-Ilan University; Sharon Naparstek, Bar-Ilan University

Affective flexibility, the ability to voluntarily engage with emotionally-relevant information and disengage

from emotionally-irrelevant information, is essential for psychological well-being. Task-switching paradigms traditionally rely on external cues, which may not fully capture how individuals regulate behaviour in response to emotional context. In contrast, voluntary task-switching paradigms allow self-initiated flexibility, enabling to take into account proactive control and strategic task selection. Here, we introduce the Voluntary Affective Task-Switching (VATS) paradigm, where participants freely switch between emotion-relevant and irrelevant tasks, classifying facial stimuli by affect, gender, or age. Results showed: (1) similar switch rates across conditions; (2) participants adapted switching behaviour based on task demands, with switch rate negatively correlated with switch cost and positively with stimulus onset asynchrony; and (3) switch costs were modulated by negative stimuli, supporting the dominance hypothesis. The VATS paradigm provides a novel tool to study cognitive-emotional interactions and distinguish between populations.

Age-Related Inhibitory Deficits in Auditory Attention: Evidence From Task Switching and Negative Priming

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In multi-talker environments, inhibitory control supports selective listening by suppressing irrelevant auditory stimuli. However, cognitive aging may weaken this mechanism, increasing distractor interference and impairing selective listening. This study examines age-related deficits in inhibitory control using a novel selective listening task. Participants categorize spoken words from one of three locations (A, B, or C) while ignoring simultaneous distractors. In each trial, a visual cue guides auditory attention either back to a previously attended location (ABA) or to a new one (CBA). This design allows the measurement of n-2 repetition costs, a well-established marker of inhibition in task-switching studies, now applied to auditory attention. Additionally, we examine spatial negative priming, requiring participants to process a target sound from a previously inhibited location. Preliminary results show that younger adults exhibit n-2 repetition costs

during negative priming trials, reflecting inhibitory control mechanisms in selective listening. In contrast, older adults show no difference between ABA and CBA trials, likely reflecting an age-related deficit in the inhibitory control mechanisms supporting auditory attention.

Switching Between Cognitive Control States? No, Thank You

Merve Ileri-Tayar, Washington University in St. Louis; Julie Bugg, Washington University in St. Louis; Wouter Kool, Washington University in St. Louis

Cognitive control, essential for goal-directed behavior, often incurs costs. We investigated whether internally switching between control states (relaxed vs. focused) while performing a single task without explicit cues to switch is costly and how it interacts with a well-established demand source—interference. We conducted a series of experiments combining the Stroop task with a Demand Selection Task and participants selected between options varying in control demands. Participants consistently avoided options with high internal state-switching (Experiment 1a, $N = 64$; Experiment 1b, $N = 81$) and frequent interference (Experiment 2, $N = 86$). Experiment 3 ($N = 121$) revealed that participants prioritized avoiding switching over interference when both demands were manipulated. To address limitations of Experiment 3, we developed a novel parametric flanker task (Experiment 4, $N = 50$) enabling strong simultaneous manipulation of switching and interference demands in Experiment 5 ($N = 130$). Experiment 5 showed that participants traded off these demands when making decisions to balance competing demands. These findings refine models of control regulation, highlighting that adjusting control—not just exerting it—carries intrinsic costs.

T-13: Attention & Cognitive Control III

Screen or Paper? A Pilot Study on Cognitive Load, Attention and Reading Comprehension Using Eye-Tracking, EEG, and GSR

Amanda Saksida, Educational Research Institute; Laura Blaznik, Educational Research Institute; Igor Žagar, Educational Research Institute

Reading from screens and paper involves distinct (neuro)cognitive processes, with implications for attention, cognitive load, comprehension, and literacy development. Research suggests that reading from screen induces higher cognitive load and greater fatigue, while paper reading may enhance sustained attention and support deeper comprehension. Robust research on these differences in schooling populations is missing. Nonetheless, education and evaluation schemes are experiencing increased pressure towards digitalization. This pilot study examines differences in reading comprehension, attention, and cognitive load across two cohorts of children (9-year-olds, $N = 19$; 14-year-olds, $N = 13$) while reading material from student-assessment programs (PISA, PIRLS) on screen and paper. Measures include EEG, GSR, eye-tracking, and a reading comprehension test. The testing will conclude within weeks. We hypothesize that reading from screen will elicit higher cognitive load and reduced comprehension, particularly in younger children, while paper reading will support more efficient attentional control and semantic integration. Findings will contribute to understanding medium-dependent reading processes and their developmental implications.

From Screens to Creativity: The Impact of Media Multitasking on Attentional Scope and Creative Potential

Eleni Orfanidou, American College of Greece; Ioanna Spentza, American College of Greece; Ioanna Daviri, American College of Greece; Panagiotis Kourtesis, American College of Greece; Chrisanthi Nega, American College of Greece

Previous research suggests that heavy MMs (HMMs) exhibit a broader attentional scope, potentially leading to poorer performance on selective attention tasks (Ophir et al., 2009). However, this proposal has not been empirically tested. Additionally, the positive effect of HMM on creativity through breadth-focused attentional control warrants further exploration, especially considering the negative impact of HMM on depression and anxiety, which may reduce creativity. Lastly, negative moods can narrow attentional scope. Participants complete a media multitasking scale (MMI), the Alternative Uses Test but with the addition of peripheral distractors as an index of irrelevance processing, a surprise memory test of the distractors, the Navon task, and a mood visual analogue scale. We

hypothesize that HMM predicts a wider attentional scope moderated by negative affect and higher creativity than low MM (LMM), potentially mediated by attentional scope differences between HMMs and LMMs. Preliminary results show differences between HMMs and LMMs in creativity, memory for the distractors and performance in the Navon Task. This paper contributes new data on the attentional breadth hypothesis of HMMs and downstream consequences on creativity.

Shifts in Attention During Listening to a Novel – Evidence From Eye-Tracking

Johanna Kaakinen, University of Turku; Diane Mézière, University of Turku; Jarkko Lehtola, University of Turku; Karin Kukkonen, University of Oslo; Jonathan Smallwood, Queen's University; Jaana Simola, University of Helsinki

The present study examined how different types of thought patterns detected during listening of an audiobook (Study 1, N = 63) are reflected in eye movements (Study 2, N = 58). Participants listened to an audio recording of a novel and responded to a 13-item mind-wandering questionnaire (MDES) and a simple memory question 30 times during the listening task. A principal components analysis (PCA) of the MDES responses produced four components in Study 1, and three components in Study 2. The three components that were replicated across the two studies were labeled Immersion, Mind-wandering, and Verbalizing. We then examined how these three thought patterns were reflected in the eye-tracking data in Study 2. The results showed that Immersion was characterized by fewer and less dispersed fixations on the screen, shorter saccades, and longer blinks. Mind-wandering was related to more dispersed fixations. Verbalization resulted in more fixations, higher dispersion across the screen, and more blinks. The results suggest that eye movements reflect shifts in attentional focus during an auditory task that does not require visual processing. The results provide important information about the processes underlying literary experience.

Influence of Curiosity on Cognitive Control

Seema Prasad, Technical University of Dresden; Christian Beste, Technical University of Dresden; Bernhard Hommel, Shandong Normal University

A common assumption in lab-based tasks is that any behaviour not in alignment with the task instructions

indicates a failure of top-down control. But, what if people engage in task-irrelevant behaviour out of curiosity, which is a concurrent motivation in most humans? We examined if curiosity leads to greater processing of irrelevant flankers. On each “experimental” block trial, participants were shown a trivia question and a flanker task with 5 directional arrows. Confidence and curiosity ratings were elicited through a self-report scale. Additionally, in Experiment 1 (n = 40), the flanker task without trivia questions was administered as a control block. In Experiment 2 (n = 40), extremely low curiosity trivia questions were included in the control block for better comparison with the experimental block. In Experiment 3 (n = 40), the same low curiosity question was presented on every control block trial to reduce the uncertainty. The experimental block, which was the same in all experiments, showed greater compatibility effects than the control block in Experiments 1 and 3. We discuss how curiosity affects control policies in the context of metacontrol.

Effects of Interruption Frequency on Performance in a Serial Multistep Task in Younger and Older Adults

Tara Radovic, Martin Luther University Halle-Wittenberg; Torsten Schubert, Martin Luther University Halle-Wittenberg

In this study, we aimed to contrast the hypothesis of general slowing and the hypothesis of specific age-related cognitive decline using a serial multistep task interrupted at low or high frequency. Old adults (72 years) and two young control groups (23 years) performed the primary task and got interrupted either with 24 (low-frequency group) or 72 interruptions (high-frequency group). One control group and the old group completed 10 trials in the interruption task, and another control group matched the interruption length of the old group. After an interruption, resuming the primary task at the correct step was required. We measured response times and sequence errors (deviations from the prescribed order of steps) at the step after interruption (resumption), and in the uninterrupted steps. At resumption especially, old adults were slower and less accurate than the control groups. Also, high (vs. low) frequency led to faster and more accurate resumption, especially in old adults, at the cost of slowing in uninterrupted tasks only in old adults. Thus, we showed specific age-related deficits when resuming the task after an interruption and a

larger benefit of high interruption frequency on the resumption performance in old adults.

T-14: Language & Bilingualism I

Individual Differences in the Tendency to Rely on Multiword Information in Natural and Artificial Languages

Dan Steinhof, Hebrew University of Jerusalem; Noam Siegelman, Hebrew University of Jerusalem; Inbal Arnon, Hebrew University of Jerusalem

Previous studies showed that relying on multiword information (MWI) is beneficial for language learning and processing. However, research has focused on group-level effects, and it is unclear whether individuals differ in their tendency to process and learn language using MWI, and whether this impacts how they learn new languages. Here we tested adults on two tasks across two sessions. The first was a recall task in participants' first language (L1), which assessed both verbal working memory and benefit from recalling frequent multiword units in L1. The second was an artificial language learning task, which assessed participants' tendency to rely on MWI when learning a new language, as reflected in their typing behavior during exposure. Our findings reveal stable individual differences: participants differ in their tendency to rely on MWI on both tasks, showing substantial test-retest reliability. Moreover, participants with lower verbal working memory, and higher sensitivity to MWI in L1, also rely more on MWI for language learning. These findings point to reliance on MWI in language processing and learning as a novel dimension of individual differences, with potential implications for language learning and processing outcomes.

Examining the Relationship of Phonological Neighborhood Density and Off-Line Consolidation Effects on Word Learning

Efthymia Kapnoula, BCBL - Basque Center on Cognition, Brain and Language; Arthur Samuel, BCBL - Basque Center on Cognition, Brain and Language

Novel words that are phonologically similar to many real words (i.e., with high neighborhood density; ND)

are learned better compared to those with low ND. This effect may be due to the novel word (e.g., "leet") triggering the co-activation of similar-sounding words (e.g., "lit", "leap", and "wheat"), thus facilitating the integration of the novel word into the mental lexicon. In this study, we examined the trajectory of the facilitatory ND effect on word learning over two consecutive days (i.e., before and after sleep) in order to explore its relation to offline consolidation. Participants learned 12 novel words; 6 with high and 6 with low ND. Lexical integration of the novel items was indexed by the degree of phonological competition with their familiar-word neighbors, measured as the reaction time increase in a lexical decision task before versus after training. The results showed that the facilitatory effect of ND remained stable across days. There was no main effect of offline consolidation and no interaction with ND. The absence of any consolidation-based increase of competition suggests that the ND and offline consolidation effects on novel word learning are likely driven by a common/similar mechanism.

The Power of Delay: Asynchronous Presentation Benefits Spoken-Written Word Form Acquisition

Johanna Funk, Philipps University of Marburg; Florian Hintz, Philipps University of Marburg

Synchronous activation of written and spoken word forms is crucial for efficient reading. It is therefore plausible that synchronous encoding (simultaneous presentation) benefits word form acquisition more than asynchronous presentation. We tested this hypothesis in three multi-session experiments. Adult participants (Exp1: 36, Exp2: 48, pre-registered Exp3: 142) learned Chinese written (Pinyin) and spoken word forms presented either synchronously or asynchronously (spoken-first, spoken-last). In contrast to our hypothesis, asynchronous yielded better learning outcomes than synchronous presentation across all experiments (spoken-first best). Our results align with prediction-based learning, in that in the asynchronous condition spoken and written word forms function as cues for their corresponding written and spoken forms. (Dis)Confirmed predictions finetune the nature and linking of both mental representations. We also explored verbal and non-verbal predictors of variability in word form acquisition and used pupillometry to assess the processing demands of forms learned in different timing conditions. The study

suggests that methods for novel word form learning should be based on asynchronous rather than synchronous presentation.

Morpheme Knowledge Is Shaped by Information Available Through Orthography

Maria Korochkina, Royal Holloway, University of London; Holly Cooper, Royal Holloway, University of London; Marc Brysbaert, University of Ghent; Kathleen Rastle, Royal Holloway, University of London

A large portion of words in a language are built by combining smaller meaningful units called morphemes (e.g., teach + -er → teacher). Understanding a language's morphology is vital for skilled reading as it enables readers to rapidly compute the meanings of both familiar and unfamiliar words (e.g., tweeter). There is agreement that children rely on reading experience to acquire morphological knowledge in English; however, the nature of this experience has remained unclear. We analysed 1,200 popular children's books and developed the first concrete description of how readers may learn affix morphemes through real-life text input. We tested our theoretical account using the morpheme interference paradigm with 120 adults. Our work demonstrates that affix identification often requires specialised linguistic knowledge and that only easily detectable affixes contribute to learning. We further show that affix knowledge is shaped by the variability in words where affixes can be identified and that affix-like patterns in non-meaningful contexts (e.g., -er in corner) actively hinder learning. Our research highlights the need to understand the real-life linguistic environment to develop psychologically realistic learning theories.

From Letters to Words: How Readers Adapt to Print-Speech Uncertainty

Naama Schwartz, The Hebrew University of Jerusalem; Ram Frost, The Hebrew University of Jerusalem; Noam Siegelman, The Hebrew University of Jerusalem

Efficiently mapping letters to sounds is essential for reading proficiency, yet writing systems vary significantly in the uncertainty of this mapping. This study investigates how the extent of print-speech uncertainty affects reading behavior at both the group and individual level, taking advantage of the unique characteristics of the Hebrew writing system. First, in a corpus analysis, we quantified Hebrew print-speech

regularities using a novel whole-word consistency measure alongside common metrics of letter-to-sound mapping, confirming that Hebrew involves greater letter-to-sound uncertainty than English. Then, in an analysis of a large-scale word recognition dataset (the Hebrew Lexicon Project), we showed that Hebrew readers rely more on whole-word consistency and less on letter-to-sound uncertainty than English readers. Importantly, in a developmental study of 300 primary-school children, we found that better early Hebrew readers are those who rely more on whole-word consistency but less on letter-to-sound mapping. Together, these findings highlight the importance of quantifying language-specific statistical regularities and suggest that reading proficiency depends on adapting to the unique properties of one's writing system.

T-15: Music & Perception

How Perceptual Ability Shapes Memory

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The enhanced processing account posits a link between perception and memory, and is supported by studies on special populations like grapheme-color synesthetes and color experts, whose abilities are associated with neural changes in the ventral visual pathway. Research shows these groups exhibit enhanced memory and perception, particularly when stimuli bias ventral over dorsal processing. Both populations outperform non-synesthetic controls on tasks favoring ventral pathway processing. However, predictions regarding populations with neural changes in the dorsal pathway, linked to spatial processing, remain unexplored. This study examines the enhanced processing account through visual perception, short-term memory, and long-term memory tasks. Participants include individuals with grapheme-color synesthesia, color expertise, sequence-space synesthesia, or spatial expertise, allowing group comparisons. The experiment employs two stimulus types: one favoring ventral processing (color) and one favoring dorsal processing (spatial). This design tests double dissociations in synesthetic experiences, disentangling ventral and dorsal pathway contributions. Preliminary results will be

discussed in relation to models of perception and memory.

Expertise Shapes Low-Level Sensory Working Memory in Artists and Musicians

Damla Çifçi, Berlin School of Mind and Brain, Humboldt Universität zu Berlin; **Joana Pereira Seabra**, Department of Psychology, Humboldt Universität zu Berlin; **Vivien Chopurian**, Department of Psychology, Humboldt Universität zu Berlin; **Thomas B. Christophel**, Department of Psychology, Humboldt Universität zu Berlin

How do daily tasks shape working memory abilities? We investigated this question in visual artists and musicians, for whom precise perception and reproduction of low-level sensory stimuli are essential daily practices. In Experiment 1, participants performed delayed recall tasks with visual grating and auditory pitch stimuli. In Experiment 2, different groups of visual artists and musicians completed delayed and undelayed color recall as well as color naming tasks. Musicians had a substantial benefit in pitch recall, but visual artists did not have an overall benefit for orientation recall. While visual artists showed no benefit in the delayed color recall, they outperformed musicians in the undelayed color recall task, demonstrating a clear effect of visual expertise. Taken together, we find a heterogeneous pattern of recall benefits for the sensory modality that musicians and visual artists specialize in. The benefits are associated with differences in self-reported memorization strategies and stimulus labelling behavior. Investigating how extensive training and daily artistic practice can shape cognitive and neural processes in recall tasks is critical to our understanding of individual differences in working memory.

How Perceived and Felt Emotions Shape the Accuracy of Musical Tempo Memory

Julia Vigl, University of Innsbruck; **Francesca Talamini**, University of Innsbruck; **Marcel Zentner**, University of Innsbruck

The ability to remember and reproduce the tempo of music is known to be highly accurate and stable. While previous research has identified predictors such as reproduction method, musical expertise, and target tempo, the role of emotions remains largely unexplored. In two studies, we address this gap by investigating how perceived emotions (valence and

arousal) and felt emotions (emotional intensity) influence the accuracy of musical tempo memory. In Study 1, 261 participants listened to 12 well-known pop/rock songs that varied in tempo and emotional content (four emotion categories: low/high arousal × low/high valence). Participants rated perceived and felt emotions, completed a distraction task, and reproduced the tempo by (1) tapping and (2) adjusting the speed of audio playback. Results showed that higher perceived arousal and positive valence were associated with greater tempo accuracy. However, stronger felt emotions led to the disappearance of valence effects. Directional analyses revealed slower reproduction for positive valence songs and faster reproduction for high arousal songs. Study 2 (in progress) follows the same design but uses unfamiliar music. Data are forthcoming and results from both studies will be presented.

The Effect of Preferred Background Music on Attentional State and Performance and the Role of Mood and Arousal

Luca Kiss, Goldsmiths University of London; **Karina J Linnell**, Goldsmiths University of London

Although listening to background music is widespread, the literature is inconclusive about its effects. Across three experiments, we explored for the first time the effect of preferred background music on attentional state, vigilance task-performance, and mood and arousal. The experiments varied in their level of distraction and included as the baseline condition complete silence, infrequent distractions, or continuous noise. Participants completed the Psychomotor Vigilance Task both with and without their chosen music. In addition to reaction time, self-reports of mind-wandering, task-focus and external-distraction states were collected throughout the task together with measures of arousal and mood valence. Results showed that regardless of the level of distraction, music decreased mind-wandering and increased task-focus states and led to faster reaction times. Mood and arousal increased with music and were shown to mediate its effects on reaction time and for the first time attentional state, both separately and together. Serial mediation effects were mostly confined to models where mood was entered first and arousal second and were consistent with the mood-arousal account of the impact of background music listening.

Do Musicians Have Better Short-Term Memory Than Nonmusicians? A Multi-Lab Study

Massimo Grassi, *University of Padua*; **Francesca Talamini**, *University of Innsbruck*

The link between music training, brain plasticity, and cognitive benefits remains debated. Expert musicians (>10 years of training) outperform nonmusicians in short-term memory tasks, but prior studies often suffer from small samples, low power, and limited control of mediating factors. To address this, 33 labs collaborated to recruit 600 musicians and 600 nonmusicians for an in person study, enabling detection of small effect sizes (Hedges' $g = 0.3$) with 90% power. Participants completed short-term memory tests for musical, verbal, and visuospatial stimuli, alongside assessments of cognitive, personality, and socioeconomic mediators. Musicians outperformed nonmusicians in all tasks, with effect sizes of Hedges' $g = 1.08$ (large) for musical, 0.16 (very small) for verbal, and 0.28 (small) for visuospatial stimuli. Results suggest that the cognitive advantage of musicianship may be domain-specific. Importantly, our findings demonstrate that prior underpowered studies may have underestimated the nuanced effects of musical training. This study highlights the value of multi-lab collaborations and provides a robust framework for exploring the cognitive impacts of music training. Presented on behalf of the Music Ensemble collaboration.

T-16: Decision Making I

The Robustness of Cognitive Illusions of Truth in Naturalistic Settings

Annika Stump, *University of Freiburg*; **Christoph Klauer**, *University of Freiburg*

In the past, cognitive illusions, such as the negativity bias in judgments of truth, the repetition-induced subjective truth and confidence, were primarily studied in experimental settings that were far removed from real-world conditions. Information channels – particularly in the area of social media – provide competing cues (such as the number of likes; see Luo et al., 2022) that may influence the cognitive illusions described above. In two studies, we investigated the robustness of the negativity bias, the repetition-induced subjective truth and confidence in

naturalistic conditions, under the systematic manipulation of likes. The results indicate a moderating effect of likes on the negativity bias, whereas the repetition-based illusory truth and confidence appear rather robust, even in the context of systematically varying numbers of likes. Theoretical and practical implications of these findings will be discussed.

Let Me Tell You That I Don't Know: A New Perspective on the Continued Influence Effect

Devora Newman, *The Hebrew University of Jerusalem, Israel*; **Ruth Mayo**, *The Hebrew University of Jerusalem, Israel*

Could the pervasiveness of the Continued Influence Effect (CIE)—where individuals rely on misinformation despite knowing it is false—be partially attributed to the way we measure it? In many paradigms, participants are instructed to disregard crucial information (correction conditions) without receiving an alternative, leaving them with no basis for their judgments. Yet, they must report their impression, preventing them from indicating that they disregarded the misinformation. We hypothesized that allowing participants to express their lack of knowledge is a crucial methodological aspect and added an “I don't know” (DK) option to a 7-point scale. In four studies ($N = 1,960$) we found a significant difference in the selection of the DK option between the correction and baseline conditions, suggesting that the DK option is used to express uncertainty. With no DK option, we find a significant increase in the selection of the midpoint, suggesting it is used as a surrogate. Crucially, open-ended responses revealed that participants are aware of their uncertainty whether they could express it or not. These findings underscore the critical role that measurement choices play in shaping our understanding of psychological phenomena.

Biased Misinformation Distorts Beliefs

Juan Vidal-Perez, *UCL*; **Raymond Dolan**, *UCL*; **Rani Moran**, *QMUL*

People often rely on others for information, but biased sources can distort beliefs and decisions. We examined whether individuals can learn to identify biased sources and debias incoming information. Using a reinforcement learning framework,

participants completed a decision-making task with feedback from neutral or biased sources. Early on, they could compare feedback to a ground truth, allowing them to learn each source's bias. Later, they had to rely on this knowledge to interpret feedback and adjust their beliefs accordingly. Computational modeling showed participants successfully differentiated between sources and corrected biased feedback, but these corrections were incomplete, leaving residual biases that influenced subsequent decisions. Perceptions of source bias were also skewed: neutral sources were often misclassified, appearing unfavorable next to favorable ones and vice versa. Strikingly, participants prioritized learning about source biases over direct value learning, leading to inefficient belief updating and reduced performance. Our findings highlight cognitive challenges in biased environments, revealing how systematic distortions emerge and persist, with implications for interventions to mitigate misinformation.

Incorporating Response Times Into Multinomial Processing Tree Models of the Illusory Truth Effect: A Comparison of RT-MPT Models

Raphael Hartmann, University of Freiburg; Lars Kulbe, University of Amsterdam; Constantin Meyer-Grant, University of Freiburg; Semih Aktepe, University of Marburg; Daniel Heck, University of Marburg

The illusory truth effect (ITE) describes the tendency to judge repeated statements as "true" more often than novel ones, even when false. Fazio et al. (2015) examined this using multinomial processing tree (MPT) models and concluded that knowledge does not protect against the ITE. Their results favored a model where familiarity overrides knowledge in truth judgments. In this study, we further investigate the cognitive mechanisms behind the ITE by incorporating response times into MPT models (RT-MPT), providing insights into the timing of latent processes. We also expand the design with three knowledge conditions (widely known, moderately known, and widely unknown) and two types of false statements (plausible and implausible). Additionally, we compare a broader set of (RT-)MPT models using multiple information criteria (LOOIC, WAIC, and DIC) to identify the best-fitting model. Our goals are to (1) assess whether Fazio et al.'s findings replicate, (2) explore alternative explanations, and (3) gain deeper insights into the cognitive processes driving the ITE.

The Role of Intuition and Reflection in Realistic Moral Judgment and Decision-Making

Simon Jauffreau, CLLE Laboratory at Jean Jaurès University; Rui Manuel Da SilvaNeves, CLLE Laboratory at Jean Jaurès University; Julie Lemarié, CLLE Laboratory at Jean Jaurès University

Moral judgment and decision-making rely on two types of thought processes: intuitive (Type 1) and reflective (Type 2). Depending on the model, those two types are hypothesized to either produce distinct moral judgments and decisions — like in Greene's Dual Process Model — or take intuitive processes as a way of reaching the same conclusions as reflective processes, with lower time and cognitive costs but with a lower performance in edge cases — like in the Fuzzy Trace Theory. However, it is still unclear which conception is right, if any. This paper aims to answer this issue. In two studies, we measured the choice, affect felt and moral acceptability of each option in realistic dilemmas. Study 1 manipulated the mode of thought using a time constraints and instructions. Study 2 used cognitive load induction mixed with two levels of situation's complexity. In both studies, we found no difference in judgment, decision, and in affective evaluation between process types. Furthermore, in Study 2, high cognitive load disrupted utility evaluation in complex dilemmas but not in simple ones. Our results corroborate the idea that type 1 processes strive to reach the same conclusion as type 2 processes at lesser cognitive and time costs.

T-17: Numerical & Mathematical Cognition

Semantics at the Wheel, Metaphors in the Backseat: What Drives the Perception of Ordinality in Numerical Cognition?

Ann Mary John, CY Cergy Paris Université; Mônica Macedo-Rouet, CY Cergy Paris Université; Hippolyte Gros, Aix-Marseille University

The role of language in shaping cognition is the focal point of the debate on linguistic relativism. This study examines whether language-specific metaphors for time influence how individuals represent durations and solve arithmetic word problems. Prior research suggests that semantic content (e.g., mention of weights vs. durations in the problem statement)

determines whether problems are perceived in terms of cardinality or ordinality, shaping solving strategies (Gros et al., 2021). Other studies propose that speakers of languages involving different metaphors for time (e.g., distance vs. amount metaphors to talk about durations) encode durations differently (Casasanto et al., 2007). To test these claims, we conducted a preregistered, cross-linguistic experiment with 1200 participants across four languages. Using arithmetic word problems admitting two distinct strategies, we investigated the determinants of strategy use. Results showed that semantic content, not language-specific metaphors, drove strategy choices: problems involving durations consistently elicited ordinal representations across languages. These findings challenge strong forms of linguistic relativism and emphasise the primacy of semantics in numerical cognition.

Testing the Role of Perceptual Length in the Comparison of Multi-Digit Numbers With Different Length

Ismael Gutiérrez-Cordero, University of Málaga; Ana Calviño, University of Málaga; Javier García-Orza, University of Málaga

In comparing numbers such as 342 and 1785, using "length" is the correct strategy. However, the extent to which this process is automatic, and the precise information used (whether people compute the exact quantity of digits or rely on perceptual length, i.e., the space occupied by the digits) remains unclear. To investigate this, we conducted two studies using a leftmost-digit comparison task ("Which number starts with the larger digit?") with length-digit congruent (4531 vs 398) and incongruent pairs (2531 vs 398). Here, better performance with congruent pairs indicates automatic processing of length. In Study 1 ($N = 33$), we added a condition where perceptual size was obscured by adding a symbol to the shorter number (2531 vs 398 Ψ). The results showed a smaller but significant congruity effect in the symbol condition compared to the no-symbol condition. These indicate roles for both perceptual and exact quantity in automatic length estimation. In Study 2 ($N = 33$), we replicated the study but replaced non-alphanumeric symbols with letters (398M). The congruity effect disappeared in the letter condition, suggesting that the larger similarity between numbers and letters avoids using both the counting and the perceptual strategies.

Does Format Matter? Investigating the Development of Arithmetic Fluency in Standard and Nonstandard Formats Over Two Years of Primary School

Lisa Jane Rodgers, Queen's University Belfast; Sabrina Di Lonardo Burr, The University of Sheffield; Judith Wylie, Queen's University Belfast; Chang Xu, Queen's University Belfast

Understanding that the equal sign is a relational symbol rather than an operational prompt is key to equivalence understanding. Previous studies have focused on addition and subtraction, but little is known about the co-development of additive and multiplicative equivalence fluency (e.g., $19 + \_\_ = 20 - 1$; $40 \div \_\_ = 4 \times 2$). In this study Northern Irish students ($N = 381$; 10 - 11 years) completed additive and multiplicative arithmetic fluency and additive equivalence fluency in Primary 6 (P6). In Primary 7 (P7) they also completed multiplicative equivalence fluency. Cross-lagged analyses, controlling for nonverbal reasoning, showed that: i) in P7 additive arithmetic fluency growth was predicted by multiplicative fluency in P6, and vice versa; ii) additive equivalence growth was predicted by both additive and multiplicative arithmetic fluency in P6; iii) multiplicative equivalence in P7 was predicted by multiplicative arithmetic and additive equivalence fluency in P6. Qualitatively there was substantial variability in strategy, highlighting the challenges students face with equivalence. We conclude that strong arithmetic skills support equivalence, but rigid operational views may lead to errors for otherwise simple arithmetic equations.

Exploring the Mechanisms Underlying a Momentum Effect in the Time Domain

Marie Jacquél, LaPsyDE - Université Paris Cité, CNRS; Arnaud Viarouge, LaPsyDE - Université Paris Cité, CNRS; André Knops, LaPsyDE - Université Paris Cité, CNRS

The Temporal Momentum Effect (TME) describes the overestimation of the result when adding two temporal intervals and underestimation when subtracting them. Initially identified by Bonato et al. (2021), it has been attributed to a spatial component in the representation of time. Bonato and colleagues used filled intervals where duration is perfectly confounded with sensory energy. In Experiment 1, we separated sensory energy from temporal duration by using empty intervals. We replicated the TME in both

conditions which underlines the idea that the TME represents a temporal bias. Using an adaptive procedure in Experiment 2, we explored the functional locus of the TME by replacing the motor reproduction with a perceptual comparison task, hence isolating cognitive and perceptual components. We observed a reverse TME: subtraction outcomes were overestimated, while addition outcomes were underestimated compared to baseline. Experiment 3 tested whether the inverse TME was due to an anchoring effect. Results confirmed the underestimation for addition but revealed no significant effect of operand order. These results imply the contribution of motor reproduction to the emergence of the TME.

Daily Living Computational Skills: The Exact Answer Is Not Always the Right One

Sara Zonca, Università di Pavia; Marzia Bizzaro, Università di Milano-Bicocca; Tomaso Vecchi, Università di Pavia; Giulio Costantini, Università di Milano-Bicocca; Luisa Girelli, Università di Milano-Bicocca

Exact computation is the most popular and latest acquired calculation skill, while approximation (e.g., $28+17 < \text{or} > 50?$) and magnitude estimation (e.g., How long is a high-speed train?) are based on early developed mechanisms. Yet, despite their ecological relevance, these skills remain overlooked in the education and clinical contexts. Here, we explored individual differences in exact (e.g., $34+8?$) and approximate (e.g., $250+531 \approx 760$ or 870) computation, ecological estimation (e.g., 'How much does a bicycle weigh?'), and non-symbolic comparison. Specific Learning Disabilities (SLD, e.g., Dyscalculia) and educational background (STEM, Humanities, etc.) were also considered as sources of variability. Results show high internal variability, with estimation being challenging. STEM and SLD participants exhibit extreme and opposite performances. Exact and non-exact tasks correlate, suggesting that although estimation and approximation are not formally acquired, they are grounded on formal calculation. The latter is a long-term trained ability across schooling. Still, everyday life requires much more: shifting the attention to everyday life computation is critical to redefine the focus of attention in a clinical setting.

T-18: Emotion

Prosody Meets Semantics: Insights From 15 Years of Exploring Emotional Speech Processing Across Human Populations... and AI Models!

Boaz Ben-David, Reichman University

The Test for Rating Emotions in Speech (T-RES) assesses the interplay between prosody (tone) and semantics (content) in emotional speech processing. Listeners rate predefined emotions (anger, happiness, sadness) in sentences varying in prosody and semantics. Versions exist in English, German, and Hebrew. In the past 15 years, the T-RES has been tested in individuals with tinnitus, cochlear implants, schizophrenia, autism, intellectual disabilities, early and late blindness, and deafness, as well as in older adults, children, and AI models. Findings indicate: (1) Prosody and semantics are separate but not separable dimensions. (2) Young, typically developed adults exhibit prosodic dominance, relying more on tone than content for emotional speech processing. Trends are similar across languages. (3) Some groups show reduced prosodic dominance, potentially compensating for auditory and/or cognitive deficits. (4) Early exposure to spoken language (visual/auditory) is crucial for emotional speech processing. (5) AI models struggle with prosodic emotions, though prosody still influences processing.

The Role of Empathy in Children's Processing and Comprehension of Written Irony

Henri Olkonemi, University of Oulu; Tuomo Häikiö, University of Turku; Matti Laine, Åbo Akademi University; Penny Pexman, Western University

Comprehending verbal irony requires understanding the speaker's intention, which is different from and sometimes even opposite to the literal meaning of a phrase. This is challenging for children, as the underlying skills needed to detect irony may not be fully developed. One of the skills that is proposed to be important for irony detection is the ability to understand other people's feelings. We investigated how 10-year-old children's empathy skills are related to their processing and comprehension of written irony. We analysed data from two of our previous eye-tracking experiments, in which children ($n = 97$, 46 girls) read both ironic and literal sentences embedded in story contexts, and answered text memory and comprehension questions. In addition, children's reading and

empathy skills were assessed. The results showed that children with stronger empathy skills showed better irony comprehension, and were less likely to reread ironic sentences. These findings have implications for current theories of figurative language comprehension and its development.

Learning to Suppress That What I Fear

Jan Theeuwes, Vrije Universiteit Amsterdam

Objects that typically evoke fear tend to capture attention automatically and involuntarily, particularly in individuals who are fearful of these objects. Here we investigated whether statistical learning can mitigate such fear-induced attentional capture. One experiment focused on individuals with a high fear of spiders, revealing that they exhibited greater attentional capture by spider-related stimuli compared to neutral distractors, unlike a control group. In another experiment, we employed shock conditioning, demonstrating that objects associated with receiving electric shocks elicited stronger attentional capture. Despite the robust fear-induced attentional capture observed in both studies, our findings indicate that statistical learning enables individuals to learn to suppress these stimuli. These results challenge dominant theories suggesting that attentional capture by fearful stimuli is inflexible and primarily governed by innate, bottom-up processes. Furthermore, the finding that fearful stimuli can be suppressed opens up potential avenues for developing behavior modification techniques aimed at counteracting attentional biases toward fearful stimuli.

Insights Into the Influence of Emotional and Semantic Value of Unexpected Visual Information on Inattentional Blindness

Katarina Pavic, LAPSCO (Université Clermont-Auvergne & CNRS); Ludovic Ferrand, LAPSCO (Université Clermont-Auvergne & CNRS); Marie Izaute, LAPSCO (Université Clermont-Auvergne & CNRS); Laetitia Silvert, LAPSCO (Université Clermont-Auvergne & CNRS)

Inattentional blindness (IB) refers to the failure to consciously perceive visible stimuli that unexpectedly appears while performing a task. Previous studies have shown reduced IB when the unexpected stimulus carries meaning for the observers. However, studies have diverged in how they operationalize the concept of "meaning". Some studies have focused on

stimuli with high semantic value, while others used stimuli with high emotional value. This presentation will discuss three studies aimed at 1) disentangling the respective influences of semantic and emotional value of unexpected stimuli on IB and 2) characterizing the circumstances that optimize the conscious perception of unexpected stimuli. In all studies, the same unexpected stimuli were displayed to participants completing a line-length judgment task. The semantic and emotional value of the stimuli, their relevance to the task, and the cognitive load of the task were systematically manipulated. Our findings provide valuable insights into the factors influencing attentional capture and offer practical recommendations for mitigating the consequences of IB in driving contexts, particularly concerning the effectiveness of warning signals.

Reducing Attentional Bias to Threat Through Reward Learning

Manon Mulckhuyse, Leiden University; Mario Severo, Leiden University

Emotionally negative stimuli, such as angry and fearful faces tend to capture attention involuntarily, particularly in high anxious individuals. This study examined whether reward learning can modulate the saliency of emotional expressions. Across two experiments, participants learned to associate happy (Experiment 1) or neutral (Experiment 2) expressions with high reward, while fearful expressions were associated with low reward. Before and after the training phase, participants performed a reward-free visual search task where an emotional or neutral face was presented as a distractor. Results showed that prior to training, fearful faces captured attention, but this effect was significantly reduced post training compared to happy and neutral faces, even in highly anxious individuals (Experiment 2). These findings suggest that reward learning can alter the emotional saliency of negative expressions and effectively modify attentional biases towards threat, highlighting its potential for Attentional Bias Modification (ABM) interventions.

T-19: Social Cognition & Consciousness

Moral Cognition: Normal Functioning and Disturbances After Traumatic Brain Injury

Caroline Bourdon, *Unité de Recherche Etudes des Mécanismes Cognitifs, Université Lyon2*; **Hakim Djeriouat**, *Unité de Recherche Etudes des Mécanismes Cognitifs, Université Lyon2*; **George Michael**, *Unité de Recherche Etudes des Mécanismes Cognitifs, Université Lyon2*

Introduction: Moral cognition is crucial for decision-making and social interactions but remains understudied in neuropsychology. This review explores the link between moral emotion processing and immoral or socially unacceptable behaviors in neurotypical individuals and traumatic brain injury (TBI) victims. **Method:** A selective review of theoretical frameworks on moral cognition was conducted to identify the triggers of moral emotions, the cognitive mechanisms involved in moral transgressions, and the impact of TBI. **Results:** Various models address moral cognition. While negative moral emotions are well studied, positive ones remain underexplored. This review highlights the complementarity of models explaining moral competencies and post-traumatic deficits. Impairments in inhibitory control, emotional regulation, and moral emotion appraisal appear to affect moral judgment. **Discussion:** Implicit and explicit responses, along with problematic behaviors, provide a comprehensive view of moral emotion processing. After a TBI, these deficits may foster negative attribution biases and moral disengagement, contributing to transgressive behaviors. Research on moral cognition could clarify post-traumatic reintegration challenges.

The Development of the Awareness Attribution Scale

Marina Sarda Gou, *The University of Sheffield*; **Kinga Ciupinska**, *Instituto Italiano di Tecnologia*; **Agnieszka Wykowska**, *Instituto Italiano di Tecnologia*; **Tony Prescott**, *The University of Sheffield*

This research introduces the Awareness Attribution Scale (AAS), which has 14 items to evaluate awareness attribution for different entities like social robots. Based on philosophical theory, fourteen constructs that constitute awareness were identified as its foundational basis. Three studies supported its development and validation: Study 1 determined the most comprehensible item for every construct while Study 2 verified the scale's internal consistency. Study 3 tested the AAS's performance across four entities selected to represent a spectrum of perceived awareness: participants evaluated four entities representing diverse awareness levels: a rock

together with a dog, a humanoid robot and a human. The AAS demonstrated its effectiveness when participants rated each entity as it consistently identified different levels of attributed awareness between biological and artificial agents. Research confirms the AAS as a structured measurement tool that validates awareness attribution studies within Human-Robot Interaction research as well as cognitive science and AI ethics.

Beyond the Ear: How Self-Perceptions and Stereotypes Shape Auditory Performance

Vered Shakuf, *Achva Academic College*; **Ornella Dakwar Kavar**, *Achva Academic College*

Auditory performance, especially in challenging listening conditions, is typically linked to physiological and cognitive factors. However, psychosocial factors, such as self-perceptions and internalized stereotypes, may also significantly affect auditory outcomes. This talk integrates findings from experiments utilizing diverse methodologies, including manipulations of feedback and stereotype threat, alongside behavioral speech-in-noise tasks, discrimination tests, self-reported hearing assessments, and neurophysiological evaluations. Manipulations of feedback and stereotype threat consistently impaired speech perception across age groups. Moreover, older adults' self-perceptions correlated with behavioral auditory outcomes but not objective physiological measures. These findings highlight the influential role of psychosocial factors in auditory performance, opening promising avenues for psychosocial interventions aimed at improving auditory experiences, communication effectiveness, and contributing valuable theoretical insights into the interplay between cognition, perception, and social psychology.

T-20: Learning & Memory III

Eye Tracking for Autobiographical Memory Detection

Andrea Zangrossi, *Department of General Psychology, University of Padova*; **Liisa Camilla Gatto**, *Department of General Psychology, University of Padova*; **Margherita Pucci**, *Department of General Psychology, University of Padova*; **Miriam Celli**, *Department of Neuroscience, University of Padova*; **Virginia Lanfranchi**, *Department of General Psychology, University of Padova*; **Giuseppe**

Sartori, Department of General Psychology, University of Padova

Autobiographical memory—the ability to recall personally experienced events—plays a crucial role in criminal trials, where detecting such memories is essential. Eye movement monitoring has emerged as a powerful tool for uncovering autobiographical memories, particularly in recognizing past events, scenes, or faces. Research shows that eye-tracking outperforms traditional memory detection methods, such as the Autobiographical Implicit Association Test and the Concealed Information Test. This advantage remains even when individuals attempt to conceal their memories, for instance, by learning an alibi in a mock crime experiment. Moreover, when combined with standard tests, eye-tracking offers a promising covert approach to memory detection. A key advantage of eye-tracking is its effectiveness in less structured tasks, such as free-viewing. Unlike standard behavioral tests, it does not rely on strict task adherence, making it more versatile and reducing the need for participant compliance. Findings from three experiments will be discussed, exploring how eye movements can reveal recognition of autobiographical memories, using both verbal and visual stimuli.

Typicality, Encoding, and Neurodivergence in Recognition Memory: Cognitive Strategies in Autism vs. Neurotypical Adults

Ann-Kathrin Beck, University of Kaiserslautern-Landau (RPTU); Cristiane Souza, Iscte - Instituto Universitário de Lisboa; Margarida V. Garrido, Iscte - Instituto Universitário de Lisboa; J. Bernardo Barahona-Correa, CADIn – Neurodesenvolvimento e Inclusão; Joana C. Carmo, Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs; Daniela Czernochowski, University of Kaiserslautern-Landau (RPTU); Thomas Lachmann, University of Kaiserslautern-Landau (RPTU)

This study examined the effects of item typicality (typical vs. atypical), encoding type (categorical vs. perceptual), and neurodivergence (autistic vs. neurotypical male adults) on memory discrimination and associated neuronal patterns. Despite similar overall memory performance between groups, analyses of event-related potentials (ERPs) revealed distinct temporal dynamics. Neurotypical participants exhibited an early ERP effect, suggesting reliance on rapid, familiarity-driven processes. In contrast, autistic participants demonstrated a later

ERP modulation, suggesting reliance on effortful, recollection-based processes. Notably, only neurotypical adults showed activation in the post-old/new-response period that appeared to reinstate item details for subsequent Remember-Know-Guess judgments. These findings suggest that autistic adults may recruit alternative neurocognitive strategies to achieve comparable recognition performance. Overall, this study highlights the importance of investigating how semantic processes contribute to episodic memory retrieval and provides novel insights into the mechanisms of memory in neurodiverse populations.

The Contributions of Online and Offline Processes to Memory Integration in Children Versus Adults

Emma James, University of York; Layla Unger, University of York

Learning about the world involves both encoding new information and integrating it with related experiences. Single-session experiments suggest that while adults can integrate related information “online” during encoding, children only integrate when prompted (Schlichting et al., 2022; Shing et al., 2019). In this study, we examined memory integration one week after learning to test the hypothesis that children instead rely on “offline” consolidation processes to integrate information in memory. Children aged 8-10 years ($n = 137$) and adults ($n = 204$) encoded overlapping (AB-AC) and non-overlapping (DE) pairs of creatures, objects, and scenes. A speeded 2-AFC test assessed memory for encoded pairs and integration for non-encoded pairs (BC). Both groups showed similar memory accuracy for encoded pairs, but children were poorer at integration trials. Group differences and differences between pair types were largest immediately and decreased over the week. However, age-related differences in integration did not change over the week. These findings suggest that while children do benefit more from offline consolidation, this does not necessarily compensate for weaker online integration.

Are Social Robots as Capable of Teaching as Humans? A Meta-Analysis

Juan C. Castro-Alonso, University of Birmingham; Rachel M. Wong, University of Tennessee; Hongyan Yang, University of Tennessee; Shelby Palmer, University of Tennessee; Ouhaio Chen, University of Leeds

Social robots are physical agents that exhibit social behavior, so they could replace humans in some duties. Most of this research is in health and care, so we aimed to investigate it in classrooms. We conducted a PRISMA meta-analysis to compare the teaching effectiveness of social robots vs. humans in education settings. The selection criteria included: (a) experimental (or quasi-experimental) designs; (b) measurable outcomes of cognitive, instructional, or affective variables (e.g., learning, self-efficacy, enjoyment). The selected databases were Scopus, Web of Science, APA PsycINFO & PsycARTICLES, ProQuest ERIC & Dissertations & Theses. The search produced a total of 6,456 articles, which we are currently reviewing. We will also consider moderating variables (e.g., warmth, competence, appearance, facial expression, gesturing). The analysis is ongoing, but the preliminary results suggest that robots may cause lower levels of instructional outcomes (e.g., learning) and higher levels of affective outcomes (e.g., happiness, enjoyment). We will discuss the completed results during the conference, but they seem to suggest that robots are not sufficiently advanced yet to replace all the social functions of a capable human teacher.

Spatial Abilities and Attitudes Toward Stem- Any Connection? Cross-Cultural Study

Marija Živković, TU Dublin; Gavin Duffy, TU Dublin; Antonija Vrdoljak, University of Zagreb; Luka Juras, University of Zagreb; Ena Kantor, University of Osijek; Helena Tomšek, secondary school Ruđer Bošković; Dóra Hegyesi, Eötvös Loránd University

Gender differences in both STEM performance and spatial abilities have been a key focus of previous research, and various studies have observed the positive relationship between spatial abilities and educational performance in STEM. Our study investigates the relationship between spatial abilities and attitudes toward STEM in Ireland, Croatia, and Hungary. We aim to assess gender differences in spatial abilities and examine whether these differences are consistent across three countries, as well as to determine whether more positive attitudes toward STEM subjects are associated with higher levels of spatial abilities. The study includes students aged 10 to 16, who completed online measures of spatial abilities (Paper Folding Test (PFT), Primary Mental Abilities Test (PMA), visuo-spatial working memory (VSWM)) and a measure of attitudes towards

STEM. Preliminary data analysis suggested no gender differences in spatial abilities and attitudes towards STEM. Significant and positive correlations were found between VSWM and attitudes towards maths and science; between PFT and attitudes towards engineering and technology, and between PMA and attitudes towards maths and science. Data collection will be completed in May 2025.

16:10 – 17:50: Symposia

PS-SYM: We Speak Many Languages! Bridging Barriers to Bring the Diversity of Language Experience Into Cognitive Psychology

Chair(s): Megan Zirnstein, Pomona College; Ingrid Finger, Universidade Federal do Rio Grande do Sul; Judith Kroll, University of California, Irvine; Janaina Weissheimer, Universidade Federal do Rio Grande do Norte

Symposium Abstract

Language is with us everywhere and in everything we do. But as most of the world is multilingual, our lives involve many day-to-day cross-language interactions that implicitly and explicitly draw upon our cognitive resources. It is only in the last 30 years that mainstream cognitive science has come to embrace the variation of language science and the power of the lens it provides for illuminating cognitive mechanisms. The goal of this symposium is to bridge language, methodological, and paradigmatic barriers in the science of bilingualism to further our understanding of the relationship between multilingual language use and cognition. Talks in this symposium will highlight researchers from a diverse set of disciplinary, methodological, and international backgrounds who are currently exploring the cognitive and neurological processes underlying second language learning and bilingual language use.

The Bilingual Experience Through the Lens of Graph Analysis

Janaina Weissheimer, Universidade Federal do Rio Grande do Norte; Ingrid Finger, Universidade Federal do Rio Grande do Sul

In this talk, we depart from interdisciplinary work in the field of bilingualism research, which has shaped

our understanding of bilingual language processing, the language and cognition interaction, and the social and cultural implications of bilingualism, and offer a new and promising approach to look at the bilingual experience through the lens of graph analyses. We highlight how studies applying computational tools and network science may add to the current debate regarding dual-language processing and education. Our ultimate aim is to contribute to bridge areas and people who are remotely located and only engaged in parallel play.

Within-Participant Variability in Multilingual Language Processing

Tamar Degani, University of Haifa

Differences across multilingual individuals and populations reveal systematic modulations of multilingual behavior. Here, I take a complementary approach, focusing on systematic sources of within-individual variability in multilingual speakers. While some of these sources are well-known modulators within psycholinguistic literature (e.g., stimulus composition), others become central in multilingual processing. I will first show how stimulus-overlap with multilinguals' prior languages affect L3 learning and processing. Next, across different multilingual groups (including Hebrew-English; Arabic-Hebrew; and Russian-Hebrew bilinguals) I will show how brief exposure to one language affects processing of another language, demonstrating how the preceding language context dynamically changes multilingual performance. Finally, I will show how the acoustic environment differentially affects performance and exertion of cognitive resources in the three languages of Arabic-Hebrew-English trilinguals. This set of results underscores the importance of identifying the range within which a given multilingual's performance varies, and calls for dynamic and longitudinal designs in studying multilingual populations.

Factors Influencing Success in Foreign Language Learning: Insights From Genetic and Behavioral Evidence in Third Language Learners in Hong Kong

Xin Kang, Chongqing University; Patrick C.M. Wong, The Chinese University of Hong Kong

Individual variability in foreign language learning success is a topic that has resulted in decades of research. We report a series of studies investigating

the genetic and behavioral factors influencing this variability (N=940). Participants, who are native Cantonese speakers of Han Chinese descent, learned English as their second language (L2) and French, German or Spanish as a third language (L3). We analyzed comprehensive data, including demographics, socioeconomic status, musical background, and multiple measures of language proficiency, to test two hypotheses. The first hypothesis suggests a universal core language function, independent of the timing and conditions of learning. The second posits that different languages, learned at various stages and under diverse conditions, involve distinct genetic and behavioral factors. Employing a candidate genes approach, our findings support the second hypothesis: additional language learning relies on shared conditions from prior experiences, with genetic influences diminishing progressively from L1 to L3.

Bilingualism Is a Dynamic Multifaceted Experience That Shapes Cognition and the Brain

Christos Piatsikas, University of Reading

Bilingualism has a significant influence on cognition, brain structure, and function. This is expressed as effects in behavioural tasks tapping attention and executive control, as well as adaptations to structure, function and connectivity of brain regions involved in the same processes. Importantly, these effects appear to be determined by the contexts bilinguals find themselves in, and the opportunities they have to use, and control between, their languages. These observations have shifted the field towards abandoning categorical definitions of bilingualism and treating bilingualism as a continuous, cognitively challenging experience. This means that any effects of bilingualism on cognition and the brain should relate to the quantity and quality of this experience, and may not be comparable for bilingual groups with varied experiences. In this talk, recent findings will be presented that support this view, followed by theoretical and practical implications for the field.

What Variation in Language Experience Tells Us About Cognition and the Brain

Judith Kroll, University of California, Irvine; Megan Zirnstein, Pomona College

Humans come into the world ready to learn and use multiple languages. That readiness for language has been widely documented but the variation in language experience that results as a function of context and culture has been largely ignored in mainstream studies of language and cognition and their neural underpinnings. In this talk, we present evidence to argue that language variation among bilingual speakers illuminates foundational language processes, the cognitive resources that enable them, and the complex consequences that result. Bilingual speakers come to regulate the use each of their languages to manage their joint activation. The principles of variation that underlie language outcomes are shared with cognition more generally. Rather than treating them as a nuisance or grouping them as a singular phenomenon, we can seek to identify the regularities that emerge. From this perspective, those who might have historically been excluded from cognitive studies, become the primary informants.

SYM-21: Learning in the Lab: Insights on Oral and Written Language From Artificial Orthographies Experiments

Chair(s): Irene Altarelli, University of Rome Tor Vergata, and Université Paris Cité

Symposium Abstract

Reading acquisition is an effortful process, with some children experiencing long-lasting difficulties with print. To shed light on the cognitive and neural mechanisms underlying the initial steps of learning to read, studies using artificial orthographies are key. In such experiments, participants have to learn novel associations between sounds and symbols, while their performance and/or neural activity are monitored. Here, many facets of the link between associative learning and written language will be explored. First of all, the question of whether audio-visual associative learning tasks may be useful in the early prediction of reading difficulties will be addressed, by modelling trajectories of learning as they unfold. Secondly, the brain correlates of associative learning in children with varying degrees of reading proficiency will be examined. Thirdly, the role of phonological skills will be analyzed, by investigating performance in a non-linguistic associative learning task among children with developmental dyslexia and controls. Finally, the inter-relations between spoken

and written language will be considered, digging into the influence of audio-visual learning on the perception and production of speech sounds.

Symbol-Sound Association Learning, a Relevant Predictor of Individual Differences in Reading?

Milene Bonte, Maastricht University; Fiona Borska, Maastricht University; Chiara Turri, Maastricht University; Leandra Zinke, Maastricht University; Jurgen Tijms, University of Amsterdam; Marjolein Tool, Maastricht University; Nienke van Atteveldt, Vrije Universiteit Amsterdam; Rogier Kievit, Radboud University

Children's reading development shows large variability. Reading problems (dyslexia) are currently diagnosed and treated after a child has failed to respond adequately to reading instruction, i.e., around 8-9 years. This is problematic because early intervention is crucial for optimal (reading) development and social opportunities. In this talk we will explore whether symbol-sound association learning tasks can be employed to improve early prediction of reading problems. While we have a fairly good understanding of how children process already learnt letter-sound associations and how this may differ in individuals with dyslexia, we know very little about the actual behavioral and brain changes that occur during the learning process itself. Using behavioral, EEG data, and gamification, we characterized individual differences in children's learning trajectories by modelling their performance and brain activity. Together these data provide first evidence for diverging learning trajectories for symbol-sound associations in children with different (pre)reading skills. With this knowledge, we aim to develop a digital learning test that predicts who will learn to read fluently and who will need extra support to prevent reading problems.

The Neural Basis of Learning Letter-Speech Sound Associations: Insights From EEG and fMRI in Children With Typical and Poor Reading Skills

Silvia Brem, University of Zurich; Nada Frei, University of Zurich and ETH Zurich; Tugce Aras, University of Zurich and ETH Zurich; David Willinger, University of Zurich and Karl Landsteiner University of Health Sciences; Christina Lutz, University of Zurich; Sarah Di Pietro, University of Zurich and ETH Zurich; Iliana I. Karipidis, University of Zurich and ETH Zurich

Learning to read involves connecting visual characters with their corresponding speech sounds. To understand the neural mechanisms underlying this process and their impairment in developmental dyslexia, we conducted two complementary studies in children with varying reading skills. Study 1 examined the neural correlates of learning new character-speech-sound (CSS) associations in 93 children (8.8yrs) with EEG. Event-related potentials measured before and after training revealed an increase in the occipito-temporal N1 amplitude to newly learned characters after training. Study 2 investigated the neural changes during learning character-speech sound associations in 80 children (8.9yrs) using fMRI. Children with poor reading skills exhibited altered learning patterns, disrupted connectivity, and impaired striatal modulation of the audiovisual learning network. Together, the studies shed light on the neural mechanisms involved in forming novel letter representations. They suggest that deviant interactions in the brain network responsible for audio-visual learning during the early stages of reading development may hinder the establishment of robust representations, potentially affecting their effective use in reading.

Audio-Visual Associative Learning, Even When Non-Linguistic, Is Impaired in Children With Developmental Dyslexia

Angela Pasqualotto, University of Applied Sciences and Arts of Southern Switzerland; Aaron Cochrane, Brown University; Daphne Bavelier, University of Geneva; Irene Altarelli, University of Rome Tor Vergata, and Université Paris Cité

Audio-visual (AV) associations are central to the initial steps of learning to read and have been explored in individuals with varying literacy skills. Yet, AV associative tasks so far have mostly entailed pairings between linguistic auditory material and visual stimuli, thus confounding AV learning per se with phonological and/or verbal abilities. The present work uses an AV learning paradigm relying on non-linguistic auditory signals and novel visual shapes. We fit trial-by-trial performance and compare the behavior of 52 Italian-speaking children with developmental dyslexia (10-13 years old) with that of age-matched (N=54) and of younger, reading-matched (N=51, 8-10 years old) typically-developing children. While all groups displayed progress in our task, children with developmental dyslexia learned less well than their

typically-developing peers. This was the case for age-matched but also notably for reading-matched typically-developing children. These findings suggest that impaired audio-visual associative learning per se may be associated with developmental dyslexia, even when phonological abilities are not tapped by the associative task at hand, and this despite taking reading proficiency into account.

Production and Perception of Novel Speech Sounds and Words After Artificial Sound-Letter Association Learning

Silvia Yang, Basque center on Cognition, Brain and Language, and University of the Basque Country; Clara Martin, Basque center on Cognition, Brain and Language, and Ikerbasque, Basque Foundation for Science; Rachel Hayes-Harb, University of Utah; Antje Stoehr, Basque center on Cognition, Brain and Language, and Ikerbasque

Learning sound-letter associations in the laboratory offers important insight into the influence of grapheme-to-phoneme correspondences (GPCs) on reading acquisition, but also on speech sound and word perception and production. Here, we tested L1-Spanish speakers in a three-day vowel learning study to explore how the simultaneous exposure to letters influence sound and word production and perception. Participants learned novel speech sounds auditorily-only, or associated to a letter conflicting with the L1 (e.g., /y/ learned auditorily-only, or linked to <u> which is associated to /u/ in Spanish). Participants also learned words containing these conflicting and non-conflicting sounds. On day 3, they were tested on vowel production and perception in isolation and in word context. Preliminary results show that learning a sound with conflicting orthography affects its position in perception and production, suggesting that conflicting GPCs can modulate phonetic aspects of speech processing, in artificial sound-letter association learning. Those results have important implications for models on novel speech sound learning and for novel language teaching strategies.

Symposium Discussion

Irene Altarelli, University of Rome Tor Vergata, and Université Paris Cité
Symposium Discussion

SYM-22: The Next Step in Memory Research: Recent Theoretical Developments and Future Directions

Chair(s): Dominic Guitard, Cardiff University

Symposium Abstract

Over the decades, a multitude of models have emerged to shape our understanding of human memory. These models continue to evolve, refining our insights into the fundamental processes of memory. This symposium brings together five leading experts from around the world, each presenting the latest developments in their influential models and addressing the pressing questions that will drive future research. The speakers include Dr. Nelson Cowan, discussing the Embedded Processes Model; Dr. Jean Saint-Aubin, focusing on the Revised Feature Model; Dr. Randy Jamieson, presenting an exemplar model; Dr. Valerie Camos, exploring the Time-Based Resource Sharing Model (TBRS); and Dr. Klaus Oberauer, offering insights into his dynamic memory framework. Together, they provide a comprehensive overview of the state-of-the-art in memory research and discuss the most critical questions that will inspire the next generation of discoveries in the field.

Embedded Processes in the Mind and Brain

Nelson Cowan, University of Missouri-Columbia

In the embedded-processes conception of human information processing, there is a capacity-limited focus of attention embedded within a temporarily activated portion of long-term storage, itself embedded within the memory system. The concept of embedding can be considered on a systems level that is based on cognitive behavioral research, or it can be considered on a physiological level that is based on brain research. One aim of the embedded processes conception is to be able to integrate evidence from various analytic levels including intracranial, MRI, EEG, behavioral, and subjective-report levels. On the basis of all of these types of evidence, I will try to show why the embedded-processes approach still seems apt and why the specifics of the approach have evolved and changed over the years since the inception of the model in a 1988 Psychological Bulletin article.

Episodic and Semantic Memory: A Tale of Two Solitudes

Randall K. Jamieson, University of Manitoba; J. Nick Reid, University of Northern British Columbia; Dominic Guitard, Cardiff University

Psychology has practiced a divide-and-conquer strategy, with different research communities investigating different phenomena. Although the strategy has been productive, it seems we might have lost track of the initial plan to put it all back together. Of the many divisions we love, the episodic/semantic division is ripe for reconciliation. I will present a model of memory that coordinates episodic and semantic subsystems. To model semantic memory, I use a prototype model that builds semantic representations for words based on language experience. To model episodic memory, I use an exemplar model that borrows, uses, and refers to those semantic representations. Although the model assumes separate episodic and semantic subsystems, it consolidates the two within a single integrated theory. The model predicts performance in recognition, recall, and categorization. The model also predicts memory for the specific words that people remember, misremember, and confuse. In this talk, I will demonstrate the model in relation to data and theory from the study of short-term verbal memory.

The Revised Feature Model: Theory and Applications

Jean Saint-Aubin, Université de Moncton; James Yearsley, Dominic Guitard, Cardiff University; Marie Poirier, University of London

The study of memory benefited from an intense empirical activity for more than a century but has often been criticized for the lack of a unified explanation of those effects and demonstrations. To address this critic, we developed the Revised Feature Model (RFM) by building on the legacy of the Feature Model. Initially developed to account for basic working memory effects in immediate serial recall, the Feature Model has recently been enhanced to broaden its scope. In addition to immediate serial recall, the RFM can account for immediate and delayed free recall, order reconstruction, backward recall, and the pattern of errors. Furthermore, its scope includes verbal and visual-spatial information,

as well as their interactions. The model and some of its main applications will be reviewed. In addition, new critical tests will be presented.

Processing and Maintenance of Information in the Time-Based Resource Sharing Model

Valérie Camos, Université de Fribourg; Maximilien Labaronne, Université de Fribourg; Julie Pougeon, Université de Fribourg, and Université Clermont-Auvergne; Clément Belletier, Université Clermont-Auvergne; Pierre Barrouillet, Université de Genève

In the last version of the Time-Based Resource-Sharing model of working memory (WM, Barrouillet & Camos, 2021), a central system conceived as a self-regulated executive loop is responsible for the construction and maintenance of working memory representations and for goal-directed processing. Along with this central attentional system, an articulatory loop can maintain a small amount of verbal information through articulatory rehearsal. We will present empirical evidence from two newly designed paradigms: the Maxispan Procedure and the Residual Measurement Paradigm. Through the former, we tested the interactions of the two systems of verbal maintenance, which sheds light on the subtle functioning of verbal WM. Through the latter, the measurement of the residuals provided evidence that memory maintenance can only occupy a sub-part of the central attentional system capacity, while processing can exhaust it. It also documented the implication of the episodic long-term memory in WM tasks.

Steps to a Computational Model of Working Memory

Klaus Oberauer, University of Zurich

I will outline a computational model that explains some benchmark findings about working memory (WM). The model builds on the following assumptions. Items of a memory set are encoded sequentially by creating temporary bindings between their elements. Bindings are mediated by a population of neurons. Each item recruits a constant proportion of available binding neurons, which are committed exclusively to that item. This creates a primacy gradient of binding strength. Encoding of each new event releases some committed binding neurons, creating a recency gradient of binding strength. Response selection is

governed by a signal-discrimination process. Together, these assumptions explain serial-position effects and the set-size effect. Free time after encoding an item allows for the gradual release of those committed neurons that contribute the least to encoding the item. This pruning process frees up binding capacity for subsequently encoded items with hardly any cost for preceding items. This assumption explains the beneficial effect of free time, and the cognitive-load effect in complex span tasks.

SYM-23: Moving Beyond Standard Memory and Language: Insights From Evolutionary Psychology (Take 2)

Chair(s): Sara B. Félix, University of Aveiro, and Ispa - Instituto Universitário; Josefa N. S. Pandeirada, University of Aveiro

Symposium Abstract

Cognition is a product of evolution, yet functional explanations for cognitive phenomena are often overlooked. This symposium showcases cutting-edge memory research inspired by an evolutionary perspective and addresses three adaptive mnemonic effects: contamination, survival processing, and animacy. The talk on the contamination effect reveals novel findings highlighting its robustness in free recall when using dynamic and multisensory (Santos et al.). Another study on this effect explores destination memory with disease-cued faces as the contamination cue (Albuquerque et al.). Work on survival processing explores memory for personal descriptive information and the influence of carotenoid skin facial coloration (Freitas et al.). The influence of emotionally-valenced words is also explored with respect to the survival effect (Altarriba & Clark). Finally, new insights on attentional processes on the animacy effect are presented (Pallentin & Kroneisen). Join us to explore why (and how) an evolutionary approach is crucial for understanding memory functioning. Theoretical and applied implications of the presented research will be discussed, inviting the audience to rethink memory through this functional lens!

Exploring the Influence of Dynamic and Multisensory Cues in the Contamination Effect

Sónia M. P. Santos, *University of Aveiro*; **Natália Lisandra Fernandes**, *University of Aveiro*; **Josefa N. S. Pandeirada**, *University of Aveiro*

Pathogens pose a recurring threat to human life, making contamination avoidance a key adaptive function of cognition to support our survival. Recent studies provided empirical evidence of a mnemonic advantage for items associated with contamination vs. non-contamination sources, termed the contamination effect (CE). These studies primarily used static images as (non)contamination cues. Given that real-world experiences are inherently multisensory, this raises the question of how other sensory cues and their coupling impact the CE. Following traditional procedures, we investigated the CE using different stimuli—videos, silent videos, sounds, and images—matched in content (between-subjects manipulation). At encoding, images of objects were paired with these stimuli, which depicted individuals who appeared either sick or healthy (within-subject manipulation), and participants identified who handled the objects (a sick or a healthy person). Memory for the objects was then tested with a surprise free recall task. Results replicated the CE in all sensory modalities, with no interactions between conditions, affirming its reliability. Effect sizes also suggest a greater advantage for dynamic and multisensory cues.

The Impact of Disease Cues on Destination Memory: Effects of Illness-Related Signals on Memory for Information Recipients

Pedro B. Albuquerque, *University of Minho*; **A. Catarina Ribeiro**, *University of Minho*; **Raquel Pinto**, *University of Minho*; **Angela Bartolo**, *University of Lille*

Destination memory refers to the ability to remember the person to whom specific information was communicated, relying on the formation of an association between the information and its recipient. This study explores whether transmitting information to faces displaying signs of potentially contagious diseases affects destination memory. In Exp. 1, participants verbally shared proverbs with images of faces, some showing signs of illness (e.g., cold sores) and others not. Participants then completed 2 memory tasks: an item memory task (recognition of the faces or proverbs) and a destination memory task (recognition if the proverb was shared with that specific face). Results revealed better destination

memory when the proverbs were associated with faces showing signs of illness, with no differences in item memory performance. In Exp. 2, participants were informed that the facial disease signs were makeup effects on actors, and no destination memory performance differences were observed between the conditions. These findings suggest that activating the Behavioral Immune System may enhance memory for individuals associated with potentially contagious signals, offering insights into how disease cues impact social and cognitive processes.

Survival Processing and the Influence of Carotenoid Coloration

Jênnyfer C. A. Freitas, *University of Aveiro*; **Josefa N. S. Pandeirada**, *University of Aveiro*; **Gün Semin**, *Ispa - Instituto Universitário*

From an evolutionary perspective, memory's ultimate function is to enhance survival and reproductive success. Evidence shows improved memory when information is processed in a survival (vs. control) context, an effect consistently replicated. However, the generalizability of the survival processing effect (SPE) to personal information linked to faces, as well as the role fitness-relevant cues might play in the effect, remains largely unexplored. To address this gap, we focused on face carotenoid coloration which is associated with various fitness-relevant indicators (e.g., healthiness). Participants will view faces with high or low carotenoid coloration alongside a personal description (stimuli). Participants will consider each person and their description in either a survival or a moving context, then evaluate the desirability of each within the scenario. A free recall task for the description will follow each stimuli presentation. We predict better memory in the survival (vs. moving) context, particularly for faces with higher fitness-relevant value. This study will deepen our understanding of the SPE and potentially introduce a new research avenue focusing on the role of fitness-relevant indicators in memory functioning.

Remain Positive! Survival Advantages Do Not Accrue for Negatively-Valenced Words

Dailyn Q. Clark, *University at Albany, State University of New York*; **Jeanette Altarriba**, *University at Albany, State University of New York*

Nairne and colleagues (Nairne et al., 2007) reported a mnemonic advantage for words processed in terms of their survival relevance. Participants read a passage asking them to imagine they are in the grasslands of a foreign land and must secure food, water, and protect themselves from predators. Subsequently, a set of words is rated for survival relevance followed by an incidental free recall task. Word recall far exceeds memory for those same words in a number of control conditions (e.g., explicit learning). To date, the nature of the words themselves has yet to be explored. The current work varied the valence of these words (positive, negative, neutral) within a survival condition, as compared to a passage related to moving from one location to another. There was a significant interaction between passage and word type, $F(1,196) = 4.02$, $p = .046$. Interestingly, a survival advantage occurred for positive words (e.g., cheer), $t(1,95) = 2.17$, $p = .033$, but no survival advantage was found for negative words (e.g., anger), $t(1,98) = -.700$, $p = .485$. Negative words processed in terms of their survival value do not show a mnemonic advantage. It may be that negative emotions are not helpful when one is in a survival context.

The Role of Attention and Context: Investigating Underlying Mechanisms of the Animacy Effect

Vanessa Sophie Pallentin, University of Kaiserslautern-Landau (RPTU); Meike Kroneisen, University of Kaiserslautern-Landau (RPTU)

The animacy effect, the effect that animate items are better remembered than inanimate objects, is a robust finding in memory research. However, the underlying mechanisms that drive the effect are not yet fully understood. The richness-of-encoding hypothesis suggests that the animate objects draw more cognitive resources and attention. The aim of this study is to investigate whether this attentional advantage is context-dependent or persists across varying conditions. Specifically, we examine how base-rate manipulations—situations where animate objects are either in the majority, the minority, or equally distributed—impact memory performance. In a 2 (word type: animate vs. inanimate) $\times$ 3 (base rate: 80% animate/20% inanimate vs. 80% animate/20% inanimate vs. 50% animate/50% inanimate) mixed-design experiment, we assess whether the reduced or increased proportion of animate objects influences the memory benefit. Working memory capacity is measured across all experiments and its moderating

role is investigated. Data collection is still ongoing. We discuss the theoretical implications of our findings in relation to the mechanisms underlying the animacy effect.

SYM-24: Gaze-Based Rehearsal During Retrieval From Working Memory

Chair(s): Agnes Rosner, Leibniz University Hannover; Candice Morey, Cardiff University

Symposium Abstract

Eye movements have been shown to provide useful insights into various areas of memory research, including episodic long-term memory and mental imagery. The study of eye movements in the field of working memory recently gained increasing attention. One of the key questions to date is the role of eye movements during working memory retrieval. That is, are eye movements functionally related to retrieval processes or are they an epiphenomenon of yet other processes tied to keeping a limited amount of information available for further processing like covert shifts of attention. The question about the functionality of eye movements is of particular interest as it sheds light on the mechanism guiding eye movements during working memory retrieval. Candidate mechanisms include the interaction of activated information in the focus of attention with visual attention in a shared priority map or the relation to long-term memory. Whatever the mechanism, how early is it present in development? This symposium presents recent advances on the gaze-based rehearsal hypothesis to clarify the nature of its functionality and thereby to broaden our theoretical understanding of working memory, one of the key concepts in human cognition.

Exploring the Role of Saccades in Visual Working Memory Utilization

Shlomit Yuval-Greenberg, Tel Aviv University; Rania Qais, Tel Aviv University

Visual working memory (VWM), the ability to maintain visual information, is typically studied using a change detection task: a set of items is presented, disappears briefly, and then reappears either identical or altered. Participants are asked to detect the change. Studies have shown that observers can store at least 3-4 items in VWM. However, how this lab-based task relates to

VWM utilization in natural environments remains unclear. In real-world scenarios, items do not typically disappear and reappear as they do on a computer screen. Instead, saccades serve as the primary mechanism for bringing items into or removing them from the visual field, and VWM retains information across saccades. In this talk I will present a novel task developed to study the unique link between saccades and VWM. Participants compared two sets of items and searched for a common item. They either moved their eyes freely between the sets or manually switched between them. Results revealed that gaze shifts altered VWM utilization compared to manual switching, suggesting that saccades are critical to VWM utilization and that they should be accounted for when studying VWM in natural environments.

Looking at Nothing Does Not Vary With Long-Term Memory Strength

João Vieira, University of Porto; Alessandra S. Souza, University of Porto; Ruhi Bhanap, University of Zurich; Agnes Rosner, Leibniz University Hannover

When retrieving information from memory, people tend to gaze toward the empty spatial location where this information appeared, a behavior known as "looking-at-nothing" (LAN). It remains unclear whether LAN is modulated by the strength of memory representations. In two studies, memory strength was manipulated by increasing the frequency of shape-color (E1) or location-shape (E2) bindings in a visual working memory task. Participants encoded sequences of four colored shapes at distinct spatial locations. Some shapes were frequently presented (80%) with the same color but different locations (E1, N = 68) or in the same location with different colors (E2, ongoing); the remaining bindings were randomly defined. During retrieval, a shape name was presented auditorily, and participants recalled aloud its color. Eye movements were recorded. Binding frequency increased color recall in E1 (shape-color bindings) but not in E2 (location-shape bindings). LAN was higher in correct trials, regardless of binding frequency, suggesting a link between working memory accuracy and LAN. In sum, we found no evidence that memory strength modulated LAN, defying the notion that the eyes are frequently guided to where stronger traces were encoded.

The Role of Eye Movements and Covert Shifts of Attention in Working Memory Retrieval

Ruhi Bhanap, University of Zurich; Klaus Oberauer, University of Zurich; Agnes Rosner, Leibniz University Hannover

During episodic memory retrieval, individuals often display the "Looking at Nothing" (LAN) effect, where their gaze returns to locations associated with the original presentation of information. Scholz et al. (2018) demonstrated that LAN can enhance memory performance through both overt eye movements and covert attentional shifts. The current study investigated whether similar benefits occur during retrieval from working memory. Participants encoded three word pairs, each presented at three locations on screen. During retrieval, participants were presented with two words as aural cues and were asked to determine whether the words had originally been presented together as a pair. Simultaneously, gaze or covert attention were manipulated via a digit tracking task. This task was performed at one of the following locations: congruent (matching the original word pair location), incongruent (a different location), or central. Results indicated no differences in memory performance across cue conditions for both gaze and covert shifts of attention. These findings suggest that while LAN aids episodic memory retrieval, it does not appear to confer similar benefits during working memory retrieval.

Encoding Spatial Information for Backwards Recall: Evidence From Eye Movements in Adults and Children

Candice Morey, Cardiff University; Genevieve Lawson, Cardiff University; Tanja Könen, University of Kaiserslautern-Landau; Julia Karbach, University of Kaiserslautern-Landau; Nicolas Chevalier, University of Edinburgh

As we encounter visuo-spatial information, our eyes move. Across time, we look for increasingly less time at incoming items in a to-be-remembered sequence, and spend some time reflecting on earlier items. We measured eye movements in a sample of young adults during encoding of a 7-item spatial sequence for backwards recall, plus a 10-second retention period. When preparing for backwards recall, encoding patterns are similar to those typically observed with forward recall. During retention, fixations towards the positions of to-be-recalled items were rare, but focused mostly on the end of the list, or the first to be recalled, and occurred mostly late during the retention period, when the response opportunity was

imminent. In a sample of 153 of 7-10 year-old children, we measured immediate backwards spatial span for increasing lists, up to one item beyond participants' demonstrated span length. Fixation patterns during encoding resembled those of adults on average. Regressive looking at the end of the list peaked as children reached their maximum span length. We consider the implications of these patterns of regressive looking during a serial memory task for understanding how spatial information is maintained.

How Do Children Encode What and Where Information? Evidence From Eye Movements

Genevieve Lawson, Cardiff University; Emily M. Elliot, Candice C. Morey, Cardiff University

Memory changes and improves with development, but how? One idea is that young children transition from predominantly using visuospatial strategies to deploying verbal strategies. This study aims to help understand this transition by investigating how children aged 5-7 encode visuospatial and verbal information. Previous findings indicate adults use different gaze patterns depending on whether they are encoding visuospatial or verbal information. Neurotypical children were recruited to complete a serial reconstruction task whilst their gaze patterns were recorded. Three objects were 'hidden' in a 2x2 grid and the children recalled, in forwards order, either where or which objects were hidden. In the final block, the children chose which version of the task to perform on each trial. If working memory consists of different components for holding spatial versus verbal information, and the verbal component matures more slowly, then we would expect to see adult-like differences in gaze patterns emerging in the oldest children sampled, with younger children evincing persistent visuospatial strategies. We consider gaze patterns, accuracy, and preferences to assess whether visuospatial tendencies give way to verbal with development.

SYM-25: The Role of the Body in Cognition and Emotion

Chair(s): Eva Van den Bussche, KU Leuven; Gethin Hughes, University of Essex

Symposium Abstract

Our thoughts and feelings can trigger bodily reactions such as elevated heart rate, sweating, dilated pupils or general arousal. This is common knowledge, and we tend to see representations of bodily changes as consequences rather than causes of cognition and emotion. However, although perhaps less obvious, the body does not always merely passively undergo the whims of the mind. Within embodied cognition this is well recognized, with the notion that states of the body shape states of the mind. With regards to emotion, dominant theories still emphasize the role that emotions play in triggering bodily changes, although early theorists, dating back to James (1890), already proposed that bodily states can also contribute to emotion experience. In the current symposium, consisting of five talks, we address how the body impacts emotions (Korb and von Mohr) and thoughts (Taubert, Demertzi and Hughes). Our symposium offers different manipulations of the body (e.g., facial muscle stimulation, cardiac interoception, movement, arousal, sense of agency) and brings together diverse researchers from different career stages (from early career researchers to senior PIs), genders and geographical locations.

Electrically Induced Facial Feedback – Effects on Felt and Perceived Emotion

Sebastian Korb, University of Essex

Theories of embodied cognition propose that facial feedback information can generate/modulate one's felt emotions, as well as influence the perception and recognition of others' emotional expressions. Both these assumptions have however received mixed support, and existing facial feedback manipulation techniques provide limited control over which muscles are activated when and to what degree. To overcome these limitations, I will first introduce facial neuromuscular electric stimulation (fNMES), which I'll argue is a promising tool to investigate multisensory integration and aspects of the facial feedback hypothesis at behavioural and neural level. Secondly, I will present results from my lab, suggesting that fNMES can be used to modulate felt emotions, as well as facial emotion recognition. Finally, I will discuss putative neural mechanisms, based on EEG recordings, by which changes in facial feedback interact with visual emotion processing.

Interacting Hearts: The Role of Cardiac Interoception on Emotional Processing and Social Decision-Making

Mariana von Mohr, Royal Holloway University of London

Social cognitive neuroscience has studied how our affects, thoughts, and intentions influence how we read other minds. However, the role of interoception in these processes has been largely neglected. Despite the growing research on interoception, our understanding of how the perception of our physiological state influences the way we perceive our own and others' mental states is scarce. To fill this gap, in a series of dyad-based studies ($n = 164$), we manipulated visceral, interoceptive state by targeting the discharge of aortic baroreceptors (i.e., the pressure and stretch sensors in the aortic arch that, at each heartbeat, signal to the brain the physiological state of the body), to examine how a heightened interoceptive state can shape social cognition. Specifically, we focused on two processes of social cognition: emotional egocentric bias (i.e., the tendency to project one's emotional state to others) and social decision-making. Our findings suggest that an accentuated interoceptive state contributes to an egocentric bias, leading to less susceptibility to being influenced by others' emotional experiences and judgments when making a decision.

Movement and the Brain: Learning-Related Changes in Brain Structure

Marco Taubert, Otto-von-Guericke-Universität Magdeburg

Movement control triggers widespread neural activations throughout the brain, extending to cortical territories involved in perceptual and higher-order cognitive processes. While neuronal activation decreases rapidly in the resting phase after the end of movement execution, changes in neuronal architecture reflect lasting plasticity effects that may be relevant for the learning and consolidation of motor skills. In my talk, I will describe research findings that demonstrate the malleability of human brain structure to environmental influences such as learning new movements. In fact, learning motor skills or aerobic exercises can have an impact on the morphology and microstructure of cortical and subcortical brain regions involved in declarative memory or executive function. My group's research focuses on non-invasive magnetic resonance imaging

(MRI) of the brain and the analysis of learning-induced changes in relevant brain tissue properties (e.g. myelin content) while our participants practice complicated motor balance tasks. I will provide insights into the analysis of microstructural plasticity and cortical folding as a predisposition to improved learning and suggest ways to translate the findings into practice.

Mind Blanking Reports Are Mediated by Altered Arousal Levels

Athena Demertzi, University of Liège

During spontaneous thinking, experience is ongoing, dynamic, and rich in mental content. Interestingly, ongoing experience can also show moments of "blanks" during which there is a failure to report the content of thoughts. Here, I will discuss the possibility of entertaining contentless mental states during waking periods. I will show how experience-sampling paired with biomedical imaging techniques (fMRI, EEG, peripheral physiological signals) underlies the phenomenology of mind blanking, pointing that arousal is a key mediator when reporting no mental content. Together, I will discuss how brain and peripheral physiology alter in conditions where reportability is diminished, therefore challenging the notion that the mind is a constant thought-oriented operator.

Bodily Arousal and Sense of Agency

Gethin Hughes, University of Essex; Harry Ford, University of Essex; Peter Gooding, University of Essex; Eva Van den Bussche, KU Leuven

Prominent theories of interoception suggest that signals coming from within the body are involved in all subjective feelings. This includes well established links between bodily arousal and emotion, self-awareness, and decision-making. However, the role of bodily signals in metacognitive states, such as the sense of agency are relatively less explored. Sense of agency refers to the feeling of being in control of your actions and the associated outcomes, such as the feeling that you caused the light to come on by flicking the switch. We will present data from a series of studies that investigate how different sources of arousal modulate sense of agency in different ways. This includes measuring the direct effect of conflict-

induced arousal, using arousal inducing images to assess the influence of incidental arousal, and investigating anticipatory arousal in decision-making tasks. Our findings suggest that the effect of bodily arousal on sense of agency is context dependent.

SYM-26: Cognitive Interventions Across the Lifespan: From Design to Implementation in Clinical and Healthy Populations

Chair(s): NA

Symposium Abstract

Cognitive training has been applied in healthy individuals and those with cognitive and learning deficits. This symposium presents findings from co-creation and training studies in clinical and non-clinical child and adult populations, which highlight qualitative and quantitative data alongside neural plasticity principles. We propose that tailoring training tools to specific populations is critical for achieving optimal transfer. Prof. Okon-Singer (University of Haifa) will discuss crucial factors for successful training interventions. Dr. Föcker (University of Lincoln) will present a multisensory Braille device to support learning through sensory enrichment in blind and visually impaired children. Prof. Nahum (Hebrew University) will share results from trials combining cognitive control training with non-invasive brain stimulation for pediatric ADHD. Dr. Matusz (Western Switzerland University) will present findings on stereoscopic Virtual Reality games for amblyopia rehabilitation. Finally, Prof. Derakhshan (University of Reading) will discuss the impact of cognitive training and paced breathing on outcomes for women following breast cancer. These findings highlight how enriched settings foster plasticity in clinical populations.

Can We Personalize Cognitive Bias Modification? Shedding Light on Emotional and Cognitive Bias Factors That Predict Training Efficiency

Hadas Okon-Singer

Department of Psychology, University of Haifa, Israel

Computerized cognitive training has garnered increased attention as a novel and targeted intervention for improving well-being. However, promising results were accompanied by small effect

sizes, replication difficulties and null generalizability. The current study is a pre-registered meta-analysis designed to identify the key factors in effective cognitive training. Machine learning methods were implemented to analyze 22 datasets comprising 1,544 participants, each of whom completed one of four training types. The analysis identified individuals most likely to benefit from cognitive training and which training types led to greater gains. Baseline mental health status—measured by symptoms of depression or anxiety—was the most influential moderator. Individuals with more severe symptoms experienced the greatest improvement. The number of training sessions ranked next in importance, with more sessions leading to greater benefit. Additionally, cognitive trainings led to more improvement than control conditions. This endeavor may serve to illustrate the type of large-scale comprehensive analyses needed to advance toward individually-tailored training programs.

Sense-Braille: Co-Creating a Multisensory Braille Device Together With Visually Impaired and Blind Children

Julia Föcker, *College of Health and Social Science, School of Psychology, Sport Science and Wellbeing, University of Lincoln, UK; Polly Atkins, College of Health and Science, University of Lincoln, UK; Jonathan Waddington, School of Health and Wellbeing, Plymouth Marjon University, UK; Patrick Dickinson, School of Engineering and Physical Sciences, University of Lincoln, UK*

Learning to read Braille involves the tactile discrimination of different letter patterns. Based on the idea that multisensory experiences can scaffold learning, we co-created a multisensory device to offer engaging technologies for braille learning. This device consists of a six-button box, in which each button press elicits a specific tone, a haptic vibration or a sound and a haptic vibration. Twelve blind, 15 visually impaired children, adolescents, and adults as well as 10 sighted individuals placed their fingers on the device to experience different braille letter patterns through auditory-haptic feedback, the haptic modality or via sounds. Results showed that participants reported enjoyment while interacting with the device, experienced a feeling of competence and felt less nervous. Furthermore, most participants preferred the auditory-haptic modality, though preferences varied between groups: blind children favored auditory-haptic and auditory modalities, while visually impaired children also liked the haptic

modality. We discuss differences in sensory sensitivity and additional diagnoses, such as autism and Cerebral Visual Impairment, as possible explanations for the varying modality preferences observed between groups.

Harnessing Non-Invasive Brain Stimulation and Cognitive Control Training for Pediatric ADHD: Advances in Pediatric Interventions

Mor Nahum, School of Occupational Therapy, The Hebrew University, Jerusalem, Israel; Ornella Dakwar-Kawar, School of Occupational Therapy, The Hebrew University, Jerusalem, Israel; Noam Mairon, School of Occupational Therapy, The Hebrew University, Jerusalem, Israel; Shachar Hochman, School of Psychology, University of Surrey, Guildford, UK; Roi Cohen Kadosh, School of Psychology, University of Surrey, Guildford, UK; Itai Berger, Pediatric Neurology Unit, Assuta-Ashdod University Hospital & Ben-Gurion University of the Negev, Beer-Sheva, Israel. School of Social Work and Social Welfare, Hebrew University of Jerusalem, Jerusalem, Israel.

Pediatric ADHD is often characterized in cognitive control deficits. Advances in non-invasive brain stimulation (NIBS) offer promising solutions for treating such deficits in pediatric ADHD. This submission synthesizes findings from two recent trials, applying a novel form of NIBS, transcranial random noise stimulation (tRNS) alongside cognitive control training (CCT). The first study compared the effects of tRNS and CCT to those of transcranial direct current stimulation (tDCS) over the dorsolateral prefrontal cortex and CCT. The results showed superiority of tRNS, which led to improved cognitive control and ADHD symptoms. The second study used tRNS over the right inferior frontal gyrus and left dorsolateral prefrontal cortex combined with CCT in a randomized, sham-controlled trial. Results showed significant improvements in ADHD symptom in the tRNS compared to the sham arm, which lasted 3 weeks post-treatment. Importantly, changes were also noted in periodic and aperiodic EEG components, reflecting enhanced cortical excitation/inhibition balance. In the talk, I will discuss the use of this technology in pediatric populations, highlighting their potential as scalable, multimodal interventions for neurodevelopmental disorders.

Home-Based Stereoptic VR Serious Games as a New Treatment for Amblyopia: Randomized Controlled Trial (RCT) Results

Pawel J. Matusz, Institute of Health Sciences, School of Health Sciences, University of Applied Sciences Western Switzerland (HES-SO Valais), Sion, Switzerland

The presentation will discuss an RCT testing stereoscopic (encouraging 3D vision) serious VR games in rehabilitation of amblyopia ("lazy eye"). In amblyopia, the brain learns to ignore signals from one eye despite the eye being healthy. Gold-standard treatment is occlusion of the fellow eye; but the treatment last years, and has issues with efficacy and stability of effects, side effects and compliance. These limitations necessitate new therapeutic targets, such as binocular rather than unilateral mechanisms, as well as new approaches emulating the natural cognitive-motivational contexts in which learning occurs. The study aimed also to shed much-needed light on attentional mechanisms in supporting visual skill recovery. In a cross-over RCT design, patients took part first in a home-based VR training (2 months; app. 20h total) and then continued with standard care (corrective glasses), or vice versa. The talk will present the clinical effects as well as experimental results, like spatial and selective attention and reading. The talk will end with a discussion of advantages and limitations of the used therapeutic approach.

From Surviving to Thriving: Resilience-Training Interventions in the Context of Breast Cancer

Nazanin Derakhshan, School of Psychology and Clinical Language Sciences, University of Reading, UK

Breast cancer remains the most common malignancy in women. While medical advances have prolonged survivorship, cognitive and emotional vulnerability in this population remains an unmet need with consequences for quality of life and mortality rates. In this talk, I will discuss research that demonstrates improving attentional control using adaptive cognitive training exercises, and paced breathing techniques increasing heart rate variability, are promising tools for improving quality of life. Specifically, I will highlight the effectiveness of these interventions on psychological and behavioural outcomes (e.g., workability and cognitive efficiency) in women treated for breast cancer. I will discuss the underpinning mechanisms behind these resilience-based interventions and suggest pathways for maximising training related benefits for patient and public health outcomes.

Friday

10:30 – 12:10: Symposia

KSYM-04: Theory Building in Cognitive Psychology: The Role of Computational Models

Chair(s): Klaus Oberauer, University of Zurich

Symposium Abstract

Theories in psychology, including cognitive psychology, are not as good as they should be. There is broad agreement on that pessimistic assessment; some even go as far as speaking of a "theory crisis" in psychology. Researchers differ in what they consider problematic in current theorizing, what they think of as a good theory, and they also disagree on what to do to improve theorizing. Several authors have recommended formalizing theories as computational models of the assumed mechanisms and processes to make theoretical assumptions more precise and enable stringent derivation of predictions. The symposium brings together different perspectives on what computational models can do for us to improve theories of cognition.

G-Distance: On the Comparison of Model and Human Heterogeneity

Andy Willis, University of Plymouth; Lenard Dome, University of Tübingen

Models are often evaluated when their behaviour is at its closest to a single, sometimes averaged, set of empirical results, but this evaluation neglects the fact that both model and human behaviour can be heterogeneous. Here, we develop a measure, g-distance, which considers model adequacy as the extent to which models exhibit a similar range of behaviours to the humans they model. We define g as the combination of two easily interpretable dimensions of model adequacy: accommodation and excess flexibility. We apply this measure to five models of an irrational learning effect, the inverse base-rate effect (IBRE). g-distance identifies two models, a neural network with rapid attentional shifts (NNRAS) and a dissimilarity-similarity generalized context model (DGCM18), that slightly outperform the previously most supported model (EXIT). We show that this conclusion holds for a wide range of beliefs

about the relative importance of excess flexibility and accommodation. We further show that a pre-existing metric, the Bayesian Information Criterion (BIC) misidentifies a known-poor model of the IBRE as the most adequate model. We discuss the implications of our findings for model evaluation generally, and for models of the IBRE in particular, and end by suggesting future avenues of research in computational modelling.

Neural Mechanism of Compositional Generalisation

Zilu Liang, University of Oxford

Humans can break down learned knowledge into constituents and later assemble them into novel combinations. We studied neural solutions for compositional generalization using a task with neural network modelling and fMRI. Participants hunted treasure based on stimuli composed of colour and animal shapes, where the features indicated treasure locations. After training with feedback on a subset of stimuli, participants were tested without feedback on unseen stimuli. Those who solved the test were classified as compositional generalisers (N=41). To generate the neural solution space for the problem, we trained the network with two output heads: a location-predicting hetero-encoder and a feature-reconstructing autoencoder. The hidden layer formed a high-dimensional representation while the transformation into a low-dimensional spatial code happened at the readout. Corresponding variations of functional dimensionality were observed across regions in humans. Rule information was represented in the hippocampus and was composed to solve the test by the vmPFC in a high-dimensional space. The superior parietal region with a low-dimensional representation transformed the stimuli into a spatial reference frame.

How Cause-Effect Reasoning Impedes Theory Development: Why We Should Focus on Mechanisms and Functions Instead

Noah van Dongen, Erasmus University Rotterdam

Scientific theories aim to explain and predict phenomena. In our field, our theories address phenomena of behavior, social relations, cognition, emotion, psychopathology, and so on. Few would disagree that (human) psychology and our social

organization are systems with the number and type of processes that merit the adjective "complex." This makes cause-effect reasoning problematic. And even if our systems of interest were merely "large" or "difficult to parse", our standard causal reasoning may still present problems. I will argue that our typical cause-effect reasoning often impedes theoretical progress. The appeal of causal explanations is intuitive: they provide clear, testable links between variables. However, this approach risks oversimplification, missing the forest for the trees, and (rein)forcing linear explanation. Exemplary problems of cause-effect reasoning are: many causes to one effect, irrelevant prime movers, differences in the value of "cause" in well-functioning and dysfunctional systems. I will contrast cause-effect reasoning with mechanistic and functional (modeling) perspectives. Mechanistic reasoning focuses on the system's particular underlying structures—consisting of components, their properties and their relations—that jointly generate observed phenomena. Functional reasoning takes a more abstract perspective of capacities, affordances, and processes across these particular instantiations. Using examples from meteorology, automotive engineering, mammalian physiology, and psychopathology, I will illustrate the shortcomings of cause-effect reasoning and the advantages of mechanistic/functional reasoning for theory development. In conclusion, I will speculate on the methodological implications and requirements for the next steps toward comprehensive, explanatory theories of (human) psychology.

To Be Fair: Theory Specification Needs an Update

Caspar van Lissa, Tilburg University

Innovations in open science and meta-science have focused on rigorous *theory testing*, yet methods for specifying, sharing, and iteratively improving theories remain underdeveloped. To address these limitations, we introduce *FAIR theory*: A standard for specifying theories as Findable, Accessible, Interoperable, and Reusable information artifacts. FAIR theories are Findable in well-established archives, Accessible in practical terms and in terms of their ability to be understood, Interoperable for specific purposes, e.g., to guide control variable selection, and Reusable so that they can be iteratively improved through collaborative efforts. This paper adapts the FAIR principles for theory, reflects on the FAIRness of

contemporary theoretical practices in psychology, introduces a workflow for FAIRifying theory, and explores FAIR theories' potential impact in terms of reducing research waste, enabling meta-research on the structure and development of theories, and incorporating theory into reproducible research workflows – from hypothesis generation to simulation studies. We make use of well-established open science infrastructure, including Git for version control, GitHub for collaboration, and Zenodo for archival and search indexing. By applying the principles and infrastructure that have already revolutionized sharing of data and publications to theory, we establish a sustainable, transparent, and collaborative approach to theory development. FAIR theory equips scholars with a standard for systematically specifying and refining theories, bridging a critical gap in open research practices and supporting the renewed interest in theory development in psychology and beyond. FAIR theory provides a structured, cumulative framework for theory development, increasing efficiency and potentially accelerating the pace of cumulative knowledge acquisition.

Symposium Discussion: What Can Computational Models Do for Us to Improve Theories of Cognition?

Klaus Oberauer, University of Zurich
Symposium Discussion

SYM-27: Understanding the Cognitive Mechanisms Supporting Conversation Across Typical and Atypical Populations

Chair(s): Ruth Corps, University of Sheffield; Katie Carpenter, University of Kent

Symposium Abstract

Everyday conversation is the most important and common way of using language, allowing us to connect with others, share ideas, get things done and build a sense of community. Many theories and studies of conversation assume it is a perfect system. For example, speakers are thought to respond directly and relevantly to each other's utterances and take timely turns, with any deviations considered to be instances of breakdown. But recent corpora studies have demonstrated that natural conversation is rarely such a perfect system. As a result, we know little about the mechanisms supporting conversation as it

actually occurs. This symposium aims to fill this gap by bringing together experimental and theoretical perspectives on conversation across a variety of contexts and populations (including adults with hearing loss and children with autism). It considers why conversation is easy for some individuals and in certain contexts but difficult in others. By considering these issues, this symposium will contribute to revising existing theoretical models so that they can better explain the cognitive mechanisms underlying natural conversation.

Studying Conversation Outside the Laboratory: A Corpus Analysis

Ruth Corps, University of Sheffield

Many theories of conversation assume that it is so successful because next-speakers are highly proactive: they begin to plan a response to their partner's turn as soon as they have understood its gist. In this talk, I present results from a corpus study that suggest such pro-active planning is not always possible outside the laboratory. Using transcripts of spoken conversations in Dutch, German, and English, I show that many speech segments (i.e., a stream of speech produced by one speaker) were just one or two words long. Based on estimates of the timing of speech planning, these segments do not give the next-speaker enough time to fully plan a response and articulate it with little gap. Further analysis revealed that speakers often do not directly respond to their partner's previous segment; instead, they tend to continue an earlier segment of their own. These results challenge the commonly held view that conversation involves a perfect alternation of well-formed and related turns.

Using Question-Answering to Understand the Flow of Conversation

Martin Pickering, University of Edinburgh; HuanHuan Yin, University of Edinburgh; Weijia Hu, University of Edinburgh; Ruth Corps, University of Sheffield

It is often assumed that conversation can flow smoothly because interlocutors regularly predict what their partners will say and prepare their responses before their partner finishes. To investigate how this might work, I report a series of experiments (using English and Mandarin Chinese) involving questions in which the key information that allows the

addressee to determine the answer occurs early or late in the question (Bogels et al., 2015). We manipulate processing difficulty by having the addressee produce a short or long answer, perform a secondary task or not, or (for bilinguals) respond in the same or different language from the question.

Conversation in Adverse Listening Conditions: Is Hearing Loss Special?

Lauren Hadley, University of Nottingham

Hearing loss is a common consequence of age, affecting over half of adults over 55. A variety of studies of conversation have demonstrated that people with hearing loss show delayed and more variable turn taking than individuals with normal hearing, but the basis of such differences is unclear. I will present studies investigating two critical conversation mechanisms: response planning, and prediction of spoken turn endings. In a behavioural study of response planning, we demonstrate that at equivalent levels of intelligibility, older adults with normal and impaired hearing plan verbal responses equally early. In a follow-up study combining response planning with prediction of a talker's turn end, we tested listeners with: (1) normal hearing, (2) hearing loss listening at low effort, and (3) hearing loss listening at high effort (but high intelligibility). All listeners were able to generate predictions of a turn end, but the hearing impaired group listening at high effort showed substantially delayed verbal responses. Together this work suggests that while some behavioural changes relating to hearing loss in conversation may be a consequence of intelligibility, others may result from changes in effort or resource availability.

Manipulating the Impact of Interest Intensity on Autistic and Neurotypical Child Conversation

Katie Carpenter, University of Kent; Amy Howard, University of Kent; Danielle Matthews, University of Sheffield; Sue Leekam, Cardiff University; Colin Bannard, University of Manchester; Michael Forrester, University of Kent; Kirsten Abbot-Smith, University of Kent

We tested the impact of highly intense interests, a feature of autism, on children's social communication. Children engaged in a conversation with a researcher via Zoom. The researcher explained that screensaver images would appear because she

had borrowed her computer from a child. These images were either 'Neutral' or of 'High Personal Interest' to the participant. We tested whether the latter would cause greater topic maintenance difficulties. Our pre-registered sample size, which will be reached before July, is 132 children (66 with an autism diagnosis). Interim analyses, following the SAP (N= 77), show effects of Diagnostic Group, Image Type and an interaction. Children show significantly greater topic maintenance difficulties in the presence of a High Interest Image and this effect is greater in the autistic group. Individual differences analyses suggest lower language ability, higher parent-rated interest intensity and higher autistic traits are significant predictors of greater difficulties with topic maintenance. This is the first study to isolate the impact of one diagnostic criterion, intense interests and experimentally manipulate it to test for causal impact on a key social communication skill - conversation.

Does Manipulating Conversation Partner Speech Rate Impact Autistic and Neurotypical Child Response Content and Timing

Chantel Smith, University of Kent; Danielle Matthews, University of Sheffield; Colin Bannard, University of Manchester; Michael Forrester, University of Kent; Sue Leekam, Cardiff University; Heather Ferguson, University of Kent; Kirsten Abbot-Smith, University of Kent

The ability to maintain a conversation topic is key to social relationships but is cognitively demanding, requiring rapid speech processing and simultaneous planning. Reduced speech rate might help children, particularly autistic children but is sometimes socially dispreferred and thus might hinder reciprocal conversation. We test if and how speech rate affects responses that acknowledge and continue the topic (so-called 'topic-supporting' responses) and response timing. In a novel paradigm, children interact with a researcher whereby pre-recorded sentences ('probes') in the researcher's voice are interspersed into naturalistic conversations. Probes are heard in two conditions: 'Fast' (80% of the original) or 'Slow' (140%). Of a target sample of 50 autistic and 50 neurotypical 6½ to 12 year-olds, we have tested 40 children to date. Following a pre-registered analysis plan, we will 1) run Diagnosis x Speech Rate mixed effects models for topic-supporting responses and timing 2) test if individual differences in autistic traits or language processing efficiency moderate any

effects of speech rate. We discuss the advantages of combining experimental manipulation within semi-naturalistic conversation.

SYM-28: Binding and Retrieval in Action Control, Part I: Modulations of Binding and Retrieval Processes

Chair(s): Carina Giesen, HMU Health and Medical University Erfurt; Andrea M. Philipp, RWTH Aachen University

Symposium Abstract

Research on human action is distributed across diverse scientific communities, each of which comes with specific experimental paradigms and corresponding theorizing. The Binding and Retrieval in Action Control (BRAC) framework provides a domain-general perspective to bridge these diverse fields. This is achieved by proposing feature binding and retrieval as two basic processes that underlie a broad range of phenomena from the field of action control and beyond. The core idea of BRAC is that stimulus and response features are bound into an event file, which can be retrieved by repeating any of these elements on a later occasion. In this double symposium, we will present findings that specify as well as broaden our understanding of conditions in which binding and retrieval effects prevail. Also, boundary conditions that restrict the explanatory power of binding and retrieval mechanisms will be presented. Part 1 of the symposium focuses on modulating factors that influence binding and retrieval processes in a diverse set of action control paradigms. Part 2 of the symposium sheds light on processes like learning and inhibition which are possibly functionally independent from binding and retrieval processes.

From Tusk Till Horn: Modulating Feature Boundaries in Action Control

Nicolas D. Münster, University of Trier; Christian Frings, University of Trier

Stimulus features that occur in action episodes are integrated together with response features into event files, upon feature repetition event files are retrieved. However, retrieval strength depends on the extent to which a particular feature is actually repeated. Since not only perceptual but also conceptual features are assumed to be bound, the boundaries between

feature representations might not only be fluid but also modulable. In three experiments (cumulative $n = 217$), we evaluated whether an internal manipulation of feature boundaries is possible. By adding additional counting tasks to a Stimulus-Response binding task, we either merged or separated feature categories, causing a significant difference in S-R binding effects: Merged feature categories caused weaker S-R binding effects compared to separated feature categories. The results indicate that merged features were actively brought to be processed as more similar to each other. We interpret our data under the broader and old question of what a feature actually is and suggest that feature boundaries are task-dependent.

Stimulus-Response Binding and Retrieval Is Impervious to Affective Consequences

Anna Martini, Friedrich Schiller University Jena; Klaus Rothermund, Friedrich Schiller University Jena

Affective consequences play a major role in instrumental learning processes, as they modulate the likelihood with which behavior is repeated (“law of effect”). Supposing that stimulus-response binding and retrieval (SRBR) could be a fundamental mechanism contributing to learning, the strength of SRBR effects should also be modulated through affective consequences. To examine whether SRBR can be viewed as a contributor to instrumental learning, a recent study analyzed the extent to which SRBR effects can be strengthened/weakened by positive/negative affective consequences, but found no evidence for such a modulation (Parmar & Rothermund, 2024). In a follow-up study we manipulated affective consequences with aversive heat stimuli instead of monetary rewards. Replicating the results of Parmar and Rothermund (2024), strong SRBR effects emerged that were independent of physical affective consequences. We will discuss the implications of these findings for our understanding of the relation between binding and learning.

Does Vicarious Feedback Influence Stimulus-Response Binding by Observation?

Kira Franke, Friedrich Schiller University Jena; Carina G. Giesen, HMU Health and Medical University Erfurt

In two experiments, we investigated whether vicarious feedback modulates observationally acquired stimulus-response binding and retrieval (oSRBR)

effects. Giesen, Scherдин, and Rothermund (2016) found reversed oSRBR effects after negative feedback and standard effects after positive feedback. This suggests that feedback was used to infer action goals, implying that oSRBR effects might represent propositional information. However, the findings were confounded, as negative feedback followed both errors and correct but slow responses. Experiment 1 addressed this by distinguishing between negative feedback due to errors and slow responses. Participants worked together in an interactive color categorization task with either positive, time-based or negative feedback after each response. Results revealed standard oSRBR effects which did not differ significantly between feedback conditions. In Experiment 2, we therefore replicated the experiment conducted by Giesen et al. (2016). However, we again found standard oSRBR effects that were independent of feedback. This implies that in both experiments feedback information was not used to infer action goals, providing no evidence that oSRBR effects represent propositional information.

Response-Response Binding Effects Can Be Increased by Investing More Effort in Each Response

Birte Moeller, University of Trier; Lars Schöpper, University of Trier; Christian Frings, University of Trier; Roland Pfister, University of Trier

Executing a response results in bindings between features of present stimuli and features of the response. Repetition of any of these features can then retrieve other integrated features thus affecting following action (binding effects). Notably, bindings can also exist between individually planned and executed responses (Moeller & Frings, 2019). Here we analyzed whether the effort invested in every single response affected binding and retrieval between sequential responses. $N = 30$ participants responded to four locations on the screen that were either directly or via a relatively complex pattern mapped to four responses. Binding and retrieval effects between responses were larger if the stimulus response mapping was complex than if the mapping was simple. Thus, participants seemed to show larger response-response binding effects if they had to invest more effort in the planning of every single response. The results are discussed in relation to the Binding and Retrieval in Action Control framework (Frings et al., 2020).

Episodic Retrieval in Task Switching: Repeating the Response Induces Retrieval of the Task

Elena Benini, RWTH Aachen University; Luca Moretti, RWTH Aachen University; Malte Möller, University of Passau; Iring Koch, RWTH Aachen University; Andrea M. Philipp, RWTH Aachen University; Ruyi Qiu, Hunan University of Chinese Medicine; James A. Grange, Keele University; Susanne Mayr, University of Passau

In task switching, task selection is assumed to precede response selection. The present study weakens this assumption, investigating whether selecting a response can still influence task selection via retrieval mechanisms. Indeed, binding and retrieval accounts propose that tasks and the responses are bound in each trial, so that when the response repeats from the previous trial ($n-1$), it retrieves the $n-1$ task. In this study (Exp1: data reanalysis, $N=255$; Exp2: $N=96$, Exp3: $N=96$), participants switched between three tasks affording four possible responses each. Using Multinomial Processing Tree models, the probability of erroneously selecting the previously relevant task was used as a measure for unintentional $n-1$ task retrieval. The probability of retrieving the $n-1$ task was larger when the correct response should be repeated than when it should be switched. This suggests that, after the correct task is selected, the process of response selection can feed back into task selection, occasionally retrieving and activating the $n-1$ task to a higher degree than the previously selected one. This study provides novel evidence for episodic retrieval in task switching while elucidating the interplay of task and response selection.

SYM-29: Seeing the World Through Rose-Colored Glasses or Feeling Blue: The Impact of Emotions on Working Memory

Chair(s): Christina Lutz, University of Geneva

Symposium Abstract

Emotions play a crucial role in shaping perception and memory (Phelps et al., 2006; Vuilleumier & Huang, 2009). From an evolutionary perspective, emotional content of external stimuli and internal emotional state are critical for survival by guiding attention and behavior (Damasio, 1998). Consequently, additional cognitive resources are allocated to emotional

processing (Vuilleumier, 2005). Despite this, the influence of emotions on working memory (WM) remains underexplored, with mixed findings. This symposium brings together diverse perspectives on the intersection of emotions and WM, fostering discussion. The first talk examines if emotional stimuli are prioritized across different stages of mnemonic processing. The second distinguishes how emotional stimuli affect WM maintenance vs processing of subsequent neutral stimuli. The third challenges the idea that emotion induction enhances visual WM. The fourth considers links between WM and rumination, their clinical implications, and discrepancies in the findings. Finally, the last contribution outlines evidence that stress impairs WM, and how brain stimulation may mitigate this effect. Collectively, the talks offer an overview of current knowledge on the impact of emotion on WM.

Emotional Prioritization in Visual Working Memory

Christina G. Lutz, University of Geneva; Evie Vergauwe, University of Geneva

Previous studies have demonstrated that certain types of content can be prioritized in working memory (WM), e.g., when cued or associated with a reward (e.g., Jeanneret, Bartsch, & Vergauwe, 2023). Here, we ask whether emotions can prioritize information in WM similarly to how they influence attention in the external environment. Specifically, we investigate emotional prioritization under three conditions: when the emotional content is available (1) immediately at initial encoding, (2) after initial encoding, or (3) only during WM maintenance. Across a set of experiments, participants perform a WM recognition task featuring visual faces with either neutral or emotional content. Emotional content is manipulated in two ways: (a) by pairing neutral faces with verbal phrases of emotional valence, or (b) by presenting neutral faces with emotional expressions. If emotions result in attentional prioritization of the stimulus, we expect better WM performance for emotional stimuli, compared to neutral ones. Our findings help clarify if and how emotional content influences stimulus prioritization in WM across different processing stages and will be discussed in the context of ongoing debates concerning the role of emotion in WM.

Modulation of Maintenance and Processing in Working Memory by Negative Emotions

Gaëtan Plancher, Université Lumière Lyon 2, and Institut Universitaire de France (IUF); Pascale Colliot, Université Lumière Lyon 2; Hanna Chainay, Université Lumière Lyon 2

Previous research has shown that working memory processes are affected by emotion. However, it is not clear if both components – maintenance and processing of information – are modulated by emotion. Some theoretical models assume that working memory is a unitary system, resulting in a perfect trade-off between maintenance and processing. If this is true, we should observe that processing emotional information affects memory performance and that maintaining emotional stimuli affects the processing of neutral information. Since emotion is intimately related to attention, we focused on attentional maintenance. In several experiments, using complex span tasks, we observed lower recall when negative stimuli were processed compared to neutral ones and longer processing times when series of negative stimuli were maintained. Overall, our results showed that emotion impacts both processing and attentional maintenance in working memory. This is consistent with models of working memory suggesting an attentional trade-off between maintenance and processing.

Further Evidence Against a Precision Boost Induced by Negative Emotion on Visual Working Memory

Alessandra S. Souza, University of Porto; Daniel Skoda, University of Zurich; Joana Pinto, University of Porto; Susana Vieira, University of Aveiro; Mariana F. C. Encarnação, University of Porto

A recent meta-analysis of 13 experiments (Xie et al., 2023) reported that inducing a negative vs. neutral emotional state increases visual working memory precision. Critically, more than half of the studies included in the meta-analysis did not find credible effects of emotion induction on precision, indicating that the evidence for this effect is weak. In this talk, I will present data of an additional set of five experiments (total N = 482) that provide evidence against a memory precision boost following negative emotion-induction. In this new set of studies, emotion was induced by (a) presenting emotional images (negative or neutral) before each trial of a visual working memory task (1 study) or (b) emotional video-

clips (4 studies) prior to the memory task. In the memory task, participants stored (emotionally neutral) oriented triangles for a continuous reproduction test. Although self-reported emotion tracked the valence manipulations, all experiments showed substantial evidence against changes in visual working memory precision under the negative emotion compared to neutral emotion. We will present an updated meta-analysis of the available evidence that negative emotion changes the processing mode of visual working memory.

Emotional Working Memory: Tests, Associations to Symptoms, and Target for Interventions?

Elvind H. Ronold, University of Bergen; Nanna K. G. Skram, University of Bergen; Constance G. Størvestre, University of Bergen; J. D. Allen, University of California, Berkeley; Sheri L. Johnson, University of California, Berkeley; Åsa Hammar, University of Bergen, Lund University, and Office for Psychiatry and Habilitation, Psychiatry Research Skåne

Deficits in cognitive control are present across psychiatric disorders, but their links to specific symptoms are less established. The divergent findings could be due to the heterogeneity in the methodologies used. This presentation will showcase the findings from studies on the association between emotional working memory (eWM) and rumination, using a novel paradigm designed to assess affective cognitive control. The studies investigated associations between eWM and rumination. In the first studies, participants who were either partially (n = 44) or fully remitted (n = 29) from major depressive disorder (MDD) performed an eWM task with sequences of sad and happy faces and completed self-reports on rumination. Results revealed that depressive (r = -.352) and neurotic rumination (r = -.381) each correlated with accuracy on high eWM load tasks involving negative stimuli. In another recent study, a group of students (n = 99) with elevated rumination scores conducted an emotional n-back task. Here, no association was found between rumination and eWM (r = .048). These discrepancies will be discussed, as well as the potential for eWM as a target for interventions such as cognitive remediation.

Modulating Prefrontal Cortex Activity to Alleviate Stress-Induced Working Memory Deficits: A Transcranial Direct Current (TDCS) Study

Sumit Roy, *Leibniz Research Centre for Working Environment and Human Factors (IfADo)*; **Michael A. Nitsche**, *Leibniz Research Centre for Working Environment and Human Factors (IfADo), Ruhr-University Bochum, German Centre for Mental Health, and Bielefeld University*

This study examines stress effects on working memory (WM) and the potential benefits of transcranial direct current stimulation (tDCS) over the dorsolateral (dlPFC) and ventromedial prefrontal cortex (vmPFC). Using a crossover, randomized, single-blind, sham-controlled design, stress was induced via aversive video clips, and WM was tested using verbal N-back tasks (2, 3, and 4-back). Physiological markers, behavioral responses, and EEG data were recorded during stress and WM tasks. Aversive clips effectively induced stress, shown by increased anxiety, negative affect, cortisol elevation, and reduced heart rate variability. EEG data indicated stress-related reductions in top-down control and increased bottom-up processing, indicating effective stress induction. Stress impaired WM at 3-back load in sham conditions, while anodal tDCS over vmPFC improved WM performance and, with dlPFC stimulation, reduced cortisol release. EEG showed vmPFC stimulation reduced the P2 ERP component and increased alpha desynchronization, suggesting decreased distractions and enhanced focus. These findings support the vmPFC as a target for reducing stress-related WM deficits, showing that focal stimulation can mitigate stress effects on cognition.

SYM-30: Closed-Loop Systems in Behavioral Training for Impact: Designing Adaptive Performance-Based Challenges for Players of All Abilities

Chair(s): Angela Pasqualotto, University of Applied Sciences and Arts of Southern Switzerland; Daphne Bavelier, University of Geneva

Symposium Abstract

The goal of this symposium is to review the design and implementation of closed-loop performance-based adaptive systems in behavioral training. These systems aim to enhance user training experiences and promote greater training gains across diverse user profiles. The time seems ripe to discuss the extent to which they have delivered on their promises, where they have failed, and lessons learned, especially concerning the delicate balance between improving

engagement versus enhancing training outcomes. In particular, while performance-based individualized closed-loop mechanics are theoretically preferable to enhance performance gains on the training itself, whether these mechanics are also efficacious to favor the type of skill transfer and wider cognitive benefits that behavioral training aims at delivering has been challenged by a number of recent efficacy studies. We propose a deep dive in those closed-loop mechanics that may foster more rapid learning of the training versus those that may foster greater generalizability.

The Importance of Design in Adaptive Algorithms for Cognitive Training

Aaron Seitz, *Northeastern University*; **Susanne Jaeggi**, *Northeastern University*

In this talk we'll discuss the importance of design when developing closed loop cognitive training approaches. This will be informed by years of research involving cognitive training focusing on hearing, vision, working memory and other executive functions. We address particular challenges regarding how to appropriately personalize challenges to individual participants in situations where challenges are multidimensional, participant performance is non-stationary, and objective functions targeting measurement may contradict the goal of learning. We suggest that, to achieve appropriate training experiences, design processes must strike a careful balance between data-driven algorithms and heuristics informed by prior research on human factors and participant engagement in co-design.

Adaptive Cognitive Training: A Novel Multidimensional Dynamic Difficulty Adjustment (DDA) System

Angela Pasqualotto, *University of Applied Sciences and Arts of Southern Switzerland*; **Marios Fanourakis**, *University of Geneva*; **Zeno Menestrina**, *University of Geneva*; **Mor Nahum**, *Hebrew University of Jerusalem*; **Daphne Bavelier**, *University of Geneva*

This presentation introduces a novel architecture for cognitive control training which links a variety of cognitive training activities through action video game play within an integrated video game experience. In all, the user is presented with up to 8 different activities lasting each 2-4 minutes per session of about 30 minutes. In addition to this unique architecture, each activity is controlled through a

system which adapts in real-time to player performance (DDA). A key feature of our proposed DDA is to be both multi-dimensional and multi-level, seamlessly pushing users' skills while also allowing for repeated training and period of relaxing exploration of unexperienced lower difficulty levels. Data from 34 players demonstrate progression through training modules, with most reaching their zone of proximal development within 30–45 minutes. The DDA system maintains variability post-stabilization, supporting skill transfer to new contexts. Accommodating diverse skill levels, this system provides seamless onboarding and sustained challenge, setting a rigorous foundation for designing closed-loop systems in cognitive training games and offering insights into their efficacy, limitations, and broader applications.

Building an Adaptive Learning Environment for Research: Using Response Times and Tracking Parameters With Elo

Abe Hofman, University of Amsterdam

The purpose of this talk is to present a decade of experience with analyzing and improving an online practice environment for math, which has thus far recorded over a billion responses. We present the methods we use to both steer and analyze this system in real-time, using scoring rules on accuracy and response times, a tailored rating system to provide both learners and items with current ability and difficulty ratings, and an adaptive engine that matches learners to items.

Closed-Loop Systems for Mindfulness and Behavior Change

Jyoti Mishra, UCSD Psychiatry

Closed-loop systems have often been implemented with performance-adaptive mechanics to train exteroceptive cognitive abilities. Yet, interoceptive abilities such as attention to breathing have also been associated with healthy neuro-cognition. This talk will present our research on implementing scalable digital closed-loop systems for engaging breath attention and training mindfulness skills. Observed neuroplasticity, as well as cognitive and behavioral effects of such training will be presented. Further, we have embedded these interoceptive closed-loop systems within larger personalized closed-loops to enable behavior change. This includes leveraging data

from smartphones and wearables for N-of-1 machine learning modeling aimed at optimizing lifestyle components of sleep, exercise, diet and social connection. Early evidence will be presented on how these personalized closed-loops can in turn broadly benefit quality of life, mental health and well-being. Overall, this talk will discuss how we can expand the use of closed-loop systems to facets of our lives and thereby promote engagement and learning outcomes.

Symposium Discussion

Daphne Bavelier, University of Geneva

Symposium Discussion

12:30 – 14:00: Poster Session 3 (P-03)

Learning & Memory III

Abstracted Category Representations Are More Familiar Than Specific Exemplars: Prototypes Resemble so We Remember?

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Our cognitive system excels at recognizing hidden structures and recalling specific instances. We examined how abstracting general regularities influences recognition memory, leading to unseen prototypes being judged as familiar. Using a covert category-learning task and a recognition memory test, we tracked generalization. The artificial stimulus set followed a complex, non-verbalizable family resemblance structure, allowing us to manipulate similarity and measure familiarity. During learning, participants saw close-to-prototype exemplars from two categories. In the test phase, they encountered unseen lures: close-to-prototypes and prototypes (averaged exemplars), along with foils from an untrained category. Results showed successful rule abstraction: prototypes were falsely judged as old, received higher false-alarm rates, and were categorized better than close-to-prototype lures. This suggests that when hidden regularities are present, we form general prototype representations that enhance familiarity but hinder memory specificity for seen items.

The Relative Self: An Investigation of Time and Distance in the Self-Reference Effect on Memory

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The self-reference effect (SRE) is a memory benefit for self-referentially (SR) over, e.g., other-referentially (OR) encoded information. Time matters here: Representations of past selves and other people alike vary in their degree of distance to our present self, with smaller SREs for OR toward someone close to us. SR also selectively boosts episodic recollection, which wanes with time. Following mixed results on the mnemonic status of past selves using fixed ages and time points, we examined past SR based on subjective distance: Participants judged if trait words correctly described either their present self, a past self that felt close, a past self that felt remote, or an acquaintance, followed by a combined recognition test including a remember/know/guess procedure. Despite differences in self-rated distance, memory performance was indistinguishable for close and remote past SR. Memory for past SR was superior to present SR and OR, with no SRE for present SR over OR. We conclude that, past and present SR effects, though malleable, cannot be reduced to unidimensional distance. Overall, the SRE seems more susceptible to variations in encoding processes and control conditions than present SR benefits in other paradigms.

Speaking to a Partner in a Shared-Memory Task Reduces the Production Effect

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We often ask others to help us remember information, but how does speaking to others influence memory? Transactive memory theory predicts that exchanging information while learning allows partners to divide the memory load, such that each person can forget the partner's share of the information. Yet, producing information (e.g., speaking) is known to improve memory compared to perceiving it (the production effect). We examined whether speaking to a partner in a shared memory context enables offloading, and thus overrides the production effect. Participants (N=45) studied word lists by reading words out loud or silently, once alone, and once with a confederate

partner who took responsibility for remembering the words the participant spoke out loud. A recognition test (always performed alone) followed each study condition. Speaking to a partner reduced the production effect: participants recognized more spoken vs. silently-read words studied alone, but showed no advantage for words spoken to a partner, particularly when they rated the partner as helpful. Speaking may enable memory offloading in shared-memory contexts. Ongoing experiments explore whether this effect replicates with participant dyads rather than confederate partners.

Effects of Semantic Salience on Memory for Object Locations

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We investigated whether an object that differs in its nameability from surrounding objects becomes salient and how this semantic salience affects memory for the objects' locations. Participants viewed sets of four objects on a screen, with either an easily nameable object among three hardly nameable objects or vice versa. After a filler task, the objects were presented again and participants judged whether their location was the same as before. The objects were shown either alone or with a previously studied object from the same set, serving as a contextual cue. When objects were presented with context, location memory was better for easily nameable than for hardly nameable objects. Moreover, easily nameable objects were remembered better when they were salient during encoding, whereas salience had no effect on hardly nameable objects. When objects were recalled alone, nameability did not affect performance. Salience again influenced memory for easily nameable objects, but in the opposite direction: Location memory was better for objects that were not salient during encoding. These findings indicate that effects of semantic salience on object-location memory depend on both object nameability and the presence of contextual cues.

Associative and Item Effects of Errorful Learning

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Errorful learning requires learners to formulate guesses about correct answers even before these answers are studied. It has been shown to be effective in improving cued recall for related pairs of words, suggesting benefits to associative memory. However, for other materials such as unrelated pairs of words or foreign vocabulary, errorful learning benefits target but not associative memory. Here we assess whether the findings observed in associative memory tests could also stem from an improved access to targets. We show that the benefits of errorful learning in cued-recall and associative recognition tests are reduced or eliminated when targets are related to multiple cue words, suggesting that the bulk of the ‘associative’ effect comes from retrospective matching of strengthened targets to the only related cue word in a memory set. We also show that strengthening targets via errorful learning impacts the results in the associative recognition test thought to reflect memory for associations rather than targets, with the net result in that test depending on the role of the strengthened word (target or foil). We suggest that errorful learning may have only a minimal effect on associative memory independently of the materials used.

The Influence of Cost on Avoidance Recovery After Extinction With Response Prevention

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Avoidance is a core symptom of anxiety disorders, yet conventional therapies, such as exposure with response prevention (ERP), may not fully eliminate it when avoidance carries no cost. Individuals who complete ERP often resume avoidance when given the opportunity, highlighting the challenge of long-term treatment success. This study examined whether introducing a cost for avoidance reduces its return after ERP. Participants underwent fear conditioning, where an aversive stimulus triggered avoidance responses. Adding a cost led to a reduction in avoidance, demonstrating its therapeutic potential. Extinction with response prevention effectively eliminated costly avoidance but was less effective for costless responses. These findings highlight the importance of incorporating avoidance costs in therapy to strengthen treatment outcomes and promote lasting behavioral change.

Recognition-Related Pupil Dilation as a Mnemonic Salience Signal

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Across three experiments, we examined how pupil dilation (PD) reflects memory processes and attentional influences. In Study 1, enhanced encoding (i.e., repeated study) improved accuracy and response speed in both cued recall and recognition tasks, but increased PD only during cued recall. In the recognition task, PD was insensitive to objective memory strength, suggesting it does not serve as an objective index of memory strength. Study 2 revealed that recognition hits elicited greater PD than correct rejections, even without precise source localization; however, precise localization further increased PD. This implies two distinct sources of recognition-related PD: (1) basic recognition and (2) the fidelity of contextual recollection. In Study 3, PD responses emerged during semantic processing of previously recognized stimuli, even without explicit memory instructions, though memory instructions significantly enhanced recognition-related PD indicating that recognition-related PD response is influenced by the currently active top-down attention. Based on these findings, we propose that recognition-related PD reflects bottom-up attentional processing of the mnemonic stimuli, modulated by the salience of the activated memory trace.

Complementary Roles of Semantics and Lab-Based Contextual Learning in Cued Recall: A Response Latency Analysis

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Cued recall is commonly used to measure one's memory performance. As possible mechanisms of (cued) recall, various formal models have been proposed so far. Although those models can fit well to group means, few can fit to performance of each participant. This is due to the conventional use of recall rate that can provide only a few representative values for each participant. In a series of studies, we develop a theoretically plausible measurement model of one's recall performance and an experimental procedure for the measurement. For the

model, we focus on complementary contributions of semantics and lab-based contextual learning to memory recall. As a measurement procedure, we propose a repetitive cued-recall test in which participants repeatedly perform cued recall of a small set of word pairs with feedback. We hypothesize that the intercept and slope of the learning curve of recall latency represent the contributions of semantics and contextual learning, respectively. In this study, we test the hypothesis through three experiments, in which semantic relatedness of word pairs is manipulated. Smaller slope and lower intercept are expected for word pairs with high semantic relatedness than those with low semantic relatedness.

Effects of Age-Related Stereotype Threat on Semantic and Subjective Organization in Older Adults

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Negative stereotypes about aging can undermine cognitive performance in older adults through stereotype threat (ST). ST triggers psychological and physiological mechanisms that consume control resources (CR) needed to perform cognitive tasks efficiently. Since CR support the use of memory strategies, one might expect ST to weaken the use of memory strategies, especially those strategies that rely more heavily on these resources. We examine whether ST has differential effects on subjective and semantic organization. Older participants (60-75 years old) in the present study are divided into two groups: a threatened group (ST activation) and a control group (no ST activation). They learn an organized and an unorganized list and perform a free recall task that allows estimation of semantic organization and subjective organization indices (Senkova & Akani, 2015). We predict that ST will undermine organization processes and that subjective organization will be more altered than semantic organization. Subjective organization would rely more on CR to enable the creation of new associations between items. Whereas, semantic clustering can rely on schematic knowledge, which would be less costly in terms of CR.

Remembering the Good and the Bad: Valence Effects on Memory for True and False Talk About Other People

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Chatting about others is a common human behavior that may have evolved for its adaptive advantages. For example, sharing information about individuals may warn a social group of potential criminals, or conversely, highlight individuals who provide significant support. Yet, not all circulated information is factually true such as rumors or intentionally spread misinformation. In the present experiment, we were interested in how well people remember true and false information about others and whether this is moderated by the valence of the described behaviors. Specifically, using a multinomial-processing tree analysis, we measured participants' memory a) for statements describing particularly positive or negative behaviors and b) for the veracity of these statements. We found that participants remembered negative statements better than positive ones. In contrast, memory for truth and falsity was better for the positive than for the negative statements. Moreover, irrespective of statement valence, participants showed superior memory for truth compared to falsity. The results not only have practical relevance but also highlight the complex relationship between the valence of information and different memory processes.

False Recognition in Parkinson's Disease Patients: Impact of Mild Cognitive Impairment

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This study investigated memory distortions in patients with Parkinson's disease (PD) (n=28) and a control group (n=23) using the Deese-Roediger-McDermott (DRM) paradigm. Two subgroups within the PD sample were distinguished: those with mild cognitive impairment (PD-MCI) and those without (PD-nMCI). Participants were presented with word lists that were either associatively or categorically related to non-presented critical words. Results showed better recognition for categorical lists compared to associative ones, with lower false recognition in the latter. No overall differences were found between groups; however, the PD-MCI group exhibited twice as many recognition errors for distractors and critical

words as the other groups, suggesting reduced inhibitory control in decision-making. Overall, these findings highlight the role of associative activation mechanisms in false recognition and reveal deficits in semantic processing and monitoring in PD-MCI patients. The results are discussed within the framework of the Activation/Monitoring Theory and Fuzzy Trace Theory.

Target Lure Interference Effect in Prospective Memory Task: Exploring the DRM Paradigm

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Objective: The present study attempts to evaluate target-lure interference on PM tasks using the DRM paradigm. **Method:** Volunteers encoded three PM target words with instructions for pm task performance, followed by a brief non-task-related activity. Further, they completed three repetitions of the working memory task with the three previously learned pm target words and one lure (highest semantic relatedness to pm targets) embedded with the working memory task. After a short break, subjects completed an old/new recognition task comprising the pm target, distractor words, and the lure word. **Results:** The study shows lures are falsely recognized as PM target words during working memory tasks accompanied by significant response delay during the processing of lures. Additionally, lures are falsely recognized as old pm target words during old/new recognition tasks. **Conclusion:** Lures with common characteristics with pm targets are falsely recognized as targets. One implication of the study would be using stimuli similarity as a means of improving prospective memories

Improving Memory in Participants With Intellectual Disabilities: The Role of Wakeful Rest After Learning

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There is evidence that a brief period of wakeful rest immediately after learning has a memory enhancing effect, compared with a similar period of time spent on a new task. Here, we tested the effects of wakeful rest in a group of participants with intellectual disabilities. The participants learned a list of words and either rested for a few minutes or watched short

animated films. Participants' memory for the word list was tested immediately after the wakeful rest/movie condition and again one day later. Our results show that wakeful rest was more effective than watching films at both shorter and longer retention intervals. Our findings are discussed in the light of existing conflicting evidence on the wakeful rest effect and its potential for everyday learning.

Effects of Delay and Task Importance on Children's Prospective Memory in Everyday Life

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Prospective memory (PM), the ability to remember future intentions, is a key skill developing significantly during childhood, particularly during the school years. As children enter school, they are increasingly expected to independently manage personal and assigned tasks. However, given that PM does not fully mature until late adolescence or young adulthood, children often struggle to remember their intentions. Research suggests that PM tasks perceived as important and with shorter delays are easier for children to remember. Yet, most studies have been conducted in laboratory settings, limiting the generalizability of their findings. Thus, this study evaluated children's PM in the classroom, using real-life PM tasks typically assigned by teachers. Task importance (parent-important or self-important) and delay interval (1 or 3 days) were manipulated. The study included 2nd- and 3rd-graders. Results showed that both delay and importance significantly influenced PM performance, with children excelling on PM tasks with shorter delays and those important to their parents. The findings highlight the significance of studying real-life PM in natural settings and provide valuable insights for future research and educational practices.

Study of the Benefits of Natural Environments on Cognition in Primary School: The Role of Environmental Characteristics and Sensorimotor Interactions

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Numerous studies have shown cognitive benefits when children engage in activities in Natural Environments (NE). These benefits may stem from the restorative qualities of nature, which help reduce stress and replenish attentional capacities. According to embodied cognition theories, cognitive processes are shaped by our interactions with the environment. Given that NE facilitate interactions, we investigated whether cognitive benefits are driven by NE characteristics or sensorimotor interactions. Eighty-nine second-grade students participated in activities under three experimental conditions: sensorimotor activities in NE, non-sensorimotor activities in NE, and sensorimotor activities in built environments. Selective attention, categorization, recognition, short-term retention, and affect were assessed pre- and post-intervention. Results showed significant benefits of sensorimotor activities on short-term retention and selective attention, especially in NE. This suggests that sensorimotor experiences support cognitive processes, and that NE provides an optimal context for such interactions, enhancing cognitive benefits.

Comparing Multi-Probe Designs With and Without Spatial Cues for Assessing the SPoARC Effect in Short-Term Memory for Serial Order

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The Spatial Positional Association of Response Codes (SPoARC) effect maps serial order information onto a horizontal mental line, with earlier items linked to the left and later ones to the right. While many studies in adults have found this effect, our experiments in primary school children hardly showed significant spatialization, suggesting both developmental and methodological factors influence serial order mapping to spatial information. To investigate the methodological factor, we compare four multi-probe designs focusing on item versus order information

with and without spatial cues. We tested 187 adults across four conditions: (1) Probe-lure pairs, presenting a sequence item alongside a novel item, (2) Order judgments, testing if probe pairs matched their original order in the to-be-remembered sequence, (3) Spatial Cueing, using lateralized dots to trigger faster responses in go/no-go trials, (4) a baseline where participants judged if a test stimulus was a probe or lure. We discuss the strengths and limitations of each method and their implications for assessing serial order spatialization. Next, we aim to assess whether optimal adult designs apply to children.

A Left-To-Right Spatial Bias in Serial Order Processing Develops Linearly With Schooling From Early to Late Childhood

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Spatialization refers here to the mental organization of ordinal information onto a horizontal line, following one's reading and writing direction (e.g., from left to right in Westerners). Studies in children have shown that a spatial bias emerges in the first year of life, followed by an irregular trajectory in which the effect seems to appear and vanish intermittently. However, most of these studies have relied on a single trial per participant to estimate the bias, which might have increased random variability. Using repeated trials, we asked 272 children (aged 3-11 years old) and 59 adults to memorize the position of an item placed on a vertical axis before retrieving the target location on a novel axis transposed horizontally. This procedure was applied to six different positions to assess the homogeneity of the intra-individual responses. While data collection is still ongoing to complete two of our age groups, preliminary results already show a more regular trajectory than in previous studies, with the spatial bias increasing linearly with age. We discuss the factors involved in the evolution of this bias, in particular the potential role of expertise in written language.

Iconic Gestures, Novel Information, and Individual Differences: When Do Gestures Help Young Children Learn?

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Iconic gestures (hand movements imagistically depicting properties of referents) are frequently used when new information is communicated. Research suggests that individual differences in working memory and vocabulary interact with multimodal communication meaning that gestures may support memory and learning differently for diverse learners. Whether gestures co-occur with semantically associated words, or occur after word onset, may also impact learning. In this preregistered study in which analysis is ongoing, we investigated effects when young children (N = 40+, ages 36 -54 months) observed gestures in the context of learning about new real-world words and concepts. After playing with toys representing unfamiliar animals and tools, children watched short explanatory videos in which the presence (present/absent) and timing (concurrent/subsequent) of gestures were manipulated. Word and conceptual learning were measured, and children completed standardised tests of working memory and receptive vocabulary. We discuss the implications of our findings in relation to the use and timing of gestures in word learning, and whether gestures may be particularly beneficial for learners with lower vocabulary and/or working memory.

Working Memory Moderates Gesture Benefit for Lexical Retrieval in Aphasia

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Naming deficits are common in people with aphasia (PWA). Some PWA benefit from observing or producing meaningful co-speech gestures in naming. However, outcomes vary and the role of individual differences is unclear. We explored whether gesture facilitation effects for naming occurred in face-to-face interactions and if cognitive variables moderated effects. We hypothesised that observing or producing gestures would enhance semantic activation, improving naming. We asked 36 PWA to play a picture-naming game with the researcher. In half of trials, players could gesture; in the other half, gesture use was constrained. We compared PWA naming accuracy in each condition. Contrary to predictions, gesture observation had no main effect on naming accuracy. However, we found that patients with lower

WM benefitted from observing gestures while naming, suggesting that gesture observation may maintain trace activation of words. Moreover, gesture production was associated with poorer naming accuracy, suggesting that PWA may primarily use gestures to convey information in communication rather than facilitate word retrieval.

What Influences the Automaticity of Feature Binding?

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Feature binding means integrating different features, such as colour and shape, into coherent objects in working memory (WM). The automaticity of feature binding may depend on whether the to-be-bound information is intrinsic (belonging to) or extrinsic (contextual). Whether the basic unit of storage in WM is object-based (store information as coherent object representation), feature-based (store information as independent features) or that both co-exist in WM may also influence the automaticity of feature binding. Accordingly, I recruited British participants to complete a continuous report paradigm with briefly presented arrays of individually calibrated numbers of shapes. Participants were required to recall the colour or location of the probed shape. The current results suggest that the automaticity of feature binding in WM depends on unitisation and the basic unit of storage in WM. In addition, both feature-based and object-based storage may co-exist in WM, but whether WM is more feature-based or object-based storage depends on unitisation.

How Does Time Affect Working Memory Processing?

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The processing component of Working Memory (WM) is rarely discussed. Barrouillet et al.'s (2023) study is a notable exception, in which the authors used an alternating n-back and tone discrimination tasks. Each task had an easy and a hard condition (0 vs 2-back; 1 vs 3 tones) to modulate their cognitive load, a manipulation thought to impair the other task. When the task was the easiest, no effect on the other task was expected. However, the processing of each task, regardless of its difficulty, was detrimental for the other one. Here, we sought to replicate these findings

(Exp. 1) and to test two explanations to the unexpected results with the easiest conditions. First, the 0-back task may be harder than expected, because the target letter must be maintained throughout the experiment. To alleviate this load in Exp. 2, we kept the target letter displayed on the screen. Second, the detrimental effect of the tasks might be caused by a sequential difficulty effect. We extended the inter-stimulus interval in Exp. 3 to allow the hypothesized executive resource enough time to replenish. While these studies are still ongoing, the preliminary results seemed to replicate the pattern found by Barrouillet et al. (2023).

Dual-Set Maintenance and Interference in Working Memory

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Working memory research has traditionally focused on how concurrent processing tasks reduce storage, as shown in paradigms like the complex span task and the Brown-Peterson task. Less is known about how adding a second memory set - or splitting a single set into two distinct sets - affects recall. Past research suggests a “dual-set benefit,” wherein encoding items as two discrete sets (while holding overall item count constant) can enhance recall compared to encoding them as a single set. In three ongoing experiments, we systematically vary (a) the recall order of item sets, (b) participants’ knowledge of that order, and (c) the composition of stimuli across sets (i.e., whether each set contains the same or different stimulus types), aiming to clarify how and under what conditions a dual-set benefit emerges. Preliminary findings from Experiment 1 suggest a set-separation advantage when the two sets differ in their features (i.e., colors + orientations), and indicate that recall order may exert a weaker influence on performance than anticipated. Experiments 2 and 3 will test whether this advantage holds when the sets share identical features and whether spatial separation confers benefits similar to those of temporal separation.

Individual Differences Study on Involuntary Thoughts About the Past and Future: The Role of Working Memory Capacity

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The study examined the relationship between working memory capacity (WMC) and the frequency of involuntary autobiographical memories (IAMs) and involuntary future thoughts (IFTs). Although IAMs and IFTs arise spontaneously and effortlessly, studies consistently show that their number decreases under the cognitive load. This effect may relate to cognitive resources in the form of working memory capacity. The cognitive flexibility hypothesis suggests a positive relationship between working memory capacity and IAMs and IFTs. It argues that greater WMC leads to a better allocation of mental resource during the task. The executive failure hypothesis, on the other hand, predicts a negative relationship between WMC and spontaneous thoughts, as greater WMC leads to a better ability to focus on the task and avoid intrusions of involuntary thoughts. To test these hypotheses, a large-scale study (n=220) was conducted. Participants with varying WMC levels (low, medium, high) engaged in a laboratory vigilance task, during which the frequency of IFTs and IAMs was assessed. The level of working memory load was manipulated by including an additional n-back task (1-back, 3-back). The results of the study are being processed and will be discussed.

Exploring the Proactive Benefits of Free Time: A Preliminary Test of an Action-Offloading Account

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Extending the time between the item presentations often improves working memory (WM) performance, suggesting that free time facilitates encoding and maintenance. However, the underlying mechanisms remain unclear. Some evidence indicates that free time benefits only items presented afterward, with no benefit for preceding ones (Mizrak & Oberauer, 2021). One explanation for this proactive benefit is the action-based offloading account, which proposes that free time allows WM representations to be reconfigured into response-oriented chunks that are then offloaded into the response-execution system, freeing WM capacity for upcoming items. To test this account, we conducted two experiments manipulating the free time availability and task conditions that either facilitate or hinder proactive response preparation. Experiment 1 varied the length

of all inter-item intervals in a list. Experiment 2 introduced a single extended interval. We compared free time effects in the recognition task (minimal response preparation) and the oral recall task (more proactive preparation). By assessing whether free time benefits recall more than recognition, we examined whether free time enables action-based offloading, leading to proactive improvements.

A New Tool for Assessing Working Memory Capacity in French Children Aged 4 to 7: A Pilot Study

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The role of working memory (WM) in academic achievement has now been clearly demonstrated. Moreover, preschoolers' WM capacity seems to be an excellent predictor of academic achievement. However, there is currently no French-language tool for assessing WM capacity in young children. The aim of the study was to design a tool for assessing WM in French children aged 4 to 7. Two tasks were designed. The verbal WM task consists in presenting lists of food and animal words both auditorily and in pictorial form. Children are required to orally recall in order the words belonging to one of the semantic categories. The visuo-spatial task consists in sequentially presenting blue and yellow butterflies on the screen. The child then has to recall the location of butterflies of a given colour. Two versions of each task are tested to determine which is most suitable for children of this age: a precue version (the child knows before the presentation of the items which semantic category/colour to recall) and a retrocue version (the child is informed after the presentation of the memory list which semantic category/colour to recall). Currently, all data have been collected among children aged 4, 5, 6 and 7 and statistical analyses are ongoing.

Individual Differences

Leisure Activity Engagement and Cognitive Functioning Across the Lifespan

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Engagement in leisure activities has been linked to cognitive health and may support cognitive functions. Vemuri et al. (2012) found that engagement in intellectually and physically stimulating activities was associated with global cognition in older adults. However, whether these associations extend across the lifespan and relate to cognitive abilities remains unclear. This study analysed pre-test data (N = 425) from a multi-site cognitive training study (von Bastian et al., 2022), including participants aged 18-85 years (M = 48.13, SD = 18.38). Leisure activity engagement over the past 12 months was assessed via questionnaire, categorising activities as intellectual (e.g., reading) or physical (e.g., exercise). Correlational results indicate intellectual activities related to reasoning ($r = .14$) and everyday cognition ($r = .14$), while physical activities correlated with working memory ($r = .10$). However, SEM analysis suggests a limited influence of intellectual and physical activities on cognitive functions, highlighting the need for further analysis. Future research should refine leisure activity measures to capture both current and lifetime participation and explore longitudinal designs to explore causal mechanisms.

Computational Modelling

Causal Attribution of Valenced Outcomes and Its Association With Transdiagnostic Mental Health Symptoms

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Depression has been associated with a negative attribution style: increased self-attribution of negative outcomes and decreased self-attribution of positive outcomes. This project aimed to investigate this computationally. In an online study (N=454), participants completed a questionnaire battery, and a reinforcement learning task in which a hidden agent could occasionally intervene and cause: losses (adversarial), rewards (benevolent), or either outcome (random condition). Overall, results showed an optimistic bias in causal attributions and learning that was modulated by condition. Self-attributions were

higher for positive than negative outcomes in the random condition, an effect increased in the adversarial, and reversed in the benevolent condition. A Bayesian model showed higher learning rates for positive than negative outcomes in the adversarial condition, and the reverse in the benevolent condition. Preliminary analyses suggest that anxious-depressive symptoms were correlated with increased self-attribution for negative outcomes, but not with attribution for positive outcomes. Further model-based analyses are ongoing to disentangle how attribution influences learning and relations with mental health.

Modeling Lexical Competition and Semantic Priming in Language Production: A Computational Approach to the Swinging Lexical Network

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This study presents a computational implementation of the Swinging Lexical Network model, which explores the interplay between semantic priming and lexical competition in language production. Using the picture-word interference (PWI) paradigm, our model follows a construction-integration framework: the construction phase generates a cohort of competing concepts based on semantic similarity between target and context, while the integration phase involves iterative cycles of spreading activation within the cohort. We assume the target concept gains an additional activation boost through accumulated evidence over time. To represent semantic memory, we employ Distributional Semantics Models. Preliminary findings, based on parameter estimation from 18 experiments with 694 participants (>150,000 data points), indicate that the target boost mechanism outperforms the spreading activation mechanism. Moreover, naming latencies in PWI experiments are predicted by both the semantic similarity between the target and context words and the lexical cohort size. These preliminary results suggest that response times in PWI are driven by evidence accumulation, lexical cohort size, and semantic similarity between the target and context.

Conveying and Understanding (Discrete) Emotions Through Out-Of-Vocabulary Stimuli

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Discrete emotions (i.e., anger, disgust, fear, happiness, sadness) are one of the main affective sources of information that explain the semantic features of words. Recent studies suggest that humans are able to assign emotionality to plausible verbal stimuli that do not belong to a given language, like pseudowords, which serve as proxies for never encountered, real words (i.e., novel words). So far, evidence at our disposal is mainly limited to valence (i.e., the hedonic tone of a words' reference, from pleasant to unpleasant), while investigating discrete emotionality could provide a more refined understanding of the processes at hand. Here, across three experiments, we probed i) humans' ability to convey discrete emotions when generating novel stimuli to express the meanings of given emotional words, and ii) humans' ability to understand such emotionality when processing these human-generated novel words. Results are discussed in terms of acquisition of emotional properties of words and systematicity in form-meaning mapping.

Learning Map-Like Neural Representations of Abstract Concepts

Sophie Johnson, University of Sussex; Sam Berens, University of Sussex

Recent theoretical models suggest that conceptual learning is grounded in our experience with space. Just as the mammalian hippocampal system learns maps of spatial environments, it may also learn 'conceptual maps' representing inferred relations between abstract objects. Here, we test several novel hypotheses about conceptual learning that stem from these models. Across ~6 weeks, participants will learn abstract conceptual relationships between visual stimuli (a modular ring of integers). Following this, they will undergo fMRI scanning while rehearsing what they have learnt. We will use multivariate analyses to examine the structure of neural representations that have been learnt. Although the task does not explicitly involve spatial transformations, we predict that the hippocampal system will learn map-like representations of the task stimuli that encode inferred conceptual 'distances' between them. Mirroring what is seen in artificial neural networks, we

also predict that participants will generalise what they have learnt to solve unseen problems, but only long after they have memorised explicitly trained relationships. Our study represents the first test of key predictions made by contemporary models of conceptual learning.

The Effect of Prior Knowledge and Representational Distinctiveness on Learning and Generalisation

Sophie Johnson, University of Sussex; Sam Berens, University of Sussex

Neurocognitive models suggest that learning and generalisation may be accelerated by mapping new information onto existing knowledge structures. Experiments in artificial neural networks further suggest that learning rates are enhanced when stimuli evoke neural representations that are both widely distributed and distinctive. However, these proposals are untested in humans. Here, we test these hypotheses by quantifying learning and generalisation rates across various stimuli differing in their relationship to pre-existing knowledge and the neural representations they elicit. Participants will learn a set of premise discriminations between stimuli that imply a transitive hierarchy. Stimuli in each hierarchy will belong to one of 9 object categories (e.g., faces, abstract art). We will use fMRI to estimate neural responses to each stimulus, quantifying their relationship to pre-existing knowledge and the distinctiveness of their neural representations. Preliminary data indicate significant variability in learning rates across stimulus categories, primarily explained by the distinctiveness of neural representations. Our findings will illuminate key mechanisms underlying human learning and generalisation.

Attention & Cognitive Control III

Changing-State Sounds Influence Self-Monitoring but Not the Serial Recall of Environmental Sounds

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The changing-state effect occurs when varying auditory streams (e.g., K-L-T) impair semantic serial recall more than steady-state streams (e.g., L-L-L).

The ongoing study extends this concept by examining how steady- versus changing-state speech interferes with the serial recall of environmental sounds. Twenty-one subjects recall randomized eight-sound sequences by either reporting the order of the first letters of the corresponding words or the full words themselves. Then, they estimate the number of correctly recalled items. An environmental sound display is followed either by changing-state, steady-state sounds, or silence. Preliminary results show lower self-estimated performance in the changing-state condition than in steady-state and silence. However, recall performance is not modulated by changing-state; neither for the letter nor the word recall task. This dissociation implies that environmental sounds may engage compensatory cognitive resources, such as strategy usage, to reduce interference, while subjects remain aware of the interference caused by item variation. The findings highlight stimulus features and metacognition of serial recall within naturalistic contexts, and the top-down processing to resist interference.

Concurrent Validity of the Hazard Prediction-Orientation Test in Naturalistic Driving Environments: Correlations With UFOV, TMT, and Contrast Sensitivity Measures

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The Hazard Prediction-Orientation (HP-O) Test involved watching 39 short videos filmed in naturalistic driving settings. Three orientation conditions were studied: a) Simple: one developing hazard; b) Valid: one potential and one developing hazard located near each other in the scene; c) Invalid: one potential and one developing hazard located in different areas of the scene. A total of 141 experienced drivers participated, including 39 middle aged adults (35-54 years old), 42 younger seniors (55-64), and 60 older seniors (65-85). Participants were required to answer a multiple-choice question: What happens next after each video cut? by providing information about the developing hazard (in which an evasive maneuver would be required to avoid a collision). The results replicated the expected main effect of orientation (Posner, 1980) in complex driving

situations. A significant age group effect and an interaction effect between both variables were also found. The decline in performance on the invalid and valid trials was most pronounced in the older seniors group. Concurrent validity of the HP-O measures was also established with the Trail Making Test (TMT), the Useful Field of View (UFOV), and with the contrast sensitivity measure.

Exploring Systematic Spatial Association Effects Arising From Language Experience Alone

Oksana Tsaregorodtseva, University of Milano–Bicocca; Luca Rinaldi, University of Pavia; Marco Marelli, University of Milano–Bicocca

Evidence suggests that language encodes spatial knowledge often attributed to sensorimotor experience. This study examines whether language alone can encode spatial information by testing how non-spatial directional biases retrieved from natural language influence human spatial intuitions and motor responses. To this end, we used words not typically linked to spatial locations as stimuli, uniformly distributed based on their linguistic index (LI), which quantified their association with vertical space using a text-based computational model. In Experiment 1, participants rated the spatial association of non-spatial words using the Best-Worst Scaling method. Results showed that LI significantly predicted human associations ($p < 0.001$), supporting the idea that spatial structures can emerge from language use. In Experiment 2, participants categorized words as abstract or concrete by dragging them to a lower or upper target in a mouse-tracking task. Results revealed an interaction between LI and movement direction: words linguistically associated with ‘up’ slowed downward movements ($p = 0.045$). These findings suggest linguistic exposure alone can shape spatial knowledge, challenging strong embodiment theories.

Exposure to Multilingual Contexts Enhances Controlled Auditory Attention in Demanding Speech Conditions: Evidence From Syllabic Forced Dichotic Listening

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Recent findings suggest that the recurrent exposure to complex multi-language contexts leads to beneficial cognitive and neural adaptations. This study examined the effect of multilingual context exposure on auditory controlled attention using forced-right and forced-left syllabic dichotic listening tasks. Participants had to focus attention on one ear while inhibiting simultaneous information from the other. Data were collected from 140 participants, categorized into three groups based on multilingual indices computed using language history, proficiency, and exposure: Spanish monolinguals, and low- and high-index Spanish-Basque multilinguals. Whereas no group differences were found in the forced-right task, in the task where attention was directed to the “less dominant” left ear, only high-index bilinguals outperformed monolinguals. Correlation analyses across the whole group revealed that task accuracy (right (or left) ear reports in the forced-right (or -left) task) positively correlated with multilingual exposure. These results suggest that degree of multilingual exposure modulates bilingual advantages in attentional control to speech, especially in the most complex situations.

Mental Number Line Compatibility Modulates Size-Based Interference

Seda Dural, İzmir University of Economics; Melike Şefikoğlu, İzmir University of Economics; Hakan Çetinkaya, Yaşar University

Prior knowledge of real-world object sizes influences visual size judgments, as demonstrated by the familiar-size Stroop effect. This study examines how space-magnitude associations, particularly mental number line (MNL) compatibility, modulate this effect. Fifty-two participants compared the visual sizes of objects while ignoring their actual sizes. The stimuli were presented under varying Stroop congruency and MNL compatibility, with participants instructed to identify the smaller (small task) or larger (large task) object. Results revealed that MNL-compatible presentations (small-left, large-right) reduced Stroop interference, whereas MNL-incompatible presentations (large-left, small-right) increased it. The task order played a significant role: MNL effects emerged in trials following a small-then-large sequence, where Stroop interference was more pronounced. RT distribution analysis showed that the MNL effects varied across time, influencing different Stroop conditions at distinct stages. Specifically, MNL

effects appeared in slower bins for Stroop-congruent trials and faster bins for Stroop-incongruent trials. These findings suggest that spatial associations systematically interact with size-related interference effects.

Do Spatial-Numerical Associations Depend on Distances Between Numbers? Evidence From a Unimanual Magnitude Comparison Task

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The Spatial-Numerical Associations (SNAs) refer to the mental representation of numbers along a spatial continuum. This phenomenon is evidenced by the numerical distance effect, where numerical comparisons are faster and more accurate as the numerical distance increases. A total of 120 participants were assigned to one of two magnitude comparison tasks. In the "small task," they pressed the B or N key to indicate the side of the smaller number, while in the "large task," they pressed the corresponding key for the larger number. Responses were performed unimanually using adjacent fingers (e.g., index and middle) on the B and N keys. Participants compared number pairs that varied in numerical distance (e.g., 1-2 vs. 1-9) and spatial-numerical compatibility (e.g., small-left being "compatible" vs. small-right being "incompatible"). Results showed a robust distance effect in both tasks but no compatibility advantage when small numbers appeared on the left and vice versa. However, a significant interaction emerged: compatibility effects appeared at larger distances, suggesting that directional SNAs become more pronounced when the cognitive load decreases, allowing implicit spatial biases to emerge.

Cognitive and Temperamental Determinants of Susceptibility to Orientation Illusions on an Example of the Poggendorff and Zöllner Figures

Hanna Bednarek, SWPS University; Magdalena Przedniczek, SWPS University

The purpose of the study was to find the cognitive and temperamental predictors of susceptibility to the Poggendorff & Zöllner illusions. The cognitive predictors included Witkin's field dependence-independence and the efficiency of Posner's

attentional networks: alerting, orienting, and executive control. The temperamental determinants were analyzed in the context of Strelau's Regulatory Theory of Temperament. 161 participants aged 20–33 ($M=24.73$, $SD=3.32$), including 89 women (55%), participated in the study. The results showed that there is no one universal mechanism that explains susceptibility to the examined illusions. Susceptibility to the Zöllner illusion was found to be related to both cognitive and temperamental predictors. This study found that people who were susceptible to the Zöllner illusion either had a field-dependent cognitive style that is characterized by a high level of the Endurance feature, or they had an efficient orienting network and a high level of Briskness. We also found that weak efficacy of the alerting network is a predictor of the Poggendorff illusion.

Eye Blink Rate: Temporal and Frequency Patterns in a Simple Visual Task

Hussam Abu Jaber, ben gurion university; Ronen Herschman, Innsbruck university; Avishai Henik, ben gurion university

Eye blink rate (EBR) serves as a physiological indicator of cognitive effort and attentional engagement, influenced by task demands. Previous studies suggest that EBR varies with stimulus familiarity and processing complexity. However, it remains unclear whether stimulus complexity contributes to the observed pattern. This study examined the contributions of task complexity in a visual simple task. Two independent variables were tested: (1) presentation time (200 ms vs. 400 ms) and (2) block type (fixed vs. mixed). Thirty participants (21 females; mean age = 23.94) performed the task while EBR was measured. Results revealed that longer presentation durations elicited higher EBR compared to shorter ones. EBR latency appeared earlier for shorter presentation times than for longer ones. Additionally, mixed-duration blocks led to higher EBR than fixed-duration blocks. These findings suggest that task complexity, as manipulated through presentation time and predictability, influences EBR patterns and may reflect changes in allocation of cognitive effort.

The Role of Irrelevant Numbers and Selective Attention in Numerical Processing: Evidence From Hierarchical Navon Stimuli

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This study investigates irrelevant number processing at various hierarchical levels. We focused on numerical performance signatures (size, distance and SNARC effects) to test their robustness and the role of selective attention in modulating the interference effect of irrelevant digits. Stimuli consisted of hierarchical Navon figures composed of single digits (1, 4, 6, 9) at global and local levels. Two groups of participants classified global or local numbers as numerically larger or smaller than 5, while ignoring the irrelevant level. We found faster processing of global stimuli, consistent with typical Navon effects. When global and local digits were identical, classification was faster. While both groups showed significant SNARC and distance effects, a size effects was found only in the local group. Interestingly, responses to local numbers were faster even if the global digit was in the same numerical range (both local and global digits smaller/larger than 5). These results suggest that numerical processing of both relevant and irrelevant numbers occurs simultaneously at different spatial scales, although local stimuli seem more subject to global interference.

Inhibition, Cognitive Flexibility and Academic Performance in College Youth With Depressive Symptoms

Bryan Jauregui, *ESPOL*; **María de los Angeles Rodríguez**, *ESPOL*; **Juancarlos Pingel**, *ESPOL*; **Purificación Galindo**, *ESPOL*

Depression is a complex disorder due to decreased quality of life; in addition, cognitive impairments in functions such as inhibition and cognitive flexibility impact academic performance. However, many studies suggest variations in executive function impairment during depression. Are there differences in inhibitory control and cognitive flexibility in college students with depressive symptoms? This study of 130 college students aged 20-25 years employed a cross-sectional comparative design with independent control groups classified according to the severity of depressive symptoms. ANOVA test results suggested that inhibitory control was preserved at all levels of depression, but when inhibition was compared according to depressive symptoms with suicidal ideation, they demonstrated poorer inhibitory control,

requiring more time to inhibit responses ($p = 0.02$) compared to non-depressed groups, but academic performance showed a significant difference between the groups with major depression and the groups without depression or with mild depression ($p = 0.01$), however, there was no difference according to suicidal ideation, but cognitive flexibility remained stable despite the severity of depression and the suicidal ideation.

Reading Vertically Scrolling Texts: Impact of Agentivity on Text Comprehension

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Because screen height limits display size, reading texts on a computer requires vertical scrolling using the mouse wheel. However, the cognitive processes involved in this type of reading are poorly understood. In our current experiment, we are investigating whether active text scrolling is beneficial for text comprehension by comparing the ability to answer questions about texts in a situation where they are moved by participants using the mouse wheel versus a situation where they automatically drift upwards. Participants' eye movements and scrolling movements are recorded throughout the experiment. Mouse wheel control may have a cognitive cost that makes active scrolling more distracting for reading than passive text movement. However, moving text movement yourself may offset this cognitive cost and make active scrolling more effective than passive scrolling. Based on preliminary data, the latter seems the most likely outcome, but this may depend on the individual. Texts that drift upwards may trigger smooth pursuit eye movements depending on the experimental condition, as key differences have been reported between tracking a self-moved target and one moved externally. The results will be presented at the meeting.

Is Temporal Integration a Unitary Process?

Abigail Wyllie, *University of Sheffield*; **Alon Zivony**, *University of Sheffield*

When presented in quick succession, features are sometimes perceived as a single item. Research into this temporal integration process often uses missing

dot (MDT) tasks and Rapid Serial Visual Presentation (RSVP) tasks. In MDT, two partially filled grids are presented and participants report the location of a single unfilled cell, which can only be achieved through successful integration. In RSVP, stimuli are rapidly presented, and participants report the target based on a selection cue. Temporal integration between the target and a distractor can result in binding errors. We investigated whether performance in these two tasks represents a single integration mechanism. In the first experiment, participants completed the two tasks separately. In the second experiment, participants completed both tasks concurrently. A complex pattern emerged. On the one hand, weak correlations were observed between the two task's integration rates, suggestive of a common factor. On the other hand, the two measures differed in associations with other performance indicators. Data collection is still ongoing, but these preliminary results suggest that temporal integration may reflect multiple attentional processes occurring across different scales.

New Insights Into Control Mechanisms in Dual Tasks Contexts: Assessing Task-Pair Mixing Costs

Alice Camisa, RWTH Aachen University; Iring Koch, RWTH Aachen University; Patricia Hirsch, RWTH Aachen University

Evidence from task-switching research shows that maintaining in memory and mixing two tasks results in performance costs. The present study aims to investigate performance costs arising from the requirement to mix two different dual tasks, where the identity of the two component tasks is jointly integrated into a single representation, termed task-pair set. To this end, we manipulated the sequence of different task-pairs (AB, AC) to obtain task-pair switch (e.g., AB → AC) and repeat (e.g., AB → AB) trials. Each task-pair, corresponding to a PRP trial, included a tone task (T1; identical for both task-pairs) followed by a visual task (T2; varying according to the task-pair), with the extent of temporal overlap between the two being manipulated. We compared performance in task-pair repetition trials from mixed blocks, where both task-pairs need to be performed and maintained in memory, to blocks where a single task-pair is repeatedly performed. While data collection is still ongoing, preliminary results show longer reaction times and higher error rates in both T1 and T2 for trials in mixed blocks, revealing task-pair mixing costs.

Such findings offer new insights into non-switch-specific control mechanisms in dual task contexts.

Sensation & Perception III

Intact Susceptibility to Visual Illusions in Autistic Individuals

Yarden Mazuz, Ben-Gurion University of the Negev; Bat-Sheva Hadad, University of Haifa; Tzvi Ganel, Ben-Gurion University of the Negev

Altered sensory perception, a core characteristic of autism, has often been linked to reduced reliance on stimulus context or prior knowledge during perception. Reduced susceptibility to perceptual illusions is frequently cited as evidence for these perceptual accounts in autism. However, empirical support for these claims has been inconsistent. This study systematically examined size illusion susceptibility in autistic and non-autistic individuals using a standardized psychophysical battery previously developed in our lab. Eighty-one participants (41 autistic, 40 non-autistic) completed the Ben-Gurion University Test for Perceptual Illusions (BTPI), designed to measure susceptibility to the Ponzo, Ebbinghaus, and Height-width illusions. Both groups exhibited susceptibility to illusions, with no significant differences in illusion magnitude or perceptual resolution of size. These results call into question theories that posit reduced reliance on prior knowledge or enhanced sensory measurement in autism. Instead, this study, using reliable psychophysical methods, offers compelling evidence that autistic individuals utilize priors and integrate long-term knowledge during perceptual processing.

Temporal Dynamics and Stimulus Similarity in Discrete Visual Perception

Mikhail Allakhverdov, Yerevan State University

The perception of visual stimuli involves the discrete temporal integration of sensory information, yet the mechanisms underlying this integration remain unclear. We hypothesise that information becomes more abstract after processing, so two slightly different objects presented in separate discrete windows may be perceived as more similar compared to when they are presented within the same window. This study investigates how this factor influences the recognition and categorisation of visual stimuli using

a priming paradigm. Eighty-four participants were tested in a repeated-measures experiment in which a visual prime preceded a target stimulus, with intervals ranging from 100 to 800 ms. Stimuli consisted of hour-hand positions on a clock face, with varying degrees of angular deviation between prime and target. RM ANOVA revealed significant effects: increased prime-target intervals improved reaction times ($F(7, 483) = 2.271, p = .039$), while greater similarity between prime and target decreased accuracy ($F(3, 207) = 5.149, p = .003$). Results support discrete models of perception, suggesting temporal windows dynamically influence the efficiency of perceptual categorisation.

Context Matters: Intense Negative Context Reduces the Decision Criterion for Unpleasant Feelings

Kim Rubinstein, Ben Gurion University of the Negev; Nachshon Meiran, Ben Gurion University of the Negev

In a series of 4 experiments, participants alternated between an Emotion task, reporting whether a mild emotion evoking picture made them feel (un)pleasant, and a perceptual task used primarily to mask the goal of the study. Context was manipulated by including a small proportion of extremely negative pictures in the experimental blocks. Applying evidence accumulation modelling to the (un)pleasantness reports concerning mild stimuli showed that extremely negative context reduced the decision criterion (B) when responding to normatively unpleasant pictures, which usually indicates hasty responding, but in this case may indicate lesser willingness to engage in emotion. This reduction is distinct from speed-accuracy trade-off, which resulted in reduction in B for both pleasant and unpleasant feelings. By estimating the trial-by-trial fluctuations in B for unpleasant, no consistent trend was found across experiments. This might support a block-wide (global) strategy that has been adopted following the instructions or the very first encounters with an intense stimulus. It is not yet clear if the results indicate a motivational shift (lesser willingness to engage with emotion) or an adaptation to the increased stimulus range.

Exploring the Effect of a VR-Based Social Interaction Task on Face Perception

Shengtong Liu, University of Manchester; Boris Otkhmezuri, University of Manchester; Rebecca Elliott, University of Manchester; Karen Lander, University of Manchester

This study investigates explores the effect of VR-based social interaction tasks on face perception and social anxiety. Forty students from the University of Manchester were divided into an experimental group and a control group (N = 20 each). The experimental group completed six weekly VR sessions featuring progressively more challenging social scenarios, with physiological data (pulse rate, eye movement) recorded as well as social anxiety scales and face tasks. The control group completed only the scales and face tests. We have established the feasibility of using a VR methodology in this context. Our results show changes in participants' pulse rates and eye movements during the VR-based social interaction tasks and initial analysis suggest changes in social anxiety and face perception across testing sessions in the experimental group. These results suggest social anxiety impairs face memory. Further, we highlight the potential use of VR to improve social and cognitive functioning in socially anxious individuals.

Metacognitive Efficiency of “Same”-“Different” Decisions in Two Visual Comparison Tasks

Michael Pilling, Oxford Brookes University

“Same”-“Different” judgements underlie a large number of lab-based and real world visual tasks. Surprisingly, the two judgement types are not complementary. For instance, when asked to compare two objects, performance is generally found to be better when participants must report if anything is different, than when they must report if anything is the same across the objects, a phenomenon called the criterion effect. In the current work participants are presented with sequential letter-string pairs of varying length (1-4) and in matched or unmatched case and, depending on task instruction, must report if there are letters different, or letters the same, and rate the confidence of their decision. In the provisional results, the classic criterion effect is reproduced, which is most evident at the larger string lengths. Results also indicate differences in the metacognitive efficiency of the two tasks with respect to the required “Same” or “Different” decision, which may suggest differential awareness of the corresponding internal sensory evidence.

How Temporal Order Judgement Affects Early Attentional Processing in the Self-Prioritization Effect

Dipanjali Dipanjali, I.I.T KANPUR

Present study investigates the influence of social salience on temporal order judgment performance, exploring effects of bottom-up & top-down processing on TOJ. Participants 1st done baseline TOJ task, followed by shape-label association task, triangle/square randomly assigned to self & other. Then, implicit TOJ task (without referring social label) identified first appearing shape, to investigate effects on performance when social salience was not invoked. Later, explicit TOJ task was done, participants were explicitly instructed to identify whether self/stranger associated shape appeared 1st, making hypothesis, top-down processing would improve performance i.e., more accurate & faster temporal order judgments. Both implicit & explicit associations from shape-label task significantly impacted TOJ performance, salient shape (self) identified earlier, despite salient labels were not invoked. Also, salient shape (self) in explicit task enhanced subjects' accuracy, i.e., evidence of role of identity-based processing in TOJs. Findings show, association to socially salient label (self) affects processing at both levels (implicit & explicit) & thus, seems to be central to information processing mechanisms involved in TOJ (perception).

Individual Differences II

Polish Adaptation of Cognitive Reserve Scale. Relationship of Cognitive Reserve With Personality and Subjective / Objective Cognitive Functioning

Jakub Stupczewski, Nicolaus Copernicus University; Bartłomiej Kiljanek, Nicolaus Copernicus University; Maria Dolores Roldan-Tapia, University of Almeria; Juan García-García, University of Almeria

Cognitive reserve (CR) refers to the adaptability of cognitive processes, explaining why some individuals better tolerate brain aging. A tool that allows the measure of CR is the Cognitive Reserve Scale (CRS), consisting of 24 items covering e.g. daily activities and social life. Aim of the project was to adapt the CRS and test the relationship between the CRS results with personality traits and subjective / objective cognitive functioning. The project conducted an online survey

with the CRS (n = 513) and a second study of 52 adults over 65 years who performed CRS, tests measuring subjective / objective cognitive functioning and personality traits. Results made it possible to verify high reliability and accuracy of the CRS, but also showed that higher levels of CR were associated with stronger intensity of Conscientiousness, Openness to Experience and bigger amount of perceived cognitive failures. Simultaneously, there were no relationships between CR level and results on objective cognitive tests. Relationship between CR and subjective cognitive performance shows that the study of CR may be a much more complex issue than previously assumed and will require researchers to take into account additional aspects of human functioning.

Deciphering White Matter Microstructure and Its Influence on Fluid Intelligence Through Structural Equation Modeling

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White matter (WM) microstructure is a candidate brain property underlying individual differences in fluid intelligence, possibly facilitating faster information transfer within and across brain regions. To date, it remains uncertain whether MRI-derived markers of WM microstructure generalize across different tracts, enabling the modeling of general factors related with fluid intelligence in a latent variable framework. Using data of N = 150 participants from the ongoing Dortmund Vital Study (Gajewski et al., 2022), we applied confirmatory factor analysis to derive measurement models for markers of WM integrity, neurite density, and myelin content. We characterized their factor structure across ten functional clusters of 52 WM tracts from the HCP-1065 tract atlas. Hierarchical models with bifactors for the hemispheres proved optimal for all markers. Fluid intelligence measured with Raven's Progressive Matrices 2 was significantly explained by WM integrity ($\beta = 0.46$, $p < .001$) and myelin content ($\beta = 0.21$, $p = .019$). By establishing measurement models for WM, this study provides a framework for using MRI-derived

markers in individual differences research while simultaneously shedding light on the biological basis of intelligence.

Inside and Outside the Body Space: Exploring Spatial Processing in Healthy Young and Older Adults

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Building on evidence that multiple types of space can be distinguished (Tversky et al., 1999), we expand on previous research, which has usually examined only one type of space at a time, by investigating in the same sample the processing of the navigational space, the space surrounding the body, and the space of the body—a space that can be experienced both from the inside, through interoception, and from the outside, through exteroception. Fifty young (20.62±2.11 yrs) and 37 older adults (61.03±7 yrs) completed tasks assessing interoceptive accuracy (Heartbeat Counting Task), action-oriented and nonaction-oriented body-representation (Hand Laterality Task and Frontal Body Evocation Task) and landmark, route and survey knowledge of a virtual environment. Older adults scored higher in an interoceptive accuracy measure. In contrast, young adults outperformed them in processing the outer body, action-oriented body space, and navigational tasks involving route and survey knowledge. These findings provide insight into the different trajectories of spatial processing in adulthood, suggesting that while outer body and navigational space decline with age, the processing of inner body space could improve.

Body Processing and Navigational Abilities: Insights From a Real-World Environment

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Multiple factors contribute to interindividual variability in navigation. Since we navigate through our bodies and based on a specific interpretation of embodiment (Goldman & de Vignemont, 2009), this study examines whether individual differences in representing the inner and outer body relate to navigational performance in real environments. One hundred ten healthy participants were given interoceptive measures (Heartbeat Counting Task; Self-Awareness Questionnaire) and tasks assessing action-oriented and nonaction-oriented body representation (Hand Laterality Task; Frontal Body Evocation Task) and the landmark, route and survey knowledge of a real environment. Higher interoceptive awareness was linked to worse landmark recognition, while faster route completion correlated with greater heartbeat sensibility and fewer uncomfortable interoceptive sensations. A better outer body representation was associated with a more accurate survey knowledge. These findings highlight a complex relationship between internal and external body representations and navigation in real-world environments.

Exploring the Impact of Digital and Print Media on Cognitive Processes and Conspiracy Theory Endorsement

Nefeli Kapsourachi, Deree, The American College of Greece; Eleni Orfanidou, Deree, The American College of Greece

In the digital age, conspiracy theories are flourishing. This study explores the relationship between cognitive processes, trust in science, and religious beliefs in the context of conspiracy beliefs, focusing on the impact of the online environment. 132 participants were divided into online and pen-and-paper groups and completed the Conspiracy Mentality Scale (CMS), Rational Experiential Inventory (REI-10), Centrality of Religiosity Scale (CRS), and Trust in Science and Scientists Inventory (TSSI-21). The online group reported higher scores in intuitive thinking than the pen-and-paper group. No significant difference was found between the groups regarding conspiracy theory endorsement. The online group also scored higher in analytical thinking, but given the low reliability of the analytical thinking subscale ($\alpha = .063$),

this result should be treated with caution. Intuitive thinking and trust in science were significant predictors of conspiracy theory endorsement (positive and negative, respectively), while analytical thinking was not a significant predictor. These findings highlight the need for further research to explore the interplay between personality traits, cognitive functions, and the endorsement of conspiracy theories.

ENGAGE++: Psychometric Validation of a Questionnaire on Organizational Commitment

Geoffrey Duran, Université Lumière Lyon 2; Ambre Di Fresco, Université Lumière Lyon 2

Organizational commitment is a key factor in well-being and performance at work. A short 31-item scale, ENGAGE+, has been created to better understand the 5 facets that make it up, namely the feeling of security at work, interpersonal relationships, recognition, professional fulfillment, societal contribution and affective commitment. Our study proposes a psychometric validation of this scale in its French version with 120 French participants. We evaluated the internal consistency, reliability, factor structure and convergent validity. Characteristics related to engagement are discussed, such as personality traits, such as empathy or dark personality traits. This ENGAGE+ scale seems appropriate for future French-language research on organizational engagement.

Cognitive Plasticity

No Evidence That Watching Nature Videos Restores Working Memory Capacity

Andree Hartanto, Singapore Management University; Verity Lua, Stanford University; Nicole Chen, Singapore Management University; Nadyanna Majeed, National University of Singapore

Previous research has demonstrated that direct exposure to natural environments can help restore attentional resources after cognitively demanding tasks. However, it is still unclear whether virtual nature experiences, such as watching nature videos, can provide the same restorative benefits for executive attention as real outdoor natural environments. Given the inconsistent findings in existing literature, we aimed to investigate whether watching nature videos (compared to urban scenery

videos) enhances working memory capacity after completing a cognitively demanding task, assessed through a complex span task, in a high-powered, pre-registered within-subject experimental design. Overall, our results provided no evidence that viewing nature videos contributes to the restoration of working memory capacity. Additionally, Bayesian analyses offered strong support for the null hypothesis. These findings suggest that watching nature videos may not successfully replicate the experiences of nature in the outdoors and restore attentional resources.

Cognitive Strategy Use in Backward Serial Recall

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Backward serial recall is a widely used measure of complex cognitive functions, yet its underlying cognitive strategies remain underexplored. The present study investigated how people use strategies during backward recall tasks with verbal and spatial stimuli by analyzing subjective strategy reports from two training studies. The results identified several key strategies and revealed that no single strategy predicted training performance; rather, the combined use of multiple strategies may be more critical. For example, the grouping strategy was more closely associated with order manipulation strategies (e.g., “peel off,” “last out”), while the semantic strategy was less associated with rehearsal and visuospatial strategies (e.g., “mental imagery,” “using response panel as cues”). Further analyses showed that the sophistication of strategy descriptions (i.e., the number of strategies and level of detail) positively correlated with baseline performance and was higher with verbal stimuli than with spatial stimuli. However, these indices did not predict actual training gains. These findings highlight the importance of understanding strategy use in complex cognitive tasks, as well as the limitations of retrospective self-report data.

Training Cognitive Functions Using Episodic Specificity Induction in Healthy Older Adults: A Task-fMRI Study of Activation and Functional Connectivity

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Aging is associated with a decline in episodic memory retrieval, which can be mitigated with cognitive training interventions. Our team developed and validated a novel cognitive training program involving repeated practice of episodic specificity induction (ESI). The program involves practicing individuals to recall and describe event details with high specificity. The aim of this study was to assess the functional correlates of this intervention using task-related functional magnetic resonance imaging. Fifty-one cognitively healthy older adults were randomly assigned to receive six two-hour training sessions of either ESI or an active control condition involving practicing picture-word associations. To assess activation, participants first encoded short videos and their titles outside of the scanner. Activation and connectivity were then measured while participants were cued with the title to retrieve details of the video. Ongoing analyses are examining training-induced changes in activation and connectivity patterns during retrieval and their relationship to memory benefit.

Systematic Review on Difficulty Adjustment in Cognitive Training

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In recent years, there is an increasing interest in personalizing cognitive training by adjusting difficulty levels based on individual characteristics such as prior knowledge, personality traits, and performance. The present work reviews the varieties of difficulty adjustment methods that have been used in the context of cognitive training, focusing exclusively on studies that target executive and/or attentional functions. A systematic review of such trainings will be presented, focusing on four key dimensions of difficulty adjustment: (1) Training dimensions - is difficulty adjusted by modifying a single or multiple aspects of training? (2) Influence of prior information - is the adjustment constrained by priors (e.g., baseline performance, cognitive profiles), and if so, what type? (3) Adaptation strategy - does difficulty change instantaneously based on recent performance, or does it incorporate the full learning trajectory? (4) Progression pattern - is difficulty strictly unidirectional

(continuously increasing), or does it allow for phases of reduced difficulty to support consolidation? This project is ongoing and we will present our methodology and preliminary results.

Discrete vs. Continuous Structure of the Cognitive Hand Map

Sylvain Gerin, UCLouvain; Michael Andres, UCLouvain

Fingers are a wonderful tool used in a wide range of situations such as object grasping, finger counting or even playing the piano. However, very little is known about the cognitive map of hands and fingers. Such cognitive representation is necessary to allow finger discrimination as no sensory signals are directly informative about hand size and shape. Prior studies have shown distortions of the cognitive map of our hands, revealing shortened fingers or broadened hand representation, and different spatial biases in finger identification. The question of how hand space and relative finger position are represented on the cognitive map has been less addressed, despite its importance for skilled hand action. This study investigated whether fingers are coded as discrete or continuous units in the hand space. We stimulated the medial and lateral sides of fingers at near-threshold intensity and participants named the stimulated finger without visual feedback. Results showed that the index finger was biased towards the little finger whereas the ring finger was biased towards the thumb. The side of stimulation did not influence the pattern of errors, indicating that fingers are coded as discrete units at the hand level.

Unlocking Multitasking Potential: How Instructions and Task Switching Training Shape Individual Differences in Processing Modes

Jovita Brüning, Otto-von-Guericke Universität; Annemarie Scholz, Otto-von-Guericke Universität

Individual differences in serial versus parallel processing of multiple tasks are well documented, but their malleability remains unclear. Using the task-switching with preview (TSWP) paradigm, we examine whether preferred processing modes in task-switching can be modified through training and how this affects multitasking efficiency. In TSWP, two tasks alternate every three trials, with the currently irrelevant task's stimulus (preview) remaining visible, allowing for task pre-processing. Some individuals

use parallel processing to achieve switch benefits (“fast switches”), while others rely on serial processing. Our ongoing training study spans five sessions: Pre-Test (Session 1), Post-Test (Session 5), and three intermediate TSWP training sessions. Preliminary data (N = 20; target N = 40) suggest an overall increase in fast switch rates across sessions, reflecting a shift toward parallel processing. This effect generalizes to novel stimuli in a transfer test. We also assess working memory capacity and fluid intelligence to explore their role in processing mode changes. Finally, we discuss these findings and outline a follow-up experiment manipulating processing strategies through explicit instructions.

Methods to Study Expectation Effects in Cognitive Training Interventions

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A wide variety of individual approaches fall under the superordinate category label of “cognitive training.” Yet, they all face a common set of methodological challenges which can greatly impact the strength of the inferences that can be drawn. Here, we present methods to mitigate these issues: (1) purposeful pseudorandom group assignment to reduce pre-test mismatches, ensuring interpretable pre-/post-test changes, (2) Bayesian stopping rules for sample size determination, ensuring informative results – whether positive or null, and (3) automatized procedures to reduce masking failures. We also present methods to better assess the role of expectations in cognitive training. Specifically, we present a series of manipulations that cause various cognitive tasks to feel easier/harder to participants, while keeping them unaware of the exact manipulations. These can be integrated into training studies to enhance explicitly provided expectations (e.g., participants can be explicitly told that a form of training will make them better at a given task and then provided with “evidence” of that improvement via a task manipulated to be easier). Together these approaches will significantly strengthen research in this domain.

Emotion II

How Fear and Happiness Disrupt the SNARC Effect: The Impact of Emotional Tasks on Spatial-Numerical Associations

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The SNARC effect is characterized by faster left-side responses for smaller numbers and right-side responses for larger numbers, consistently observed across different magnitude contexts. This study investigated the SNARC effect within an emotional framework, examining happy and fearful expressions of varying intensities. A total of 132 participants were assigned to either a happy or fearful condition. They completed gender and parity judgment tasks in a counterbalanced order. In the gender judgment task, participants identified the gender of emotional faces, while in the parity judgment task, they classified numbers as odd or even, using left or right key presses. Results revealed a reverse SNARC in the parity judgment task, while no SNARC effect was evident in the gender judgment task across emotional conditions. Furthermore, performance in the gender judgment task disrupted subsequent performance in the parity judgment task, regardless of emotional manipulation. These findings highlight the flexibility of the SNARC effect and its dynamic nature, demonstrating how it interacts with non-numerical cognitive factors, as well as with emotion and cognition in the context of numerical processing.

Sex Differences in Multimodal Emotional Processing of Moral Transgressions

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The present research examines the impact of gender on the perception of moral emotions—specifically anger and disgust—expressed by male and female through facial expressions, vocalizations, and integrated modalities in reactions to autonomy violations. Two hundred eighty-four male and female decoders rated the appropriateness of encoders

expressing anger, disgust, or neutrality in response to moral violations. Results revealed different response profiles depending on the encoder-decoder combination. Female observers—whether paired with female or male expressors—rated anger as more appropriate than other emotions when facing violations of autonomy. In contrast, male observers, especially when paired with female expressors, did not exhibit a clear preference between rating anger and disgust as appropriate, although they did show a clear preference for anger over sadness. Additionally, combining facial and vocal cues did not significantly change moral judgments compared to single-modality presentations, contrary to expectations. These results clearly show that gender significantly influences how moral emotions are perceived and evaluated, underscoring the need to incorporate gender-specific factors into models of moral judgment.

Exploring the Role of Emotion Intensity and Background on Face Emotion Recognition

Yuanyi Peng, university of manchester; Alex Kafkas, university of manchester; Karen Lander, university of Manchester

The extent to which faces and backgrounds influence emotion recognition remains unclear. Previous studies have focused on either the face or background but overlooked emotion intensity. We hypothesized that their relative contribution fluctuates with valence intensity levels. In Experiment 1, 103 participants identified happy, sad, and neutral faces within positive, negative, and neutral backgrounds. Happy and sad faces varied in intensity. Participants rated emotions from -4 (strongly sad) to 4 (strongly happy). Results showed that backgrounds influenced recognition when face intensity was low but had less impact as intensity increased. Experiment 2 is using eye-tracking to examine gaze patterns with static or dynamic backgrounds. Preliminary analyses are showing that background type and intensity affect gaze probability within facial regions, supporting Experiment 1. Overall, the findings indicate that background intensity and type play an important role in face emotional recognition. Faces with low emotional intensity rely more on background for accurate emotion recognition, a reliance that is heightened in dynamic backgrounds.

Facial Expression Predictions and Their Impact on Social Cognition in Early-Stage Psychosis

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Predictive processing provides a novel and holistic approach for understanding brain function, positing that the brain continuously updates predictions to reduce uncertainty based on sensory input. Emotion predictions, particularly regarding facial expressions, are critical for social cognition and influence how individuals interpret social cues and engage in social behaviors. In this study, we explored facial expression predictions and their impact on social evaluation in early-stage psychosis. Thirty-four individuals with early-stage psychosis (≤ 5 years from first episode) and 34 nonclinical controls completed a social perception task. Participants were shown a neutral facial expression, followed by an emotion evoking scenario (fear, happiness, or sadness). They then gave predictability and likability ratings. Results showed that individuals with psychosis made less stereotypical predictions about facial expressions compared to controls. Additionally, dimensional schizotypy scores within the nonclinical group also reflected similar patterns. These findings highlight the role of predictive processing in social cognition and provide valuable insights for a better understanding of psychosis.

Emotional Cues in Earnings Calls Influence Investors' Perception of Trust and Confidence

Maaha Ahmad, School of Computer Science, University of Sheffield; Junhong Yang, Management School, University of Sheffield; Chaona Chen, School of Computer Science, University of Sheffield

Earnings calls are quarterly conferences where publicly traded companies discuss their financial performance with investors. While much research has focused on analysing call content, few studies have explored how subtle emotional cues in speech can influence investors' perceptions of investment risk. In

this study, we analysed over 300 earnings calls from more than 50 companies, examining prosodic and acoustic features (e.g., pitch, speech rate) and contextual text features (e.g., n-grams) using speech processing tools like OpenSMILE and GloVe. Using these features, we developed a machine learning model to automatically measure the emotional content of each earnings call—by specific emotions (e.g., anxiety, excitement) or affective dimensions (e.g., valence and arousal). We validated our results with human judgments and assessed how emotional cues influence trust and confidence perceptions. Results show that our model successfully detected emotional nuances in speech, which significantly impacted perceptions of trust and confidence. These findings highlight the importance of emotional cues in business communication, with potential implications for assessing company performance and predicting investors' decisions.

No Impact of Restricting Facial Movements on the Perception of Human Affect Vocalizations and Instrumental Sounds

Kinga Wołoszyn, Ignatianum University in Krakow; Mateusz Hohol, Jagiellonian University; Piotr Winkielman, University of California San Diego

Studies show that blocking facial movements affects emotion recognition. In our previous study on emotional vocalization perception, blocking facial expressions introduced a positivity bias in valence ratings, independent of emotion category, but did not affect recognition accuracy. Elsewhere, we found greater mimicry in response to human vocalizations than to instrumental emotional sounds. Here we tested whether such blocking differently affects the processing of vocal vs. instrumental sounds, mainly happy human vocalizations. 70 individuals ($M_{age} = 23.2$, $SD = 4.82$) participated in a preregistered (<https://osf.io/pkudx>) pen-in-the-mouth study with 3 factors: emotion (sadness, fear, happiness, neutral), type (vocal, instrumental), and blocking (blocking, free). We found no evidence of differences between blocking conditions in accuracy or RTs. Instrumental sounds were recognized worse, with slower reactions than vocal sounds, particularly for negative and neutral expressions. Interestingly, happy instrumental sounds did not differ in accuracy or recognition time from vocal counterparts. After all, we found no evidence of facial feedback. Our results challenge the

role of facial expression blocking in emotional sound processing.

The Interference of Auditory Negative Emotional Stimuli on Visual Semantic Vigilance Performance

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Emotionally charged objects attract and retain attention, are better remembered, and interfere more with primary task performance than neutral objects. Therefore, it seems reasonable to assume that emotional stimuli also strongly influence sustained attention and vigilance decrement. In this study, we investigated whether emotional stimuli demand more attentional resources than neutral ones in a dual-task paradigm. We measured participants' performance on a semantic discrimination vigilance task in a single-task and two dual-task conditions. In the dual-task conditions, the visual paradigm was combined with an auditory word recall task (with neutral or negative emotional stimuli). We found reduced vigilance and improved word-recall performance in the emotional dual-task condition compared to the neutral dual-task and single-task conditions. The reduced performance was evident throughout the task, whereas in the neutral conditions participants' performance initially increased and then decreased over time. Our results suggest that negative emotional stimuli not only have an advantage in cognitive processing, but also continuously require more attentional resources during their presence compared to neutral stimuli.

Recognising Basic Emotions in Art

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Facial expressions play a key role in emotion recognition, with six basic emotions—anger, disgust, fear, happiness, sadness, and surprise—identified as universal (Ekman, 1982). While these emotions are well-studied in real life, their recognition in artworks remains largely unexplored. This study examines whether facial expressions in paintings can be reliably

categorised into these six emotions and whether artworks can serve as valid stimuli for emotion research. We selected 116 artworks featuring human faces, cropped to standardised dimensions, and categorised them using the Facial Action Coding System (FACS; Ekman, 1982) to ensure all six emotions were represented. A total of 152 participants completed an online task, identifying emotions in each image. Chi-square analysis assessed whether perceived emotions aligned with one of the six basic emotions. Results showed significant associations for 112 out of 116 stimuli. Among them, 61 faces had a significant association with one basic emotion, while 51 faces were associated with two to three emotions, resulting as ambiguous. Four faces were emotionally unclassifiable. These findings support using artworks in emotion research while recognizing their limitations.

Enhancing Attentional Disengagement From Threat: A Novel Online Paradigm for Attention Bias Modification Training

Mario Carlo Severo, Leiden University; Manon Mulckhuysse, Leiden University

Anxiety disorders often involve dysfunctional attention to threats. Recently, attention bias modification (ABM) training, a computer-delivered treatment targeting this bias, has emerged as a practical and cost-effective option. However, commonly employed ABM tasks produce inconsistent outcomes. This study introduces an alternative task aimed to enhance attentional disengagement from threat among individuals with subclinical levels of social anxiety. We recruit 60 participants for an online experiment where they perform a go/no-go-like visual search task, exposing them to either disgusted or neutral faces. Reaction times (RTs) and accuracy rates for these emotional faces are compared during pre- and post-training phases using a linear mixed model. Moreover, we examine the relationship between task performance and psychometric indices of emotional tendencies (PANAS) and attention bias (ABQ) using structural equation modeling. We expect faster RTs in response to disgusted faces compared to neutral ones post-training. We also expect task performance to show strong relationship with negative emotional tendency and ABQ scores. Overall, our proposed task offers a promising avenue to augment ABM training and alleviate anxiety symptoms.

Affective Perspective Taking (APT) and Rumination

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Affective perspective taking (APT) is a social-cognitive process in which one suppresses one's own perspective and represents the emotional state of another. Research found an asymmetric APT effect toward valence: the difference between emotional ratings from extrovert and introvert perspectives was larger in positive emotion than in the negative emotion. Interestingly, high rumination was associated with lower perspective taking and inflexibility ("stickiness"). This study tried to replicate the asymmetric APT effect and investigated whether the effect varies according to the level of rumination. 157 participants completed the Affective Perspective Taking Task, Ruminative Response Scale, and Interpersonal Reactivity Index. Our results: 1. Replicated asymmetric APT effect toward valence. 2. Found that participants with high rumination showed higher emotional ratings than participants with low rumination. 3. When examining rumination components, brooding (BR) and reflective pondering (RP): the differences between perspectives were higher for participants low in RP than for those high in RP. No effect in BR was found. The study highlights the way cognitive inflexibility is manifested in APT in people with high and low rumination.

Neuroscience

Impaired Early Visual Processing During Visuospatial Neglect: An Event-Related Potential Study

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Visuospatial neglect (VSN) is an attention-related deficit in which patients fail to adequately respond to events on the left side of space. Less is known about how early stages of visual processing, as indexed by the C1 and C2 pattern-specific event-related potential (ERP) components, are affected. To investigate this, we presented stimuli with vanishing (OFF events) and reappearing (ON events) parts on the lower left and right sides of the screen, creating two simultaneous but independent sequences with frequent (standard) and infrequent (deviant) events. We analysed ERPs elicited by the standard events. The study involved a VSN group (N=17), and two control groups: stroke patients (N=16) and healthy participants (N=17). The VSN group was measured at three time points: pre- and post-rehabilitation, and at a 4-month follow-up. C1 reliably emerged only in the healthy control group, and it was absent in the stroke and VSN group, at all time points. C2 emerged for all events with no differences between the groups. These results suggest that both stroke and VSN impair early visual processing, but VSN does so more profoundly, and this impairment does not improve over time or with rehabilitation.

Cognitive Demand That Deactivates Fronto-Parietal Regions

Berhan Akgur, Bilkent University; Tamer Gezici, Bilkent University; Elif Oymagil, Bilkent University; Ausaf Farooqui, Bilkent University

We show that cognitive control during extended tasks consists of two categorically different domain-general demands. The first involves control interventions (attention, inhibition, etc.) that activate frontoparietal regions and increase pupil size. The second demand occurs because extended task episodes are executed as one unit. This requires instantiating a higher-level program related to the entirety of the episode at the beginning of the episode. This demand is likely to be distinct from the first because it would not involve making changes in ongoing sensory and motor processing and instead involves creating a program that will bring about organizational changes later in the ensuing episode. Across four experiments, we found that while executing difficult episodes expectedly activates frontoparietal regions and increases pupil size, the beginnings of these difficult episodes, i.e., junctures where more complex higher-level programs are instantiated, deactivate these same frontoparietal regions and decrease pupil size

showing that controlling cognition during difficult extended tasks involves categorically different demands at the beginning compared to during their subsequent execution.

Rule Encoding by Mental Simulation

Yanick Kloss, University of Würzburg; Wilfried Kunde, University of Würzburg; Roland Pfister, University of Trier

Rules exert a powerful influence on human behavior. They even shape human action through instructions without any previous experience of following the rule. Here we suggest that rules become ingrained deeply into the human cognitive system because encoding a rule entails mentally simulating an instance of rule following. Previously, we tested the mental simulation hypothesis by measuring sub-threshold muscular activity during rule instruction. As predicted, activity was higher in effectors targeted by a stimulus-response mapping rule as compared to non-targeted effectors. Now, we replicate this finding by measuring a reduction of beta power in motor areas during the processing of the same instructions.

Cognitive Development

The Development of Children's Fairness Cognition and Redistribution in Merit-Based Resource Inequality

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Resource inequality significantly shapes social structures and individual opportunities. Although redistribution ("taking from the rich to give to the poor") is widely endorsed, moral judgments become complex when inequality results from individual effort. This study explores how the causes of inequality influence children's fairness cognition and behavior regarding redistribution. We conducted two experiments with 137 Han Chinese children (aged 6-9 years) to examine the development of fairness judgments and redistributive behavior. The findings revealed that older children showed stronger endorsement of contribution-based fairness principles and expressed more negative attitudes toward redistribution, suggesting a developmental shift toward merit-based moral reasoning. Notably, our research uncovered a dissociation between children's fairness cognition and behavioral

responses. Despite expressing negative judgments about redistribution, most children engaged in redistributive actions when personally involved in resource allocation scenarios. This research enhances our understanding of children's developing fairness cognition, highlighting the interplay between moral reasoning and behavior in contexts of earned inequality.

Self-Prioritization, Power and Gender in Children Aged 7 to 9

Hélène Maire, University of Lorraine; Jean-Baptiste Van der Henst, University of Lyon; Alexandre Foncelle, University of Lyon; Rawan Charafeddine, University of Lorraine

Children, like adults, exhibit self-biases, with own information (face, name...) being processed more efficiently. Using a matching task paradigm, a self-prioritization effect (SPE) has been shown to occur even with stimuli arbitrarily associated with the self, both in adults (Sui et al., 2012) and children (Maire et al., 2020; Singh & Karnick, 2022). In adults, SPE is accentuated when the stimuli to be associated with the self are positive (Hu et al., 2019). Given that children, especially boys, see power as a desirable attribute (Charafeddine et al., 2020), the aim of the study was to examine whether, in children, i) SPE could be modulated by the power of the stimulus with which 'self' (vs. 'other') is associated, and ii) this modulation could itself vary according to the participants' gender. 132 participants aged 7 to 9 carried out a child-friendly matching task, associating the self with dominant or subordinate character and assessing reaction times, accuracy and perceptual sensitivity (d'). Results showed that SPE was larger when self=dominant, and this pattern was stronger in boys than in girls. This suggests that high power position is more readily incorporated into the self than low power position, especially for boys.

Whispers of Attention in the Classroom: Piloting an ASMR Intervention in Kindergarten

Sandra McKay, Northumbria University; Colin Hamilton, Northumbria University; Michael Craig, Northumbria University; Joanna Greer, Northumbria University

Kindergarten-aged children often exhibit attentional challenges in the classroom similar to those observed in Attention-Deficit Hyperactivity Disorder (ADHD). The autonomous sensory meridian response (ASMR) has shown promise in enhancing self-regulation and

attentional focus in adults. This study explored viewing ASMR videos as a kindergarten classroom intervention to support ADHD-associated attentional issues. Thirty-eight children (~5.5 yrs) were divided into ASMR ($n=20$) or Cartoon ($n=18$) viewing groups, incorporating a 5-minute ASMR video or Cartoon episode into their daily school routine for four weeks. ADHD-traits were assessed via the ADHD RS-IV Preschool rating scale. Pre- and post-intervention scores on the Attentional Control Scale for Children (ACS-C) and behavioural measures from a Sustained Attention to Response Task (SART) revealed mixed results. Teacher rated ACS-C scores showed improved attentional control post-intervention for the ASMR group. ADHD-trait scores were positively related with ACS-C scores, and increased hit rates and faster reaction time (SART) post-intervention regardless of group. This study demonstrates potential for ASMR viewing to support attentional issues associated with ADHD in young learners.

How Does Experiencing Disadvantage Impact Toddler Language Skills? A Comparison of Socioeconomic Circumstances and Parent Stress

Molly Willis, The University of Sheffield; Emma Smith, The University of Sheffield; Molly Jackson, The University of Sheffield; Danielle Matthews, The University of Sheffield; Emma Blakey, The University of Sheffield

Language skills lay an important foundation for school readiness and educational outcomes. Experiencing disadvantage has been negatively associated with child language skills but these constructs are often measured narrowly. We aimed to examine the influence of both family socioeconomic circumstances (SEC) and parent stress on toddler language skills, using a broad range of measures. Two to three-year-olds ($N=208$) completed standardised measures of receptive and expressive language skills alongside semi-naturalistic measures of language obtained from a recorded parent-child interaction. We also collected multiple measures of both SEC and parent stress. Regression analyses showed that family SECs were significantly positively related to overall language ability, but parent stress was not. Interestingly, when we broke this down, the relationship only held for standardised measures of language, but not semi-naturalistic measures. The results raise methodological questions around the best way to capture language in the toddler years and highlight the necessity of including a range of

language measures. We discuss the need to understand the distinct mechanisms through which different aspects of disadvantage shape cognitive development.

Numerical & Mathematical Cognition III

Do Different Modalities of Statistical Learning Predict Different Mathematical Skills?

Michelle Janssens, KU Leuven; Liv Smets, UCLouvain; Arnaud Szmalec, UCLouvain; Bert Reynvoet, KU Leuven

Mathematics is a fundamental tool in life. However, there is a lack of a clear scientific understanding about how math learning is precisely achieved. A critical learning mechanism that has recently been put forward as an important contributor to a wide range of cognitive processes is statistical learning (SL). SL refers to the human ability to extract regularities in how stimuli co-occur in the environment over space and time. SL is considered to shape human cognition through a set of computational principles that may however operate differently depending on stimulus modality, most likely also in the domain of mathematics. In the current study, we therefore investigate the relation between auditive and visual/visuospatial SL on the one hand, early math skills (ordinality processing and geometry intuition) and a standardized math test on the other hand. Participants ($N = 78$; university students, ranging from 17 to 23 years of age) were tested on these tasks. We hypothesize that auditive and visual/visuospatial SL underly the recognition of relations between numbers and geometry intuition respectively, which in turn affect performance on curriculum-based math tests.

Can We Predict Adolescents' Mathematical Abilities From Their Basic Statistical Learning Skills?

Liv Smets, UC Louvain; Cathy Hauspie, University of Ghent; Michelle Janssens, KU Leuven; Christophe Vanhouwe, University of Ghent; Wouter Duyck, University of Ghent; Bert Reynvoet, KU Leuven; Arnaud Szmalec, UC Louvain

Just like language, also mathematics uses meaningful symbols which must be organized according to a finite set of rules in order to exchange ideas among people. One of the most impactful insights that emerged from the psychology of language over the last decade is

that language seems to be largely acquired through a simple, robust and rapid learning mechanism called statistical learning (SL). SL refers to the ability to detect the regularities that define structures in our environment. Drawing on the structural analogies between linguistic and mathematical knowledge, this study is the first large-scale longitudinal attempt to investigate the link between mathematical abilities and SL skills in 284 adolescents, of whom 167 were followed over two years. Participants performed an auditive SL task and a curriculum-based mathematical performance test in third and fourth year of secondary school. A moderate but significant correlation ($r = .29$) was found between SL and mathematical performance. This study is the proof of concept in a new research line investigating how the same biologically plausible regularity detection mechanism that underlies language development, may also play a role in mathematical cognition.

Can the Efficient Coding Principle Explain How We Process the Number Zero?

Giulia Vigna, University of Padova; Paola Previtali, Department of Brain and Behavioral Sciences; Annamaria Porru, University of Padova; Luca Rinaldi, Department of Brain and Behavioral Sciences; Silvia Benavides-Varela, University of Padova

The number Zero poses cognitive challenges and is rare in natural language, making it ideal for testing a recent theory suggesting that numerical cognition relies on an efficient encoding of environmental regularities. Forty participants (aged 20 to 40 years) completed two numerical comparison tasks on the online platform Pavlovia, one using Arabic digits and the other using number words. In each task, two numerosities (range: 0-9) were presented sequentially, and participants determined whether the second was smaller, larger, or equal to the first. Two Italian words for "nothing" were also included among the numerosities. Preliminary analyses showed that mixed models incorporating numerical properties (size and distance) or linguistic parameters (the absolute frequency of each number and their linguistic distance) explained participants' reaction times. Additionally, in both tasks, participants' responses were significantly slower when the second numerosity was "zero" compared to all other numbers. These findings suggest that zero holds a unique cognitive status, which is possibly linked to the

way this number is represented and used in everyday language.

Spatial Biases in Arithmetic: The Effect of Operation Order and Visual Spacing on Calculations

Michał Obidziński, Jagiellonian University; Martyna Sroka, Jagiellonian University; Mateusz Hohol, Jagiellonian University; Krzysztof Cipora, Loughborough University

Physical spacing of numbers in arithmetic problems has been shown to affect the time needed to solve them (Landy & Goldstone, 2010). If spacing follows operation order (e.g., $2 \times 3 + 4$) participants are faster and more accurate than when it does not (e.g., $2 \times 3 + 4$). This observation has implications both for understanding of relations between spatial numerical processing and arithmetic teaching. In this preregistered study we replicated Landy and Goldstone using a modified procedure: instead of production task, we used a forced-choice test, allowing for a more precise measurement of reaction time and better alignment with assessments used in mathematical education. We also adjusted spacings to make them look more natural. Participants ($N = 200$) performed faster and more accurate in the congruent condition than in the incongruent condition. While the main effect of operator order in the equations was not significant, we found a significant interaction between order and reaction time—reaction times were longer for incongruent equations that began with multiplication than for congruent ones. To sum up, we successfully replicated the spacing effect and show its robustness across designs.

Does Body Posture Modulate the SNARC Effect? Embodied and Situated Constraints of Numerical Cognition

Mateusz Hohol, Jagiellonian University; Kinga Szafron, Jagiellonian University; Hubert Balcerzak, Jagiellonian University; Krzysztof Cipora, Loughborough University

The SNARC effect—faster left/right hand responses to small/large numbers respectively—is a robust and highly replicable phenomenon in mathematical cognition. Even though its explanations refer to embodied and situated cognition, the role of whole-body posture remains unexplored, while there are some anecdotal accounts of problems finding the

effect in the fMRI scanner (i.e., when participants are lying with their hands along their body). This study examines whether body position influences the SNARC effect. Participants ($N=80$; ensuring power > 0.8 for Cohen's $d > 0.36$) will perform a standard parity judgment task in within-subject design, completing it while (1) seated (i.e., like in typical SNARC studies), (2) standing, (3) lying flat, and (4) lying at a 45-degree angle. Reaction times will be recorded via handheld controllers in a VR setup. Analyses will determine in which positions a conclusive evidence for SNARC effect or Bayesian evidence for lack of thereof. We hypothesize that the SNARC effect will be weaker or absent in reclining positions, indicating that spatial-numerical associations depend on posture. Data collection will be concluded by May 2025.

14:00 – 15:40: Regular Talks

T-21: Learning & Memory IV

Rethinking the Free-Time Benefit: Evidence Against a Decay and Refreshing Account

Benjamin Kowialiewski, University of Liège; Steve Majerus, University of Liège

In working memory (WM) tasks, people remember more information when they have more time to study it. This free-time benefit is typically explained by decay and refreshing models, which propose that decaying WM representations are restored through attention-based refreshing or articulatory rehearsal. According to these models, additional time enhances performance by providing more opportunities to counteract decay via refreshing. Despite the widespread acceptance of this explanation, its theoretical plausibility has never been formally tested. We began by replicating the free-time benefit across three experiments (Total $N = 119$) in which participants encoded and immediately recalled short word lists (6 items). We then evaluated whether TBRS*, a computational model implementing decay and refreshing mechanisms, could account for this effect. Contrary to empirical findings, TBRS* predicted a reversed free-time benefit: additional study time impaired, rather than improved, recall performance. These results challenge the theoretical foundation of decay and refreshing models. We will discuss alternative explanations for the free-time benefit.

How Does Free Time Benefit Working Memory in Complex Span Tasks?

Eda Mizrak, University of Queen Mary, London; Klaus Oberauer, University of Zurich

Giving people more time between encoding items into working memory (WM) improves performance. In complex span tasks performance depends on the cognitive load imposed by a secondary task carried out between encoding items; free time is one variable determining cognitive load. Explanations of the effects of time and of cognitive load on working memory often build on the assumption that time is used for maintenance processes such as rehearsal or refreshing. This leads to the prediction that a manipulation of time has a retroactive effect on items encoded before. In contrast, the encoding resource account suggests that free time has a proactive benefit by replenishing encoding resources between items, thereby improving encoding of subsequent items. In three studies, we examined whether giving additional free time resulted in a proactive or retroactive benefit in a modified complex-span task. We found that, whereas the secondary task led to a retroactive detriment, the free time benefit was proactive. These findings call for a new way of thinking about the effect of cognitive load in WM.

Exploring the Dual Structure of Maintenance in Verbal Working Memory

Maximilien Labaronne, University of Fribourg; Pierre Barrouillet, University of Geneva; Valérie Camos, University of Fribourg

Verbal working memory is thought to involve two maintenance systems, an articulatory loop and a central attentional system, each with a theoretical capacity of four items. Following the hypothesis that individuals misuse the dual structure of verbal working memory, Barrouillet et al. (2021) proposed the Maxispan procedure. This procedure instructs participants to cumulatively rehearse a limited number of letters until the end of the list presentation, such that the following letters can no longer enter the articulatory loop and must be stored in the attentional system. The Maxispan procedure has led to a drastic increase in verbal working memory span, reaching nearly the theoretical span of eight. In the present study, we first replicated the Maxispan advantage with

monosyllabic words. In three follow-up experiments, we manipulated the length of the to-be-rehearsed and non-rehearsed words or pseudowords, to examine how this affects maintenance in the articulatory loop, the attentional system, and their independence. We found that overloading the articulatory loop recruits the attentional system to preserve the articulation. Our results support a dual structure of working memory, and provide new insights into its functioning.

The Role of Episodic Memory for Repetition Learning

Philipp Musfeld, University of Zurich; Joscha Dutli, University of Zurich; Keisuke Fukuda, University of Toronto, Mississauga; Klaus Oberauer, University of Zurich

Repetition learning is often studied via the Hebb effect: immediate memory improves when a memory set repeats among non-repeated filler sets. Recent studies have highlighted the importance of recognizing repetitions for learning to occur, suggesting a crucial role of episodic memory. We investigated this in two experiments. Experiment 1 manipulated the accessibility of specific memory sets in episodic memory by adding task-irrelevant context features to a visual working memory task. We found more pronounced learning effects when irrelevant context features repeated together with a repeated memory set, as compared to a condition in which irrelevant context features changed across repetitions. Experiment 2 asked whether this observed dependency on episodic memory remained once a repeated array had been learned. After participants had learned a repeated array tied to a specific context feature, we changed that context mid-experiment. Contrary to a strict dependency assumption, learning quickly transferred to the new context. We conclude that episodic memory plays a crucial role in enabling repetition learning but that the learned representations are rapidly abstracted from the episodic context and become more generally accessible.

Contextual Cueing of Visual Search and Awareness: Evidence for a Single Memory System From Mousetracking and Computational Modelling

Yu Heng Daryl Lee, University College London; Christopher Berry, University of Plymouth; David Shanks, University College London

Many studies have argued that contextual cueing of visual search reflects an implicit process, with no correlation between learning and awareness measures. To gain a deeper understanding of the relationship between learning and awareness, we employed a novel mousetracking method in which participants moved an artificial fovea across AI-generated images to find a target. Search efficiency was measured via response times (RT) and cursor path ratio (CPR). For both measures, contextual cueing was independent of awareness in a contrast between high-confidence recognition misses and correct rejections. However, unlike prior research, a negative correlation between recognition ratings (quantifying awareness of repeated images) and search efficiency for old images was found. In a subsequent computational modelling analysis, we compared single-system (SS) models with a common signal for recognition and CPR, and multiple-systems (MS) models with two distinct signals. The SS unequal-variance model best fit CPR data, capturing critical patterns of the experimental results, supporting the single memory perspective and showcasing the value of the new mousetracking approach in studying learning and awareness in visual search.

T-22: Memory & Attention

Prioritization of Verbal Items Based on Their Reward Value: The Role of Attentional Resources in Working Memory

Christophe Fitamen, University of Fribourg; Maximilien Labaronne, University of Fribourg; Chantal Martin Sölch, University of Fribourg; Valérie Camos, University of Fribourg

Items associated with a high reward are better recalled in working memory than those associated with a low reward. Although it has been hypothesized that attentional resources favor the memorization of high-reward items, this hypothesis remains untested. Through three experiments, our study investigated the allocation of attentional resources based on reward value and cognitive load. In a complex span task, participants memorized series of 4 letters. We manipulated [1] the reward value (low vs. high) associated with each letter; [2] the cognitive load (low vs. high) by varying the available time (respectively: 8 vs. 4 seconds) to judge 4 spatial figures between the letters under articulatory suppression (Experiment 1) or by varying the difficulty of the concurrent task for

the same delay (saying the displayed number vs. +3, Experiment 2; -1 vs. -3, Experiment 3). Under high cognitive load, participants prioritized high-value items over low-value items. This effect was smaller under low cognitive load. The hypothesis was confirmed in Experiment 2. Due to a ceiling effect limiting interpretation, Experiment 3 was conducted.

Mechanisms Underlying Strategic Prioritisation in Working Memory

David Peebles, University of Huddersfield; Richard Allen, University of Leeds; Graham Hitch, University of York

The Multi-Component Model (MCM: Hitch et al., 2025) provides an influential account of the broad structure and properties of working memory (WM) and its close relationship with attention. Research in the last decade using sequential visual WM tasks has shown that prioritised information in WM is enhanced at the cost of decreasing the recency effect, with both effects interacting with perceptual interference. The MCM account of these effects is that prioritised information is maintained in the focus of attention by a top-down refreshing process that keeps the item in the episodic buffer. Here we propose a mechanistic account of WM prioritisation in the form of a computational cognitive model developed within the ACT-R theory of cognition (Anderson, 2007). The model closely fits human response accuracy data from four experiments from Hu et al., (2014) and Hitch et al., (2018) and demonstrates how top-down refreshing can improve the recall of prioritised items, reduce recency effects, and how the effect can be weakened by distractor stimuli. This work shows how expressing hypotheses as computational process models within established cognitive frameworks can inform theory development and motivate further research.

The Temporal Dynamics of Retro-Cue Benefits in Visual Working Memory: Feature Cue vs. Spatial Cue

Lijing Guo, University of Jyväskylä

Retro-cueing is a powerful tool for investigating the dynamic allocation of attention in visual working memory (VWM). While previous studies have shown that both spatial and feature-based (color, orientation) retro-cues generate retro-cue benefits (RCBs), less is known about how these cue types differ

in effectiveness over time. This study examined the temporal dynamics of RCBs in VWM across four experiments, varying cue-probe delays to assess how rapidly these cues enhance memory performance. Results showed that both spatial and feature-based retro-cues improved memory when sufficient time was available, and RCBs increased as the delay lengthened. However, their timing varied significantly. Color-based retro-cues facilitated RCBs more rapidly than spatial cues, likely due to the automatic processing of color. In contrast, orientation-based retro-cues were slower than spatial cues, reflecting their reliance on sequential attentional processes. These findings highlight the critical role of cue properties in shaping the time course of RCBs and suggest that feature-based retro-cues are not a uniform category, as their effectiveness depends on the inherent attributes of each feature.

Two Minds Don't Boost Together: Target Detection Enhances the Recognition of Self-Relevant, but Not Other-Relevant, Items

Pietro Spataro, University of the Italian Chambers of Commerce; Neil Mulligan, University of North Carolina; Clelia Rossi-Arnaud, Sapienza University

In the Attentional Boost Effect (ABE) participants recognize stimuli paired with targets to which they responded during the encoding phase better than stimuli paired with distractors that they ignored. Based on previous evidence indicating that the simulation of a motor action can enhance the incidental encoding of study words (the Joint Memory Effect: JME), we asked whether the ABE could be likewise triggered by simply observing the responses provided by a co-actor in a joint-action condition. In Experiments 1 and 2, pairs of participants studied words associated with self-relevant squares (to which they were to respond), other-relevant squares (to which the co-actor responded), and non-task-relevant squares (to which neither of them responded). Memory for the words was later tested in a yes/no recognition task, the standard assessment of the ABE. Experiment 3 verified the generalizability of the results to a final test of free recall. In all experiments, the results converged in showing that the ABE was significant for self-relevant trials, but not for other-relevant trials. The findings are discussed in terms of the revised version of the dual-task interaction account of the ABE, and the social-epistemic account of the JME.

T-23: Attention & Cognitive Control IV

Assessing Changes in Cognitive Control and Vigilance Components in a Dual Task Over Time

Amelie C. Jung, University; Fernando G. Luna, University; Rico Fischer, University

Cognitive control (e.g., interference control) seems to be susceptible to temporal fluctuations. In previous dual-task studies, interference control assessed by the backward crosstalk effect (BCE) decreased over time (Fischer et al., 2018; Jung et al., unpublished). Similar time-related changes have been observed in vigilance processes, known as the vigilance decrement (e.g., Mackworth, 1948). But, the relationship between the two phenomena remains unclear (Luna et al., 2022). Thus, we aimed to assess temporal loss of cognitive control, as assessed by changes in the BCE, simultaneously with a vigilance decrement, as assessed with an adapted ANTI-Vea task (Luna et al., 2021), in the same paradigm. Though the BCE in dual-task trials did not increase over time, we observed an increment in Time on Task (ToT, Reissland & Manzey, 2016), i.e., an increase in time needed for overall completion of the dual task across blocks. ToT slope correlated with the slope of one marker of the arousal vigilance decrement, i.e., RT SD. We also found an executive vigilance decrement, as is typically observed in the standard ANTI-Vea. The present outcomes motivate to further examine the relationship between cognitive control and vigilance loss over time.

The Affective Consequences of Response Inhibition Determine No-Go-Based Crosstalk Effects in Dual Tasks

Devu Mahesan, Institute of Psychology, University of Greifswald; Rico Fischer, Institute of Psychology, University of Greifswald

Backward crosstalk effects (BCEs) are observed in dual-task studies when characteristics of Task 2 influence Task 1 performance. When Task 2 is a go/no-go task, responses in Task 1 are slower when Task 2 is a no-go as compared with a go trial. This no-go BCE is argued to be due to response inhibition spilling over from Task 2 to Task 1. Growing evidence shows that response inhibition elicits negative affect leading to affective devaluation of associated stimuli. We tested for a functional role of the negative affective

consequence of response inhibition in the no-go BCE by investigating its interaction with affective processing in Task 1. In four experiments, Task 1 was a valence categorisation task, and Task 2 a go/no-go task. In all experiments, the no-go BCE strongly depended on affective processing in Task 1. While this modulation could be attributed to an affective (mis)match between stimulus features in both tasks in Experiments 1 and 2, Experiments 3 and 4 provided evidence for an affective (mis)match between stimulus valence in Task 1 and affective consequences of Task 2 response inhibition. The results are discussed in the context of current theories of no-go BCEs in dual tasks.

Can't Wait to Relax: Prospective Relaxation of Control as Revealed by a Future-Based Congruency Sequence Effect

Luca Moretti, RWTH Aachen; Giacomo Spinelli, University of Milano Bicocca

In recent years, a growing literature investigated how cognitive control is regulated when explicit knowledge about upcoming conflict is available. In interference tasks, this work has been conducted by cueing whether the distractor and the target in an upcoming trial will be congruent or incongruent. To date however, it is unclear whether control is adapted upon cue presentation in a prospective fashion, or rather upon presentation of the cued stimulus. We examined this issue with a novel cueing paradigm in which the trials of an interference task were presented in pairs and the congruency of Trial 2 was either cued or uncued before the trial pair. Consistent with previous research, a cueing benefit emerged in Trial 2, albeit restricted to congruent trials. More importantly, although Trial 1 was never cued, across three experiments we observed a larger congruency effect when a congruent Trial 2 was cued. This congruency-effect modulation based on future congruency resembles that based on past congruency and suggests that the control state evoked by congruent cues is implemented upon cue presentation, with control being relaxed even before it should be.

Investigating the Impact of Lower-Level Learning Processes on the Sequential Modulation of Task-Order Switch Costs in Dual Tasks

Tilo Strobach, Medical School Hamburg; Nils Assink, Medical School Hamburg

Performing two tasks simultaneously involves the coordination of their processing. This coordination is particularly required in dual-task situations with varying orders of the component tasks. When task order switches between subsequent trials, task-order coordination leads to order switch costs in comparison to task order repetitions (i.e., impaired performance in order switch trials compared to order repetition trials). Previous evidence demonstrated that task coordination adapts in response to changes in task demands (e.g., the previous experience of a task-order switch), producing a Gratton-like effect. However, the mechanisms underlying this adaptation are underspecified so far. The current study investigates the assumption that this effect is exclusively the result of stimulus-stimulus repetitions across trials and thus basic, lower-level learning processes. To control for such processes, this study creates a visual-auditory dual task that avoids those stimulus repetitions. Repetitions are avoided in the visual task, the auditory task, or both tasks. Preliminary results are discussed in the context of the Gratton effect in task-order coordination and basic, lower-level learning processes.

On Prerequisites for the Activation of Task-Order Representations in Dual Tasks

Torsten Schubert, Martin Luther University Halle-Wittenberg; Daniel Darnstaedt, Martin Luther University Halle-Wittenberg; Leif Langsdorf, Martin Luther University Halle-Wittenberg; Sebastian Kuebler, Martin Luther University Halle-Wittenberg

Recent studies showed that task-order sets schedule the order of component tasks in dual tasks. This was shown in dual-task situations with a variable order of component tasks. Here, performance is improved in trials with repeated processing order (same order) compared to a reversed order relative to the previous trial (different order). We asked, which information from the previous trial is necessary for activating the task-order set and tested the assumption that the retrieval of task-order sets requires the completion of the whole stimulus-response chain in addition to information about the task order. To that end we presented dual tasks trials with partial component task information in the previous trials and assessed the occurrence of a same order benefit. The findings show that a processing advantage in same compared to different order trials does NOT occur after

processing of only partial information from the stimulus-response chain but it requires complete stimulus-response processing in the previous trial in addition to the order information. These findings specify task-order representations as essential parts of task control knowledge activated by the processing of the stimulus-response chain and task order information.

T-24: Attention & Cognitive Control V

Instructions Specifying Context-Specific Strategic Control Can Modulate Voluntary Behaviour but Not the Automatic Effects of Instructions

Cai Longman, University of the West of Scotland; Christina Pfeuffer, Catholic University of Eichstätt-Ingolstadt; Andrea Kiesel, University of Freiburg

Automatic effects of instructions (AEIs) are typically only reported with simple instructions that specify stimulus-response (S-R) mappings. We investigated whether instructions communicating context-specific strategic control routines designed to reduce evidence accumulation from the target stimulus would affect AEIs. In each mini-block, participants were first instructed on the S-R mappings that should be implemented in the two GO trials at the end of the mini-block. In the intervening NEXT trials, participants responded to each stimulus with the same (e.g., left) response. Importantly, the instructions also indicated the probability that each stimulus would be presented during the critical GO trials (e.g., 10% versus 90%). We reasoned that this would strategically bias the amount of information accumulated from the target stimulus prior to selecting a response, thereby reducing the magnitude of AEIs. GO performance was modulated by the context suggesting that the strategic aspects of the instructions had been voluntarily implemented. However, AEIs were broadly consistent across contexts suggesting that reducing the evidence accumulated from the stimulus did not affect the automatic implementation of the simple S-R instructions.

Age-Related Differences in Action Preparation: Evidence From Crossmodal Response Precuing

Denise Stephan, RWTH Aachen University; Ludivine Schils, RWTH Aachen University; Pi-Chun Huang, National Cheng Kung University; Shulan Hsieh, National Cheng Kung

University; Jos Adam, Maastricht University; Iring Koch, RWTH Aachen University

In response precuing, a cue allows participants to prepare a subset of possible responses. We developed a novel crossmodal response precuing paradigm using a bimodal visual-auditory four-choice task with three precue types: effector-modality (manual vs. vocal), spatial (left vs. right response), and uninformative (all options cued). Informative precues reduced response options from four to two. Additionally, the cue-target interval (CTI) varied to assess preparation time. Performance was compared between young and older adults (N = 73). While overall response times were longer for older adults, the preparation benefit with prolonged CTI was larger for them than for younger adults when the effector modality was precued. In contrast, with spatial precues, older adults showed a pronounced increase in error rates at long CTIs, suggesting difficulty preparing an abstract spatial response without effector-modality information. Overall, both groups were able to utilize informative precues in this novel complex crossmodal response precuing paradigm. However, older adults had difficulty relying solely on spatial precues over extended preparation intervals, while they used effector-modality precues more efficiently than younger adults.

How Do We Avoid Doing or Saying the Wrong Thing at the Wrong Time: Exerting Cognitive Control During and After the Accumulation of Internal Evidence

Isaac Fradkin, Hebrew University of Jerusalem

The ability to adapt verbal and behavioral output to current goals relies on cognitive control mechanisms, often distinguished by their effects on response latency. Studies exploring these effects using evidence accumulation models suggest that cognitive control can modulate the rate of evidence accumulation or the response thresholds. However, our subjective experience of exerting control often involves the experience of withholding the expression of a response that has already won an internal race. Such post-accumulation control is especially relevant for tasks involving memory retrieval (e.g., free recall, semantic fluency), where the verbal expression of an already retrieved memory could be inhibited if it is inconsistent with task instructions (e.g., a repeated word). I will present two recently developed models

formalizing post-accumulation inhibition and characterizing its unique behavioral signature. I will then show evidence from three separate studies that post-accumulation inhibition plays a role in memory retrieval primarily when the control criterion does not depend on memory strength. I will conclude by discussing the theoretical importance of characterizing the temporal dynamics of cognitive control across tasks.

Strategy-Driven Interference: Investigating the Role of Order Information Processing in the Changing-State Effect

Philipp Radloff, University of Erfurt; Judith Schweppe, University of Erfurt

The changing-state effect (CSE) describes a disruption of working memory, with changing-state sounds being more disruptive than steady-state sounds. Two mechanisms explain these effects: the attentional capture mechanism, which suggests irrelevant sounds divert attention, and the interference-by-process mechanism, which posits that changing-state sounds automatically contain order information, interfering with task-relevant order information. Recent studies have incorporated strategy use as a quasi-experimental factor, as it provides insight into order information processing. This study goes further by introducing strategy use as an experimental factor through specific instructions. Using a 2x2 design, we manipulated sound condition (steady-state vs. changing-state) within participants and strategy group (order-based vs. non-order-based) between participants. Results showed a significant CSE in the rehearsal (order-based strategy) group, but not in the checklist (non-order-based strategy) group, supporting the interference-by-process mechanism. These findings highlight the importance of considering participants' actual strategy use, rather than task properties, in understanding how irrelevant sound affects working memory.

Paradoxical Learning of Distractor Occurrence Across Space

Thiago Leiros Costa, University of Verona; Massimo Turatto, University of Trento; Leonardo Chelazzi, University of Verona

While investigating implicit learning out of the focus of attention, we identified a new phenomenon of

statistical learning (SL) in visual search. Manipulations of spatial contingencies of distractors led to stable, target-specific enhancement of performance, not affecting distractor cost. We describe this in 7 experiments starting with 2 successful replications & extensions of works from the literature showing that: (i) SL can happen out of the focus of attention and (ii) SL affects both target and distractor processing at a high probability location. Subsequent experiments used more extreme manipulations of distractors out of the focus of attention and revealed the paradoxical effect: SL of distractors led to enhanced performance for targets while leaving unaffected attentional capture by distractors at the same location. One experiment showed that this effect is present during passive viewing, supporting its independence from task demands. Subsequent experiments assessed the role of local inhibitory competition between elements in the search array or of the overall frequency of visual stimulation at the various locations regardless of stimulus characteristics. Implications for models of SL and visual search will be discussed.

T-25: Language & Bilingualism II

Are Pupils With Developmental or Learning Disorders More at Risk in Immersion Education?

Chloé Parmentier, Psychological Sciences Research Institute, Université catholique de Louvain; Arnaud Szmalec, Psychological Sciences Research Institute, Université catholique de Louvain

Although immersion education has gained popularity worldwide, very little research has been conducted on its inclusiveness for pupils who display atypical development. We investigated whether pupils with dyslexia (Study 1) or AD(H)D (Study 2) also benefit from immersion education or whether their respective impairments put them more at risk. Participants were recruited in French-speaking Belgium from schools offering Content and Language Integrated Learning (CLIL). Study 1 (Parmentier et al., 2024) included 5th- and 11th-grade CLIL and non-CLIL pupils with dyslexia (n=28) and matched controls (n=112). For Study 2, we recruited 5th- and 6th-grade CLIL and non-CLIL children with (n=21) or without AD(H)D (n=46). In both studies, we compared the 4 subgroups on linguistic and academic measures, as well as

literacy (Study 1) or attentional and executive (Study 2) measures. Overall, we observed that participating in immersion education did not exacerbate reading or attentional difficulties, nor did it compromise language acquisition and school achievement of pupils with dyslexia or AD(H)D. Our findings rather suggest that they may benefit from immersion education, just like their typically developing peers do.

Promoting Parental Support of Early Child Language Development: An RCT to Evaluate a Text Messaging Service With BBC Tiny Happy People Video Content

Danielle Matthews, University of Sheffield; Colin Bannard, University of Manchester; Silke Fricke, University of Sheffield; Penny Levickis, University of Melbourne; Gideon Salter, University of York; Kiera Solaiman, University of Sheffield; Emma Thornton, University of Manchester; Julian Pine, University of Liverpool; Emily Hancock, University of Sheffield; Antonia Pavlou-Rodriguez, University of Sheffield; Emma Smith, University of Sheffield; Molly Willis, University of Sheffield

We investigated the effectiveness and acceptability of a text-message service for parents that delivers BBC Tiny Happy People (THP) video content to smartphones in order to promote parent-child interaction and mitigate the risk of language delay associated with socio-economic disadvantage. 435 UK families in the lower half of national indices of multiple deprivation with 4- to 9-month-old infants were randomly allocated to the THP text service or a matched, physical-health service. Outcomes were 12-month infant communication, parental linguistic responsiveness (coded blind at 12, 17 and 24 months) and parent-reported vocabulary (17 and 24 months). Intention-to-treat analyses were pre-registered (ClinicalTrials.gov NCT04919343; <https://osf.io/kme68/>). Parental responsiveness was higher in the language condition ($B=0.93$, $z=3.2$, $p=0.001$. Odds of being on higher side of each point on the ordinal scale: 2.53 times greater). While infant communication was also more frequent, child vocabulary did not differ by condition. Acceptability to parents was high (91% would recommend to a friend). We conclude digital services are promising but need refinement. We report a follow-up PAFS and an ongoing RCT ($N=800$) testing an improved service.

What Drives L2 Learning? A Longitudinal Study of Metacognition and Achievement Emotions in Primary School Children

Eugenio Trotta, University of Foggia; Paola Palladino, University of Foggia; Milvia Cottini, Free University of Bolzano-Bozen

Second language (L2) learning is a complex process influenced by various factors, including emotions and metacognition (MC). While several studies examined these factors individually or focused on adult samples, there is a notable gap in research concerning school-age learners, the age at which L2 learning typically begins. Critically, no studies examined these factors in combination, and their long-term effects on L2 learning remain unknown. To address this gap, over 300 Italian primary school children were assessed four times between 2021 and 2024. Children were evaluated on their English vocabulary, their MC monitoring and control of their performance, and their achievement emotions related to English as an L2. A growth curve analysis was used to identify significant changes in L2 vocabulary, emotions, and MC over time. Subsequently, a multilevel model was employed to examine predictors of L2 learning. Results revealed a significant effect of time on L2 learning and all other measured variables. MC monitoring and control, as well as anxiety, emerged as key predictors of L2 learning. To our knowledge, this is the first longitudinal study to highlight the role of MC and emotions in long-term L2 learning during primary school.

The Role of Caregivers' Multimodal Behaviours in Children's Word Learning

Gabriella Vigliocco, UCL; Antonia Jordan Monteiro De Barros, UCL; Ed Donnellan, University of Warwick; Francesco Cabiddu, Nottingham Trent University

Children learn language in face-to-face interactions with caregivers where they are exposed to multimodal signals, including verbal (e.g., label repetitions) and non-verbal (e.g., gaze, gestures) behaviours. Here, we examine how caregivers' natural use of multimodal signals affects children's word learning and vocabulary growth. We used data from the ECOLANG Corpus. 38 caregivers were filmed while talking to their child (3-4 years old) about objects unknown to the child. Children's immediate learning and vocabulary growth 1-year later were assessed. Caregivers' verbal and non-verbal behaviours were annotated. The analyses included linguistic (e.g., word length, lexical diversity) and multimodal (e.g.,

mean F0, gestures) predictors. For immediate learning, pitch predicted learning. Points and representational gestures supported learning, for children with lower vocabulary, or when the caregiver's language was more limited/complex. In contrast, object manipulations hindered learning for children with lower vocabulary. Results were similar for vocabulary growth. Thus, multimodal behaviours affect lexical development and their impact depends on the child's linguistic abilities and the quality of the linguistic input.

The Role of Social Interaction in Children's Learning of Abstract Concepts: An fNIRS Hyperscanning Study

Gal Rozic, University College London; Sara De Felice, University College London; Antonia Hamilton, University College London; Gabriella Vigliocco, University College London

Learning abstract concepts like fraud and inflation starts in middle childhood and is crucial for advanced reasoning. These concepts are mostly learned in social interaction with more knowledgeable people, such as caregivers and teachers. The behavioural and neural dynamics that occur in face-to-face interactions, the typical learning context, likely play a role in the acquisition of abstract concepts. Here, we conducted a multimodal fNIRS hyperscanning study where 29 dyads of caregivers and their 8-to-9-year-old children participated in an interactive abstract concept-learning task. Verbal and non-verbal behaviours were recorded, and a novel pipeline was applied for automated annotation of verbal coordination, including turn-taking, questions, and backchanneling. Simultaneous fNIRS on caregiver and child recorded brain activity in regions linked to social cognition, language, and learning (left dlPFC, MTG, and TPJ). Preliminary findings suggest that more open-ended questions and greater brain-to-brain synchronisation over the left MTG significantly predict children's abstract concept learning. We will present the full analysis linking behavioural coordination and brain-to-brain synchronisation to abstract concept learning.

T-26: Language & Bilingualism III

Implicit Association Test Gender & Career Bias Modelling With Linguistic Features

Alexander Porshnev, Maynooth University; Kevin Dirk Kiy, Maynooth University; Diarmuid O'Donoghue, Maynooth University; Manokamna Singh, Maynooth University; Cai Wingfield, The University of Birmingham; Dermot Lynott, Maynooth University

Prejudicial attitudes, such as those relating to age, race, or gender, exert a powerful influence on individuals, and are pervasive throughout society. Recent research suggests that the statistical patterns of how words are used in language may capture such biases, with language models providing approximations for people's linguistic experience. In the current study we focus on gender-career bias, where men are routinely favoured over women in the workplace, to examine the extent to which similarity between words in language models reflect people's response times in the Gender-Career Implicit Association Test. We examined data from over 800.000 participants (2005-2021), systematically testing information added by 600 language model variants. We ran linear mixed model regressions to determine if the similarity between words in language models n-gram, count vector, word2vec, and Large Language Models (LLMs) adds information to baseline models (controlling for country and stimuli features). A large proportion of models capture behavioural responses, suggesting that societal biases may be encoded in language, but that resource-greedy large language models are not necessary for their detection.

Saying "No" Is Not Always Enough: The Effect of Focus on the Interpretation of Short Exchanges

Candice Frances, Max Planck Institute for Psycholinguistics; Antje Meyer, Max Planck Institute for Psycholinguistics

People often use ambiguous statements like "It was a mild hurricane" instead of direct answers (e.g., saying "no" to "Was it a severe storm?"), emphasizing key words with pitch accents. We conducted two online studies to examine how pitch accents influence listeners' interpretation of ambiguous sentences with conflicting content. Native English speakers read questions, heard ambiguous answers, and responded yes/no. We manipulated adjectives (intense/mild), nouns (hurricane/rain), and pitch accent placement (noun/adjective). Experiment 1 (n=46) showed that while overall participants relied on pitch accents, they clustered into three groups based on their relative

reliance on accent, noun, or adjective to respond to the question. Experiment 2 (n=49) added explicit interjections (“yes/no, it was a mild hurricane”), yet pitch accents still affected responses. Participant clustering based on their responses to the question revealed that most balanced prosodic and lexical cues, while only about a quarter relied solely on the interjection. These findings support the idea that listeners integrate prosodic and lexical cues, and show variability in individual cue weighing.

How Readers Resolve Ambiguity in Unfamiliar Compound Words: Computational and Behavioural Studies in Chinese

Cheng-Yu Hsieh, Royal Holloway, University of London; Marco Marelli, University of Milano-Bicocca; Kathleen Rastle, Royal Holloway, University of London

Most Chinese words are compounds comprising multiple constituent characters. For example, “rooster” in Chinese is composed of 公 (“male”) and 雞 (“chicken”). Understanding individual character meaning is essential for comprehending the entire word. However, Chinese characters can bear multiple meanings — for instance, 公 can also mean “public” — creating potential ambiguity. It remains unclear how readers resolve such ambiguities when making sense of compound words. In this talk, we will present a series of analyses on the processing of unfamiliar compounds. Firstly, we will show that ambiguity in character meaning slows the processing of unfamiliar words. Then, we will demonstrate that both a computational model and human readers learn to assign greater weight to characters having a consistent meaningful function. Finally, we explore whether consistent characters help readers to determine the contextually appropriate meaning for ambiguous characters. Our research suggests that the graded knowledge of Chinese characters plays a crucial role in a sense that it reduces uncertainty in the text, guiding readers to meaningful information in reading.

Disentangling the Moral Foreign Language Effect: Evidence From the Cni Model and Real-World Dilemmas

Francesca Dumančić, Faculty of Humanities and Social Sciences; Mirjana Tonković, Faculty of Humanities and Social Sciences

The moral foreign language effect (mFLE) refers to differences in moral decision-making when using a native (L1) or foreign (L2) language. Although mFLE has been replicated, it is unclear whether the effect arises from increased engagement of System II processes (Increased Deliberation Account), reduced influence of System I processes (Reduced Intuition Account), or both. Most previous studies have been unable to distinguish between these explanations. This study applied the CNI model (Gawronski et al., 2017), which disentangles sensitivity to consequences (C), moral norms (N), and general action tendencies (I), using 9 newly constructed realistic moral dilemmas to address limitations of traditional studies. A total of 153 native English speakers fluent in German were randomly assigned to L1 or L2 condition. The CNI model fit 8 out of 9 dilemmas ($G2(2) \leq 4.83$; $p > .05$). Participants showed lower sensitivity to moral norms in the L2 condition compared to the L1 condition ($\Delta G2(1) = 8.97$; $p < .01$). No differences were found in sensitivity to consequences ($\Delta G2(1) = 1.00$; $p = .32$) or preference for (in)action ($\Delta G2(1) = 0.06$; $p = .80$). Thus, mFLE may be driven by reduced System I processes, rather than increased System II engagement.

The Importance of Being Specific: Unfamiliar Objects Elicit More Specific and Concrete Words in Semi-Naturalistic Conversation

Tommaso Lamarra, University of Bologna; Andrea Amelio Ravelli, University of Bologna; Marianna Bolognesi, University of Bologna; Gabriella Vigliocco, University College London

Referentiality and words familiarity might influence conversational dynamics. We investigated whether familiar/unfamiliar and present/absent objects affect the concreteness and specificity of the language used by interlocutors. Additionally, we examined whether participants employed specific abstraction processes (superordinate categorization, analogical comparison) and whether they focused more on the object or other topics and personal experience. We analyzed the ECOLANG corpus, a dataset of 31 semi-naturalistic interactions where a knowledgeable “speaker” describes familiar and unfamiliar objects to an “addressee” while the object is present or absent. We measured the concreteness and the specificity of 1612 nouns and analyzed 22581 sentences produced by the “speakers”. Results showed that “speakers” produced more concrete and specific words when the

object was unfamiliar. However, when predicting sentence specificity, we found a significant interaction: absent and unfamiliar objects elicited more specific sentences. Additionally, abstraction processes were more likely when the object was unfamiliar and absent. Finally, when the object was absent and familiar, interlocutors focused more on other topics and personal experience.

T-27: Reading & Writing

The Processing of the Definite Article in Brazilian Portuguese: When “The” Carries Gender and Number Marking

Denis Drieghe, University of Southampton; João Vieira, University of Southampton; Hayward Godwin, University of Southampton; Elisângela Teixeira, Federal University of Ceará

Two eye-movement studies in reading in English indicate special status of the definite article “the” compared to content words. Angele and Rayner (2013), using a gaze-contingent paradigm, reported that when the preview of a word was a grammatically incorrect “the”, it was skipped more often than a grammatical continuation of the sentence. Staub et al. (2018) found that readers noticed the repetition of “the” less frequently than the repetition of content words. We repeated both studies in Brazilian Portuguese (BP), where compared to English, definite articles carry more information in the form of gender and number marks. In a gaze-contingent experiment, we found that the preview of an ungrammatical definite article was skipped more often than a grammatical continuation, replicating Angele and Rayner. The mechanism of automatically skipping an article – even when it is grammatically incorrect – is also present in BP potentially because gender and number marking is typically repeated in the next word. However, contrary to Staub et al., repeated definite articles were noticed nearly as frequently as content words. When directly fixated, definite articles in BP have too much semantic/syntactic information for them to be ignored.

Semantic and Syntactic Prediction in Reading Aloud and Statistical Learning: An fMRI Study in University Students With Dyslexia

Elisa Gavard, Aix-Marseille Univ, CNRS, CRPN; Valérie Chanoine, Aix-Marseille Univ, CNRS, LPL; Franziska

Geringswald, Aix-Marseille Univ, CNRS, LPL; Jean-Luc Anton, Aix-Marseille Univ, CNRS, Centre IRM-INT@CERIMED; Eddy Cavalli, Université Lumière Lyon 2, EMC; Johannes Ziegler, Aix-Marseille Univ, CNRS, CRPN

Prediction is central to language processing and reading. Recent studies suggest that predictive mechanisms in reading may be related to domain-general statistical learning (SL) abilities that support the extraction of regularities from sequential input. Both predictive mechanisms have been discussed in relation to developmental dyslexia. Some suggest that SL is impaired in dyslexia with negative effects on the ability to make linguistic predictions. Others suggest that dyslexic readers rely to a greater extent on semantic and syntactic predictions to compensate for lower-level deficits. We investigated both questions in an fMRI study, assessing semantic and syntactic prediction in reading and SL abilities in university students with dyslexia. The SL task was a serial reaction time task, while the predictive reading task contrasted predictive and non-predictive semantic and syntactic contexts. Results revealed distinct neural networks for semantic and syntactic predictions, group differences in predictive processing, and an association between predictive reading and SL, particularly in dyslexic readers. These findings shed new light on the neural correlates supporting the interplay between SL, reading and compensation in dyslexia.

Is It a Word or a Pseudoword? Error Dynamics During Lexical Decision in Children and Adults and Its Relationship With Reading Skills

Gwendoline Mahé, University of Lille; Fanny Grisetto, University of Reims; Adrien Lorient, University of Lille; Clémence Roger, University of Lille

By integrating reaction (RTs) and accuracy, Condition Accuracy Functions (CAFs), used in conflict tasks, enable distinguishing fast impulsive errors from slow decision-making errors. CAFs were used in 3 studies to investigate the origin of errors in lexical decision tasks in adults (N = 42 and N = 38) and children (N = 62). Regarding pseudowords, fast errors were observed in the adult studies, suggesting that lexical capture (i.e., automatic activation of lexical representations) drives erroneous responding. Moreover, fast errors were more observed for transposed-letter pseudowords (study 2). Interestingly, fast pseudoword errors were not observed in children, suggesting no lexical capture in

novice readers. Regarding words, errors were independent from RTs in skilled adult readers. However, slow errors were observed in children and poor adult readers, consistent with models of visual word recognition. With increasing time without sufficient lexical activation, stronger is the probability of a pseudoword. Slow word errors and fast pseudoword errors seem to depend on lexical activation and to reflect reading skills. Error patterns during lexical decision tasks could thus be used as objective markers of reading difficulties.

The Multilingual Eye-Movement Corpus (MECO): Updates After Six Years of Collecting Eye-Tracking Reading Data Worldwide

Noam Siegelman, The Hebrew University of Jerusalem; Sascha Schroeder, University of Göttingen; Victor Kuperman, McMaster University

The Multilingual Eye-movement Corpus (MECO) is an international resource generation project aimed at collecting comparable eye-tracking reading data from different languages of the world and from participants with diverse language backgrounds. In this presentation we will go back to the original motivation behind the project and how the MECO collaborative procedure is meant to address it. We will then provide an overview of the state of the project and its publicly available data, which currently includes more than 1200 participants from 27 testing sites. We will also emphasize how MECO data is already used and how it could be further mined in reading research, highlighting specific features that make MECO unique. These include, among others, the availability of within-subject data on reading in one's first language (L1) and English as a second language (L2); the inclusion of "replication samples" (i.e., multiple participant samples from the same source language), and accompanying individual-differences data. We will also stress limitations of MECO and, relatedly, its ongoing and future expansion plans.

Testing Two Accounts of Transposed-Letter Effects by Varying the Location of Transpositions Relative to Fixation

Stéphanie Massol, Université Lumière Lyon 2; Manuel Perea, Universitat de València; Jonathan Mirault, Centre de Recherche en Psychologie et Neurosciences, CNRS & Aix-Marseille University; Jonathan Grainger, Centre de Recherche en Psychologie et Neurosciences, CNRS & Aix-Marseille University

This study tested two competing accounts of transposed-letter effects (TL effects; e.g., "GADREN", derived from "GARDEN", is harder to classify as nonword in a lexical decision task compared to "GASTEN"). One account explains these effects as arising from positional uncertainty, either due to noise in letter order (Gomez et al., 2008) or due to positional flexibility in encoding (Grainger & van Heuven, 2004). A competing hypothesis (PONG, Snell, 2025) proposes that TL effects arise from laterality noise—errors when assigning letters to either the left or right visual hemifield—on top of a precise letter position encoding. We manipulated both the positions of letter transpositions and the initial fixation location (either at position 2 or 5). Critical stimuli were nonwords created by transposing two consonants at positions 2 and 3 or positions 4 and 5 in 6-letter words, alongside their corresponding double-substitution controls. Results showed stronger TL effects when the transpositions occurred farther from fixation. These findings favor the positional noise/flexibility account and pose problems for the PONG model, which predicts that TL effects should be greater when they occur closer to fixation.

T-28: Embodied Cognition

Sun and Grief Trigger Automatic Attentional Shift: Evidence From Cross-Modal Correspondence Effect

Armina Janyan, Research Center for Cognitive Science, New Bulgarian University; Sashka Aleksandrova, New Bulgarian University; Kassim Basha, New Bulgarian University

We tested an extent of automaticity and strength of activation of our mental representation of space when briefly presented with task-irrelevant words referring either to objects typically located in the upper or lower space (sun vs. puddle; Experiment 2) or to affectional states (joy vs. grief, Experiment 3). First, a classical cross-modal correspondence effect was replicated (Exp.1). It combined pitch (high/low) and a circle position (in upper/central/lower part of the screen). The stimuli were presented simultaneously for 100 ms. Then the circle was replaced with centrally presented words (Exp. 2 and 3). Participants had to categorize the pitch while looking at the screen. The reaction time results showed that in some cases ('upper' object words in Exp.2 and negative state words in Exp.3), processing of words induced a strong

endogenous attentional shift that was powerful enough to automatically spread into auditory modality, and be involved in cross-modal processing. Generally, the results supported theories of Grounded cognition and provided evidence in support of a novel hypothesis that claims that endogenous attention can spread cross-modally in an exogenous manner and modulate multisensory integration.

Social Grounding of Abstract Words: Evidence From a Joint Semantic Categorization Task

Daria Goriachun, Aix-Marseille University; Kristof Strijkers, Aix-Marseille University; Jonathan Mirault, Aix-Marseille University; Johannes Ziegler, Aix-Marseille University

Socialness and sociality are believed to contribute to the grounding of abstract concepts, but their mutual influence on word processing remains unexplored. Here, we investigated their effects on the processing of abstract and concrete words using two semantic categorization tasks (SCT: socialness categorization task, CCT: concreteness categorization task) The tasks were performed individually or in dyads. Dyads received agreement feedback and were further divided into interactive or non-interactive dyads based on gaze fixation rates. Socialness modulated the concreteness effect: while concrete nonsocial words were processed faster than abstract nonsocial words, the advantage for concrete social words over abstract social words was significant only in CCT performed in dyads. In dyadic CCT, abstract social words elicited slower reaction times, higher error rates, lower agreement rates, and increased gaze fixations. Moreover, these effects were specific to interactive dyads, suggesting that social interaction influenced performance by making abstract social words appear more concrete. This provides strong evidence that social experience plays an important role in grounding abstract concepts.

Visuospatial Perspective Taking: The Roles of Language, Embodiment, and Mental Imagery

Steven Samuel, City St. George's; Geoff Cole, Essex

Visuospatial perspective-taking (VSPT) is the ability to infer something about the visual and/or spatial properties of a scene in relation to another person or position. Across two experiments, we tested a number of hypotheses about how we solve such problems. In the first, we asked participants to take another

person's visual perspective of a coloured isosceles triangle. Participant's perspective of the triangle could vary from the agent's on two dimensions: colour and orientation. Participants also performed a concurrent verbal or visual interference task. Results found no evidence that VSPT employs mental imagery. Second, and in ongoing work to be completed imminently, we investigated whether embodied perspective taking (representing another's left as one's own left) is only required when the task is to generate a spatial response. In one condition, participants judged whether a gun or a rose was on an agent's LEFT or RIGHT (spatial response), and in another whether a GUN or ROSE was on the agent's left or right (non-spatial response). Results so far point to critical limitations on the role of embodiment in spatial perspective taking. Together, these findings suggest a more complex theoretical picture than hitherto supposed.

Memory and Imagination an Integrated Continuum: A Theoretical Perspective

Vijay Paul Punia, Srishti Manipal Institute of Art, Design and Technology, Manipal Academy of Higher Education

The current philosophical discourse in cognitive science often illustrates memory and imagination as similar processes, with theoretical ambiguity. By analysing recurring themes and widely accepted phenomena in existing literature, this paper proposes a framework that elucidates the overlapping yet distinct nature of the two. I propose a continuum between the notionally true constructs of memory and imagination that aid each other while striving toward distinct objectives. The imagination aims for a) non-occurrent dynamic modal experiencing; b) psychological generativity; c) manipulating, assembling, and gluing memory fragments; d) no traceability to personal past; e) no annexing to lived reality; and f) creative novel experiencing. Whereas memory strives for a) occurrent tacit embodied reexperiencing; b) being psychologically preservative; c) veracity; d) traceability to personal past; and e) annexing personally experienced reality. Knowing what is memory-like or imagination-like for everything that exists on this operative continuum may allow better construct validity and judicious research designs in cognitive science, psychology, and creative learning, while finding potential extensions into the interpretivist paradigm.

T-29: Sensation & Perception

Seeing 'Me' First: The Cognitive Edge of Self-Prioritization

Neetu Singh, Indian Institute of Technology Kanpur; Irfan Ahmad, Indian Institute of Technology Kanpur; Dr Ark Verma, Indian Institute of Technology Kanpur

The self-prioritization effect (SPE) refers to the enhanced processing of self-associated stimuli over others. While prior research has shown this effect with arbitrary shapes (Sui et al., 2012, 2015, 2017), it's unclear whether it arises from an abstract self-representation or from better memory of shape-label associations. This study examines whether self-prioritization is independent of shape form and occurs at early perceptual stages. Two experiments were conducted: Experiment 1 (29 participants) involved learning shape-label associations (self/stranger with triangle/rectangle), and Experiment 2 (28 participants) used multiple shape variations linked to different self/stranger labels. Prime durations (17–68 ms) were manipulated to explore temporal boundaries of self-prioritization. Results revealed faster responses for self-associated primes, even at brief prime durations. In Experiment 2, self-prioritization persisted across different shapes and labels, suggesting the effect operates at an abstract level. These findings support the idea that self-referent processing occurs early and automatically, independent of stimulus form.

Imagery as Predicted Perception: Imagery Predictively Biases Judgments of Observed Action Kinematics

Eleonora Parrotta, Sapienza University of Rome; Katrina McDonough, University of East Anglia; Patric Bach, University of Aberdeen

Mental imagery has been proposed to reflect the voluntary engagement of the same top-down prediction processes that inform perceptual experience. We therefore tested whether prior imagery induces similar predictive biases in perceptual judgments as those known to affect the perception of intentional human action. In two experiments, participants viewed videos of hands reaching with an expected trajectory towards a goal (straight when the path was clear, arched over an obstacle) or an unexpected trajectory (arched despite

a clear path, straight despite an obstacle in the way) and localized the hand's sudden disappearance points. Reports were robustly biased towards the expected path, revealing the influence of prior expectations on perception. Importantly, imagery of motion induced similar biases, both when participants imagined straight or arched reaches before action onset (Experiment 1), or the absence or presence of obstacles that predicted one of the two actions (Experiment 2). The findings reveal that imagery not only shapes perceptual representations like other prediction processes, but that it can also drive these processes, inducing expectations about events likely to occur in the imagined realities.

The Conceptual Structure of Ephemerality and Its Influence on Aesthetic Perception

Kanji Goda, Kyoto University

“Hakanasa (ephemerality)” is a mixed emotion that arises when one encounters fleeting or fragile phenomena. A key characteristic of ephemerality is an emotional mode that accepts typically negative states such as impermanence and sadness and yet finds positive value in them. This contrasts with the conventional psychological paradigm, which generally asserts that mental health is best promoted by reducing negativity and enhancing positivity. We aim to elucidate the unexplored concept of ephemerality through natural language processing and experiments. We are currently conducting preliminary research. Initially, we are planning to identify the conceptual structure of ephemerality and its co-occurring emotions using a topic modelling approach, anticipating topics such as temporal finiteness, impermanence and beauty to emerge. Based on these topics, we will create stimuli that evoke ephemerality and conduct a behavioural experiment to explore its cognitive framework. Currently, we are designing an experiment in which we group flower images by their blooming duration and examine their aesthetic impact. Participants will be asked to rate the aesthetics of flowers based on the images, bloom duration, and names.

Perceptual Completion in Pea Plants

Silvia Guerra, Department of General Psychology, University of Padova; Bianca Bonato, Department of General Psychology, University of Padova; Gabriela Gjinaj, Department of General Psychology, University of Padova;

Marco Dadda, Department of General Psychology, University of Padova; Umberto Castiello, Department of General Psychology, University of Padova

Perceptual completion refers to the process of bridging the gaps created by occlusion, resulting in the perception of a fragmentary element in its complete form. This process is one of the fundamental abilities that animal species, including humans, have acquired through evolution to meet their needs. A key question is whether it can be extended to plants. Here we tested the existence of the perceptual completion process in pea plants by analyzing their approach-to-clasp behavior using three-dimensional (3D) kinematical analysis. Plants were tested in the presence of a support divided into two parts located in opposite positions. One part was grounded and only perceived by the root system. The other part was raised from the ground so it was only accessible by the aerial part. Control conditions were also included. The results showed that the plants integrated the information coming from the two parts of the support to clasp it successfully. Perceptual completion in plants may be achieved through a complex signaling network between each plant module to establish a unified percept. These findings provide novel insights into the understanding of perception in relation to cognitive and ecological adaptation in different species.

Prediction, Step by Step: The Influence of Incidentally Generated Movement Sounds for a Neural Predictive Model of Hurdling

Sophie Siestrup, University of Münster; Viviana Villafañe Barraza, University of Münster; Dennis Redlich, German Sport University Cologne; Alexandra Pizzera, German Sport University Cologne; Markus Raab, German Sport University Cologne; Ricarda I. Schubotz, University of Münster

According to the predictive coding framework, sensory effects of actions are vital for the predictive model engaged during action execution. Here, we investigated the relevance of incidentally generated movement sounds for a predictive movement model using the example of hurdling. During a functional Magnetic Resonance Imaging session, participants watched short films of hurdling, some of which partly missed sound, visual input, or both. The participants' task was to judge if the hurdler maintained the same speed throughout the video. When visual input was missing, participants relied on the remaining auditory stimulus, but also supplemented the missing visual

modality, as shown by the co-activation of auditory and visual cortices. In contrast, when auditory input was missing, we found evidence for the exploitation of available visual information through the activation of visual cortices, but no involvement of auditory cortices. Behaviorally, participants performed worse when auditory compared to visual input was missing, hinting at a higher reliance on the former. Our findings reveal a potential asymmetry of the impact of different sensory modalities in predictive movement models when action sounds are incidentally generated.

T-30: Decision Making II

Curated Realities: The Influence of Ingroup Bias on Media Processing and Behavioral Discourse

Abishek Baba, Indian Institute of Technology Kanpur; Ark Verma, Indian Institute of Technology Kanpur

Mass media in today's landscape has reshaped information consumption, broadening access while reinforcing biases that shape beliefs, attitudes, and behaviors. Instead of purely rational evaluation, individuals favor their ingroup through motivated reasoning. This study examines ingroup bias across media engagement—processing, belief formation, and behavior—through five experiments using a minimal group paradigm. Experiment 1 found that ingroup news was processed faster, mainly due to quicker processing of positive ingroup news. Experiments 2a–2c tested believability across media conditions. Bias emerged only for negative news in Exp 2a (non-echo chamber, untimed), extended to both positive and negative news in Exp 2b (echo chamber, untimed), and was again limited to negative news in Exp 2c (echo chamber, timed). Experiment 3 revealed clear behavioral biases, with participants sharing ingroup news more preferentially and favoring ingroup candidates in a voting task. Notably, sharing was asymmetric—positive ingroup news was prioritized, while outgroup news was shared evenly across valence. Findings highlight how bias shapes media engagement, underscoring the need for policy interventions to foster balanced information ecosystems.

How Do Crime-Lineup Delays Affect the Cognitive Processes Underlying Eyewitness Responses in Lineups?—A Multinomial Analysis

Amelie Therre, Heinrich Heine University; **Raoul Bell**, Heinrich Heine University; **Nicola Marie Menne**, Heinrich Heine University; **Carolin Mayer**, Heinrich Heine University; **Ulla Lichtenhagen**, Heinrich Heine University; **Axel Buchner**, Heinrich Heine University

Eyewitness responses to lineups may be influenced by the time elapsed between witnessing a crime and seeing a police lineup. We investigated the effects of four different crime-lineup delays on the cognitive processes underlying eyewitness decisions. Participants watched a staged-crime video and subsequently completed simultaneous photo lineups either immediately, after one day, after one week or after one month. There was a significant decrease in the probability of culprit-presence detection which was characterized best by a power function—with the most rapid decline at short crime-lineup delays. Importantly, eyewitnesses did not compensate for reduced culprit-presence detection by increasing guessing-based selection. Instead, the probability of guessing-based selection remained stable across all delays. These findings highlight the necessity of minimizing delays between a crime and the corresponding lineup.

Contradict Them Softly! Contradictions of the Subject Feel Less True Than Contradictions of the Object

Beatriz Gusmão, University of Cologne; **Michael K. Zürn**, Nuremberg Institute for Market Decisions; **Sascha Topolinski**, University of Cologne

Individuals attribute a higher truth value to repeated compared to novel information, the well-known truth effect. Also, information that contradicts what we have heard earlier is considered falser than both repeated and completely new information, known as the contradiction effect. These two effects are a challenge to the correction of misinformation because one cannot easily correct earlier misleading claims. In the present paper, we show a new and important factor that enhances the effectiveness of corrections, the syntactic placement of the contradiction. We argue that because the subject of a sentence has a stronger psychological importance than the object, a contradiction of the subject (compared to the object) is felt as a stronger contrast to the earlier information and thus experienced as more false. Experiments 1 and 2 provided null results, possibly due to confounding material and task. Crucially, Experiments 3-5 (total N = 628) reliably

showed that contradictions of the subject were perceived to be falser than contradictions of the object. Implications and future studies are considered.

When the Injured Brain Erases Boundaries: An Online Survey on the Impact of Head Injury on Moral Disengagement and Criminal Behavior

Caroline Bourdon, Unité de Recherche Etudes des Mécanismes Cognitifs, Université Lyon2; **Hakim Djeriouat**, Unité de Recherche Etudes des Mécanismes Cognitifs, Université Lyon2; **George Michael**, Unité de Recherche Etudes des Mécanismes Cognitifs, Université Lyon2

Introduction: Moral Disengagement (MD) enables individuals to justify unethical behavior without guilt. This study examines the link between traumatic brain injury (TBI) and criminal behavior, focusing on how head injuries influence MD and identifying key contributing factors. Method: 469 participants completed an online survey and were classified into three groups: no head injury (CTRL), undiagnosed TBI (TBI_{nd}), and diagnosed TBI (TBI_d). They reported offenses, police interactions, and completed a shortened MD scale. Principal component analysis identified three factors: dehumanization, consequence minimization, and diffuse responsibility. Results: Analysis of covariance revealed that both TBI groups committed more diverse offenses than CTRL due to diffuse responsibility, comparable between TBI_{nd} and TBI_d. TBI_d had more police interactions than CTRL, explained by consequence minimization, independent of gender and education. Discussion: Diffuse responsibility may increase risk-taking and offense diversity, amplified by vulnerability, group influence, and disinhibition after TBI, regardless of severity. Minimizing consequences may reduce TBI_d's awareness of their role, fostering norm violations and increasing police interactions.

Investigating Age-Related Differences in the Cognitive Processes Underlying Eyewitness Responses to Lineups Using a Multinomial Processing Tree Model

Carolin Mayer, Heinrich Heine University; **Raoul Bell**, Heinrich Heine University; **Nicola Marie Menne**, Heinrich Heine University; **Amelie Therre**, Heinrich Heine University; **Ulla Lichtenhagen**, Heinrich Heine University; **Axel Buchner**, Heinrich Heine University

Age-related differences exist in a variety of tasks. In eyewitness testimony, a possible age-related decline in memory performance is particularly relevant. Regarding police lineups, past research has shown that older eyewitnesses are less likely to correctly identify a culprit in a lineup than younger eyewitnesses. Here, we used the 2-HT eyewitness identification model to examine age-related differences in the cognitive processes underlying eyewitness responses to lineups. To this end, we first reanalyzed a large dataset originally collected for a different purpose and examined age-related differences in culprit-presence detection, culprit-absence detection and guessing-based selection. We compared the probability of the processes among young to middle-aged, young-old and old-old adults. We then conducted a novel experiment that confirmed the robustness of the findings: While the probability of culprit-presence detection and, at least descriptively, the probability of culprit-absence detection decrease with age, the probability of guessing-based selection increases with age. These age-related changes in the cognitive processes shed light on possible challenges to the validity of eyewitness testimony from older adults.

16:10 – 17:50: Symposia

SYM-31: Advancing Mentalizing Research: From Core Mechanisms to Cultural Influences

Chair(s): François Quesque, Paris Nanterre University

Symposium Abstract

Research on mentalizing—the ability to attribute mental states—has evolved from mapping developmental trajectories or specific population profiles to uncovering its cognitive structure and the factors influencing its manifestation. At the heart of this research are two key theoretical questions: “To what extent do different sub-processes represent different types of mental states?” and “To what extent is mentalizing spontaneous?” This symposium addresses these questions, presenting recent advancements in understanding mentalizing. The first talk examines speed differences in processing others’ beliefs versus visuospatial perspectives, comparing non-autistic and autistic adults. The second explores how sleep deprivation impacts belief-desire reasoning and emotion recognition, particularly under

temporal constraints. The third investigates how reducing egocentric perceptual biases enhances the ability to infer others’ perspectives across modalities. Lastly, the fourth underscores the role of cultural learning in shaping mentalizing. Together, these talks highlight recent progress in understanding the cognitive and social factors that shape this critical ability.

Dissociating Visual Perspective Taking and Belief Reasoning in Autistic and Non-Autistic Participants

Klaus Kessler, University College Dublin; Green Rachel Lara, Nanyang Technological University; Carrington Sarah Joanne, Aston University; Shaw Daniel Joel, Aston University

Mentalizing refers to the human capacity to represent the mental states of others. Representing another’s intentions and beliefs is typically subsumed under Theory of Mind (ToM), while inferring their visuospatial experience of the world is referred to commonly as Visuospatial Perspective Taking (VPT-2). Historically, these two aspects of mentalizing have been studied independently, here however, we present a novel paradigm that allowed us to jointly investigate both processes. Across three preregistered online experiments we consistently observed that another’s perspective could be processed significantly faster than their false belief, yet importantly, also their true belief, raising fascinating questions about what may drive this difference. In a further preregistered online study we compared autistic and non-autistic participants and identified subtle group differences in self-other control. Autistic participants were significantly less influenced by another’s belief when only their visuospatial perspective had to be inferred. Overall, our findings suggest that investigating aspects of self-other control offers promising avenues for investigating and delineating between mentalizing sub-processes.

The Impact of Sleep Deprivation on Mentalizing

Andrew Surtees, University of Birmingham; Rui Pereira, University of Birmingham; Martina de Lillo, University of Birmingham; Andrew Bagshaw, University of Birmingham; Clare Anderson, University of Birmingham

Mentalizing is a crucial social ability, but not one that occurs in a vacuum. A range of circumstances precipitate the need to mentalize successfully when sleep deprived, but little is known about how this

compares to mentalizing when well-rested. In this study, we examined the impact of one night of total sleep deprivation on belief-desire reasoning, empathy, emotion recognition, and social motivation, as well as on a range of domain general cognitive tasks. Across the night, participants' social motivation decreased, as sleepiness increased, and attention decreased. On fast, less demanding tasks, participants showed the biggest impact on performance - becoming less fluent at mentalizing. On slower, more difficult tasks, performance difference changes were more marginal. When biases, rather than performance were measured, no impact was evidenced. Sleep deprivation has a complex impact on mentalizing, related to specific task demands, domain general resources and domain specific factors.

Improving Mentalizing Abilities Through Low-Level Interventions: The Case of Visual Illusion Exposure

François Quesque, Paris Nanterre University

While we can engage in mentalizing when explicitly prompted, we often struggle to do so efficiently in natural settings. Recognizing others' viewpoints requires an effortful shift from an ego-centered perspective. We hypothesized that an embodied experience linking perception to one's spatial viewpoint might enhance spontaneous mentalizing abilities beyond spatial reasoning. Three experiments (two completed, one underway at submission) relying on 'privileged information' biasing participants' estimates of others' mental states will be presented. In the experimental conditions, participants actively experienced 3D illusions forming different shapes (e.g., a square vs. a circle) based on viewing angle. Preliminary findings suggest that exposure to spatial illusions reduces egocentric biases in representing others' mental states, generalizing across mental representations, including visual judgment, auditory recognition, and intentions. This supports the hypothesis that direct experience of perceptual ambiguity can foster greater awareness of others' perspectives without explicit rationalizing.

Anti-Social Learning: The Impact of Language on Mentalizing

Caroline Catmur, King's College London; Bryony Payne, King's College London; Geoffrey Bird, University of Oxford, and University College London

The media is one of the main ways in which information about out-groups is shared. Across three experiments we explored whether the language used in the media to describe out-groups, and specifically language about mental states, shapes how recipients represent the minds of out-group members. All three experiments measured the extent to which participants represented out-group members as individuals with distinctive minds. Experiment 1 compared language in a left-leaning versus a right-leaning UK news source. Experiment 2 tested the effect of including or omitting mental states or first-person language, while Experiment 3 examined the impact of varying the amount of mental-state language. We show that participants are more prone to take into account each out-group member's mind when inferring their mental states when mental-state language is used to introduce them. This demonstrates the clear role of cultural learning on how people think about others' minds.

Symposium Discussion

François Quesque, Paris Nanterre University
Symposium Discussion

SYM-32: Are Eyes Special in Shaping Attention? Emerging Perspectives From Social and Non-Social Cues

Chair(s): Mario Dalmaso, University of Padova; Anna Lorenzoni, University of Padova

Symposium Abstract

Individuals tend to orient their attentional resources toward spatial locations indicated by others, a phenomenon known as social attention, which plays a crucial role in creating meaningful social relationships. Given its importance, much effort has been made to uncover the core mechanisms underlying such a phenomenon (e.g., 1,2). Undoubtedly, eye gaze plays a central role in social attention. Humans are susceptible to gaze stimuli, a preference thought to be present from birth (e.g., 3). To determine whether gaze cues elicit unique and distinct orienting responses, considerable research has compared gaze to other social (e.g., pointing gestures) and non-social (e.g., arrows) directional cues, leading to intriguing insights. For example, in the comparison between gaze and arrow cues, many studies have reported that both stimuli elicit similar

orienting effects. However, more recent tasks and methods have shown that a dissociation between gaze and arrow cues can be observed (e.g., 4). This symposium will bring together experts in social attention to present comprehensive and up-to-date perspectives on the specific role that eye gaze can play in shaping attention and the possible differences with other social and non-social stimuli. References

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On the Nature of the Reversed Congruency Effect for Gaze Stimuli: Exploring the Joint Attention Hypothesis

Anna Lorenzoni, University of Padova; Mario Dalmasso, University of Padova

Recent evidence reported differences in attentional shifting between eye-gaze and arrow stimuli. Specifically, in a spatial Stroop task, arrows induced a standard congruency effect (SCE; faster reaction times for congruent vs. incongruent trials), while eye-gaze stimuli elicited a reversed congruency effect (RCE; faster reaction times for incongruent vs. congruent trials). Our study aimed to explore the origins of the RCE in relation to the 'joint attention hypothesis', which postulate that, on incongruent trials, eye-gaze stimuli are 'looking' at the same object fixated by the participant (i.e., the fixation point), a condition that did not apply to arrows. In four experiments, participants ($N_{\text{tot}} = 240$) reported the direction indicated by the target stimulus (eye-gaze or arrow), which appeared to the left or right of a central fixation point. To test the joint attention hypothesis, we varied the fixation point: a meaningful real-life object (typically linked to joint attention) or a symbolic cross. The results showed a SCE for arrows and a RCE

for eye-gaze stimuli, regardless of the fixation point type. These findings did not support the joint attention hypothesis. Ongoing research aims to clarify this effect.

Spatial Biases to Pointing- and Gaze-Cues

Wieske van Zoest, University of Birmingham

The aim of this study was to investigate differences between gaze- and pointing-cue, looking specifically at saliency, spatial proximity, and trial context. A cartoon figure was designed to present four types of cues: 1) a gaze-cue, 2) a peripheral pointing cue on an outstretched arm, 3) a central pointing cue presented over the torso of the body, and 4) a flower cue matched for low-level features to the peripheral pointing cue. Validity was non-predictive, meaning there was no strategic incentive to follow to cues. Different cue types were presented randomly within blocks (Experiment 1 and 3) or tested in separate blocks (Experiment 2). The results showed that the pointing cue was more effective than the gaze-cue in biasing spatial attention. The impact of the pointing cue could not be explained by low-level salience or spatial proximity to the target. Trial context did affect the effectiveness of cues, suggesting that spatial cues are influenced by overall context and shaped by expectations. It is concluded that not all social cues are alike. While the label 'social' given to embodied cues like the gaze- and pointing-cue can be useful in descriptive sense, the predictive validity of this categorization is debatable.

Are There Quantitative Differences in Spatial Interference Triggered by Social and Non-Social Targets?

Yoshihiko Tanaka, Senshu University; Kenta Ishikawa, Teikyo University; Takato Oyama, Aichi Shukutoku; Matia Okubo, Senshu University

In spatial Stroop tasks, directional responses to arrows are faster when the direction and the location are congruent than incongruent (SCE; standard congruency effect). Conversely, those to gaze are faster when incongruent than congruent (RCE; reversed congruency effect). Researchers have argued that the RCE reflects the uniqueness of gaze processing. However, recent studies showed that gaze non-specific general processing, such as target discriminability, plays an important role. The present

study used directional stimuli with complex backgrounds (e.g., facial context and mosaic pattern) to investigate whether the RCE occurs selectively for gaze. In the spatial Stroop task, participants responded to the tongue direction of face stimuli and arrow stimuli in mosaic backgrounds. Conventional arrow and gaze stimuli were also presented. Arrows and gaze stimuli elicited the SCE and the RCE, respectively. Importantly, tongue stimuli produced the RCE. Arrows numerically reversed the SCE when presented with mosaic backgrounds. These findings indicated that the RCE is not unique to gaze stimuli. We propose that target discriminability and temporal characteristics in task-irrelevant codes are responsible for the RCE.

Exploring Spatial Interference Effects in Social and Non-Social Targets: A Conditional Accuracy Function Analysis

Renato Ponce, *Sapienza University of Rome, and University of Granada*; **Juan Lupiáñez**, *University of Granada*; **Carlos González-García**, *University of Granada*; **Maria Casagrande**, *Sapienza University of Rome*; **Andrea Marotta**, *University of Granada*

Recent research using the spatial interference paradigm reveals qualitative differences in congruency effects between gaze and arrow stimuli. Arrows typically produce a standard congruency effect (SCE), with faster responses when the target direction matches its location. In contrast, gaze stimuli often result in a reversed congruency effect (RCE), where similar conditions yield slower responses. To explore this, we analyzed accuracy across reaction time bins using the Conditional Accuracy Function (CAF) and hierarchical linear mixed modeling. Data from sixteen experiments, 705 participants, comparing cropped eyes and full faces as social stimuli with arrows as non-social stimuli, were synthesized into three models. Results showed that for non-social stimuli, incongruent trials had lower accuracy in the fastest bin compared to later bins, while congruent trials maintained stable accuracy. For social stimuli, the fastest responses exhibited reduced accuracy for both conditions, with congruent trials performing even worse than incongruent ones. These findings suggest that gaze targets engage in additional processing, besides attentional capture, during earlier stages.

Effects of Learning Regularities With Gaze and Arrow Cues on Attention

Anna Pecchinenda, *Sapienza University of Rome*; **Claudia Salera**, *Sapienza University of Rome*; **Ala Yankouskaya**, *Bournemouth University*

We can detect and learn from environmental regularities, and this learning guides attention. However, it remains unclear whether this effect operates similarly for gaze and arrow cues and if it relies on shared mechanisms. Gaze following, an early-emerging human ability, is crucial for joint attention and social learning, while arrows do not elicit similar responses in early development, as children respond to gaze cues earlier than arrow cues. Given gaze following's role in social learning, adults may also use gaze direction to infer and predict action sequences. In a series of experiments, we manipulated cue predictive validity without participants' awareness. Initially, cues were non-predictive (baseline), then predictive (learning), and finally returned to non-predictive (testing). Results showed larger attention cueing effects during learning and, importantly, persistence during testing, even after cue regularities ceased. This pattern appeared for both arrows and gaze, though effects were stronger for gaze cues, underscoring their role in attention orienting and social learning.

SYM-33: (Electro)Physiological Constraints on Language

Chair(s): **Lena Henke**, *Max Planck Research Group Language Cycles, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*; **Lars Meyer**, *Max Planck Research Group Language Cycles, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*; **Clinic for Phoniatrics and Pediatric Audiology, University Hospital Münster, Germany**

Symposium Abstract

Throughout evolution, language developed within our physiological limits, including factors as diverse as breathing, articulator movement, and neuronal processing. Specifically, language must be compatible with our physiological mechanisms of perception, production, and learning in order to allow for successful communication. Under this view, physiological limits shape and enable the structure of language. In recent years, a growing number of

researchers adopted this biological perspective on language. Our symposium provides a platform for recent results on various physiological determinants and the numerous ways in which these shape language. The talks will address (1) respiratory cycles (S. Fuchs); (2) the kinematics of the articulators (M. Svensson Lundmark); (3) the speech rate (J. Giroud); (4) electrophysiological maturation and language acquisition (K. Menn); and finally, (5) electrophysiological integration windows (L. Henke). Together, our symposium can help to relate research on language in cognitive science to the biology of the physiological underpinnings of language, highlighting the diverse influences that physiology exerts over our communicative abilities—and the shape of language as a cultural system.

Respiratory Cycles as Intrinsic Temporal Frames Grounding Speech Production

Susanne Fuchs, IMÉRA & ILCB of Aix-Marseille University, Marseille, France; Leibniz-Zentrum Allgemeine Sprachwissenschaft, Berlin, Germany

Respiratory cycles inherently structure the airstream into alternating phases of inhalation pauses and exhalatory speech events, creating natural temporal boundaries that influence both the speaker's capacity to express meaning and the listener's ability to process information. These cycles impose physical and cognitive constraints on speech planning and comprehension, shaping the rhythm and flow of communication. Moreover, breathing is not merely an automatic physiological process to guarantee homeostasis—it is dynamically influenced by cognitive load, social interactions, and emotional states. In this presentation I will review current literature on breathing “frames”, their flexibility and stability in speech and motion, highlighting its adaptability and constraints. Additionally, it will report findings from a recent longitudinal study investigating the interplay of breathing, motion, and vocalization of a prelexical child in interaction with her mother, offering new insights into developmental trajectories. Based on the results, breathing cycles and the coordination of breathing with the voice are the foundation of speech production. I will make some proposals how this coordination could be implemented in developmental models of speech acquisition.

Jerky Jaw Kinematics in the Creation of Syllables

Malin Svensson Lundmark, Centre for Languages and Literature, Lund University, Sweden

The jaw has a specific purpose in speech as it shapes the syllable (it opens for vowels and closes for constrictions), and is lowered more for some syllables than others, in connection with stress or emphasis. The jaw is also a help articulator and provides a structure in the complex interaction of muscle activity in the oral cavity. In this talk I will present a new approach to analyzing articulatory jaw dynamics, characterizing a component that is crucial for revealing the forces that activate the complex interaction of muscle activities: jerk (= rapid movement changes directly linked to muscle activation). Jerky movements of the lower jaw are tightly coordinated with other articulators in that its rapid movement changes always follow the other articulators in closing/constrictions, while always precede when opening for e.g. vowels. Furthermore, jerky movements in articulatory dynamics have phonological universal tendencies, which can account for elements of real speech such as prosodic features, and which have possible links to perception by the human sensory systems.

Estimating Individual Linguistic Processing Bottleneck

Jérémy Giroud, University of Cambridge, MRC CBU, UK; Aix Marseille Univ, Inserm, INS, Inst Neurosci Syst, Marseille, France; Jacques Pesnot Lerousseau, Aix Marseille Univ, Inserm, INS, Inst Neurosci Syst, Marseille, France; François Pellegrino, Laboratoire Dynamique du Langage UMR 5596, CNRS, University of Lyon, France; Benjamin Morillon, Aix Marseille Univ, Inserm, INS, Inst Neurosci Syst, Marseille, France

Humans excel at processing speech, but the mechanisms underlying this remarkable ability remain a key question in cognitive neuroscience. To shed light on this process, we developed a behavioral method to assess the efficiency of the speech comprehension system and estimate its capacity and limitations. Our unified measurement framework evaluates the influence of seven distinct acoustic and linguistic features on speech comprehension, spanning acoustic, sub-lexical, lexical, and supra-lexical levels of description. We demonstrate that each of these features independently affects comprehension to varying degrees, with syllabic rate

emerging as the most influential factor. For each feature, we quantified its channel capacity—the maximum rate at which linguistic information can be effectively transmitted while maintaining high comprehension. Our findings reveal that the bottlenecks associated with syllabic and phonemic processing, as measured behaviorally, align with neurophysiological models of speech processing. Overall, this study highlights how constraints at multiple linguistic levels shape speech comprehension.

Electrophysiological Constraints Shape Infant Language Acquisition

Katharina Menn, Department of Cognitive Neuropsychology, Tilburg University, The Netherlands; Max Planck Research Group Language Cycles, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; **Claudia Männel**, Department of Neuropsychology, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany, Department of Audiology and Phoniatrics, Charité – Universitätsmedizin Berlin, Germany; **Lars Meyer**, Max Planck Research Group Language Cycles, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany, Clinic for Phoniatrics and Pediatric Audiology, University Hospital Münster, Germany

Infants acquire language with remarkable ease, despite their brains being not fully matured at birth. The newborn EEG is dominated by slow electrophysiological activity, with faster activity emerging only toward the end of the first year. This talk explores how these neural constraints shape the trajectory of phoneme acquisition and how parental speech adapts to support this process. In a cross-sectional analysis of naturalistic EEG data, we show that the emergence of abstract phoneme representations that govern mature speech processing mirrors the acceleration of infant EEG: Phonological features spanning longer time intervals are acquired earlier than shorter-lived features ($p=0.005$), indicating that infants initially exploit feature timing to acquire native phonemes. In a corpus analysis, we show that the slow-to-fast trajectory of phonological feature acquisition is mirrored in infant-directed speech. Parents initially enhance phonological feature durations. The trajectory at which features become adult-like matches phonological acquisition: Features acquired earlier show faster declines in enhancement ($p=0.002$). These findings reveal a dynamic interplay

between neural maturation, language development and parental speech.

Electrophysiological Time Constraints on Multi-Word Chunking

Lena Henke, Max Planck Research Group Language Cycles, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; **Lars Meyer**, Max Planck Research Group Language Cycles, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany, Clinic for Phoniatrics and Pediatric Audiology, University Hospital Münster, Germany

Our cognitive abilities are limited in time; specifically, processing in various domains is confined by temporally limited integration windows of approximately 2–3 seconds. In the domain of language, it was observed that these windows constrain the grouping of individual words into larger multi-word chunks, which is required for comprehension. Current auditory neuroscience emphasizes the role of rhythmic neuronal activity for language processing. We argue that low-frequency processing cycles shape language comprehension from the inside out, by imposing their preferred timescales onto chunking to keep chunk duration within our processing capacity. In our talk, we first present evidence that (artificial) language learning is influenced by these processing timescales. In particular, new multi-word chunks can only be learnt up to a duration of about 3 seconds. Additionally, we show that these processing timescales also influence the chunking of words in more naturalistic sentences. In conclusion, our results suggest that oscillatory cycles might serve as a pacemaker for language processing and may even shape language comprehension in an endogenous manner.

SYM-35: Binding and Retrieval in Action Control: Part II: Dissociating Binding and Retrieval From Inhibition and Learning

Chair(s): Carina Giesen, HMU Health and Medical University Erfurt; Andrea M. Philipp, RWTH Aachen University

Symposium Abstract

Research on human action is distributed across diverse scientific communities, each of which comes

with specific experimental paradigms and corresponding theorizing. The Binding and Retrieval in Action Control (BRAC) framework provides a domain-general perspective to bridge these diverse fields. This is achieved by proposing feature binding and retrieval as two basic processes that underlie a broad range of phenomena from the field of action control and beyond. The core idea of BRAC is that stimulus and response features are bound into an event file, which can be retrieved by repeating any of these elements on a later occasion. In this double symposium, we will present findings that specify as well as broaden our understanding of conditions in which binding and retrieval effects prevail. Also, boundary conditions that restrict the explanatory power of binding and retrieval mechanisms will be presented. Part 1 of the symposium focuses on modulating factors that influence binding and retrieval processes in a diverse set of action control paradigms. Part 2 of the symposium sheds light on processes like learning and inhibition which are possibly functionally independent from binding and retrieval processes.

Binding and Retrieval in Response Inhibition – Overlaps With Action Control?

Astrid Prochnow, TU Dresden

Inhibition is a fundamental cognitive process involving the restraint of actions or thoughts. The presented work investigates response inhibition through a prime-probe paradigm framed within the Binding and Retrieval in Action Control (BRAC) framework. We explore how varying degrees of feature overlap between prime and probe stimuli influence action restraint in a Go/Nogo task. While our findings replicate expected repetition benefits and partial-repetition costs for Go trials, we observe no significant effects of feature overlap on Nogo trials, suggesting that inhibition may operate through mechanisms distinct from binding and retrieval processes. Furthermore, we will expand this investigation using a Stop-Signal Task to examine action stopping. Our results indicate that inhibition functions as an independent cognitive mechanism, emphasizing an ‘inhibition mode’ separate from influences of binding and retrieval in action control. These insights challenge previous assumptions about inhibition within the BRAC framework and highlight the need for a nuanced understanding of cognitive control processes.

Adaptation by Binding: A Meta-Analysis on the Specificity of Adaptive Control

Daxun Zhu, Ghent University; Hannah Kaiser, University of Tübingen; Karin Bausenhardt, University of Tübingen; David Dignath, University of Tübingen; Carolin Dudschig, University of Tübingen; Wim Notebaert, Ghent University; Donna Bryce, University of Augsburg; Senne Braem, Ghent University

Humans flexibly adapt their behavior in response to conflicting situations, often measured using the congruency sequence effect (CSE). A long-standing debate concerns whether CSEs reflect domain-general or domain-specific control. The adaptation-by-binding account holds that previous conflict should strengthen those task-specific associations and therefore predicts task-specific control. Starting from this, one model further predicts a U-shaped relation where only highly similar or highly dissimilar tasks would show CSEs across tasks, because only those tasks can be activated in parallel. To investigate this issue more systematically, we conducted a meta-analysis of cross-task CSE studies (1992–2023; 169 experiments, 229 effect sizes). Results suggest task dissimilarity shows a negative linear relation with cross-task CSEs. Interestingly, dissimilar stimulus or response identities may increase rather than reduce CSEs. These results call for a more refined understanding of what drives adaptive control, with a central role for shared versus separate task representations, moving beyond simple domain-general or domain-specific accounts.

Manipulating Instructions to Dissociate Influences of Episodic Retrieval and Propositional Knowledge in the Valence Contingency Learning Task

Carina Giesen, HMU Health and Medical University Erfurt

In the valence contingency learning (VCL) task, participants evaluate target words which are preceded by nonwords. Nonwords are predictive for positive/negative evaluations. This produces robust contingency learning (CL) effects, reflected in faster and more accurate performance for highly contingent nonword-valence pairings. Previous findings indicate controlling for episodic retrieval of transient stimulus-response episodes reduces CL effects, but does not eliminate them. These residual CL effects are best explained by propositional knowledge. In the present talk, I will present findings from different manipulations that aim to influence participants

beliefs about contingencies in the VCL task. This is achieved by merely instructing contingencies (a) in a task that does not include any actual contingencies (study 1) and (b) in a task in which the actual contingencies contradict the instructed contingencies (study 2). Both studies assess effects of valence contingency learning, evaluative conditioning, and contingency awareness of instructed and actually experienced contingencies for nonwords. Implications for theories on processes underlying contingency learning and evaluative conditioning are discussed.

Binding of Context, Concept, and Language

Andrea M. Philipp, RWTH Aachen University; **Elena Benini**, RWTH Aachen University; **Iring Koch**, RWTH Aachen University

Bilingual (or multilingual) speakers have the ability to flexibly switch between their languages. Yet, to speak in a certain language, bilinguals need to selectively activate the correct language. This requires cognitive control which is often investigated through language-switching paradigms. In the present study we explored in three experiments ($N_s=48$) whether feature binding and retrieval contribute to language-switching performance. More specifically, we were interested in the potential binding between the concept, the target language and a specific context. Participants typed the name of a depicted object (i.e., the concept) in each trial, in which the currently relevant language was indicated by a symbolic cue that also contained an irrelevant dimension (i.e., the context). Results were mixed in that we observed larger language repetition benefits when the context repeated than when it switched in some but not all conditions. We discuss the implications of these findings with respect to the interplay between language control and short-term bindings.

The Integration and Disintegration of Newly Learned Meaningful Words

Rebecca Crowley, Royal Holloway, University of London; **Amir-Homayoun Javadi**, University of Kent; **Jakke Tamminen**, Royal Holloway, University of London

Little is known about how new words are retrieved from memory. Even less is known about whether words are forgotten in an all-or-none manner or whether it is possible to forget some word elements

but retain others. We examined whether a statistical association exists between the retrieval successes of discrete elements from the same new word during cued recognition (retrieval dependency) to assess whether elements making up a new word representation are integrated and retrieved together from memory. Participants encoded word triplets made from a written nonword alongside pictorial and auditory elements representing meaning. Retrieval dependency was found immediately after learning. These associative connections maintained across one week of forgetting such that the word elements were forgotten together or not at all. This associative structure could be disrupted though by a mechanism akin to retrieval-induced forgetting, suggesting that word representations are susceptible to interference during learning. These findings are not accounted for by existing theories of word learning or word representation which have tended to overlook memory retrieval and forgetting processes.

SYM-36: From Sensory Presentation to Working Memory Representations: New Insights on How Working Memory Operates in Our Sensorily Rich World

Chair(s): Laura Klatt, Leibniz Research Centre for Working Environment and Human Factors

Symposium Abstract

Successful interaction with everyday environments rests on processing of information presented in various sensory formats. Yet, such sensory complexity is often neglected in laboratory studies of cognition, despite evidence that presentation format affects cognitive processes fundamental for everyday life, such as working memory (WM). Thus, for example, though we know that presenting memoranda to multiple senses improves WM performance (reviewed in Penney [1975]), the underlying mechanisms of such and similar effects remain insufficiently clear. This symposium gathers early career researchers of various backgrounds investigating the links between how information is perceptually presented and represented in WM in its absence, in the service of goal-relevant behaviour. We will present new behavioural and neuroimaging insights on how sensorily diverse object features are represented in WM, how WM is used to track multisensory objects during occlusion, and how

research on such topics can help clarify the structure of WM itself. With this, we aim to pave the way for a new science of WM, and cognition more broadly, that seeks to investigate how cognitive processes operate in a sensorily multifaceted world.

Decoding Tactile Working Memory Content Reveals Performance Relevance of Parietal fMRI Activity Patterns

Miro Grundei, Freie Universität Berlin; Timo Torsten Schmidt, Freie Universität Berlin; Paolo Barbieri, University of Turin; Felix Blankenburg, Freie Universität Berlin

Working memory (WM) supports higher-order cognition by enabling short-term maintenance and manipulation of information through dynamic, distributed neural processes. In this talk, I present research on the somatosensory modality, showing that tactile WM engages both sensory and higher-order cortical regions. While this parallels findings in the visual domain, the temporal dynamics and functional roles of these areas remain underexplored. Using multivariate pattern analysis, we examined how spatial features of tactile stimuli are represented and maintained over a short delay. Results revealed early engagement of contralateral primary somatosensory cortex (S1) and anterior superior parietal lobe (SPL), shifting to bilateral posterior SPL later in the delay. Decoding accuracy in ipsilateral SPL correlated with individual performance, suggesting that distinctiveness of representations in this region supports retention. These findings illuminate the evolving hierarchy of tactospatial WM, indicating a transformation from sensory to more abstract parietal representations. The posterior parietal cortex thus emerges as a prime target for non-invasive modulation of tactile WM, as pursued in our ongoing MeMoSLAP research unit.

Binding Information Across Sensory Formats in Working Memory

Nora Turoman, University of Geneva; Elodie Walter, University of Geneva; Anaë Motz, University of Geneva; Laura-Isabelle Klatt, Leibniz Research Centre for Working Environment and Human Factors

To-be-remembered information's sensory format at presentation affects working memory (WM) performance. For example, information is typically recalled better when it is presented audiovisually than just visually or aurally. However, this bimodal

advantage has only been found in free and serial recall, where the identity of an object is recalled, but not in cued recall, where one object feature is recalled when another one is cued – despite both tasks requiring binding features into an object in WM. We conducted a series of cued recall experiments to clarify this discrepancy, varying the presentation format of memoranda. We found evidence for a bimodal advantage across multiple experiments, despite nearly identical task settings as in the original cued recall tasks. Moreover, our results suggest that the bimodal advantage arises as a result of audiovisual presentation, not WM storage as an audiovisual object. Finally, we found the bimodal advantage to be sensitive to the characteristics of the to-be-remembered object feature that is cued, such as whether it was a color or shape, and whether it was the aurally- or visually-presented feature. In sum, our results show not only that the bimodal advantage can appear in cued recall, but also clarify its mechanism: it is likely mainly a perceptual-level phenomenon that occurs at information encoding. As such, it is sensitive to other perceptual-level stimulus characteristics at encoding. These results present an important step towards better understanding the complex relationship between perception and WM representation.

Behavioral and Electrophysiological Indices of Audiovisual Working Memory

Ceren Arslan, Leibniz Research Centre for Working Environment and Human Factors; Stephan Getzmann, Leibniz Research Centre for Working Environment and Human Factors; Daniel Schneider, Leibniz Research Centre for Working Environment and Human Factors; Laura-Isabelle Klatt, Leibniz Research Centre for Working Environment and Human Factors

Current working memory (WM) research is dominated by investigations of the visual domain. To obtain a better understanding of how multisensory inputs are encoded, stored, and recalled, we conducted two EEG experiments adopting an audiovisual-delayed-match-to-sample task. In a first study, participants were presented with one or two audiovisual objects, attending to either auditory (AA), visual (AV), or both features. Behavioral results showed automatic encoding of both features into WM, with task-irrelevant features still interfering at recall. However, their maintenance was not reflected in traditional unisensory ERP measures. In a second study, we added unisensory controls (auditory-only, visual-only)

and manipulated audio-visual feature presentation to be spatially disparate or compatible. Spatially disparate features diminish performance in AV, but not in AA or conjunction trials. Representational similarity analysis suggests that task-irrelevant auditory features (in AV trials) are less consistently filtered out and reactivated at recall compared to task-irrelevant auditory features (in AA trials), irrespective of their spatial compatibility.

Using Working Memory to Track Multisensory Moving Objects Under Occlusion

Surya Gayet, Utrecht University; Yichen Yuan, Utrecht University; Nathan van der Stoep, Utrecht University

Predicting the location of moving objects is essential in day-to-day behavior, for instance when participating in traffic. Visuo-spatial working memory helps keeping track of objects, despite temporary sensory interruption (e.g., occlusion). Although many objects inherently provide multisensory information, it remains unknown whether observers benefit from keeping multisensory (compared to unisensory) information in working memory when tracking occluded objects. In a series of behavioral experiments, participants predicted the location of moving objects that were interrupted by an audio-visual or visual-only occluder. Their localization performance was fully driven by a single modality: the visual component during audio-visual occlusion, and the auditory component during visual-only occlusion. This was surprising, considering that the visual and auditory components demonstrably provided useful location information when tracked in isolation, and that substantial multisensory benefits were found without occlusion. These findings show that observers selectively maintain the most reliable sensory input to minimize working memory load, and flexibly prioritize one sense over the other in anticipation of modality-specific interference.

Evidence Against a Single-Stream Account: Working Memory for Successive Versus Concurrent Presentation of Auditory and Visual Information

Dominic Guitard, Cardiff University; Luísa Superbia Guimarães, University of Leeds; Nelson Cowan, University of Missouri-Columbia

Working memory is essential for navigating the complex, multisensory environments that surround us daily. Traditional models propose that only one stream of sensory information can be encoded in working memory at a time. Across two large developmental studies (N ~200 children) and a large adult study (N ~360), we investigated both item recognition (e.g., identifying the color or tone presented) and position memory (e.g., recalling which position a color or tone appeared in the list). Participants were tested on visual (color) and auditory (tone) information presented either successively (one modality following the other) or concurrently (one tone paired with each color, but uncorrelated). Our findings challenge the single-stream model, showing no difference in performance between successive and concurrent presentations for both item recognition and position memory. Remarkably, even first-grade children demonstrated the ability to encode and organize two simultaneous streams. These results suggest that from early childhood, humans have a robust capacity to concurrently encode and retain separate sensory streams in working memory, offering new insights into multisensory integration across development.

SYM-40: Can We Retrieve Information Based on Relational Similarity?

Chair(s): Penka Hristova, New Bulgarian University; Margarita Pavlova, New Bulgarian University

Symposium Abstract

Theoretical and computational models of human memory predict that situations sharing common perceptual features are more likely to be retrieved. Empirical research on analogy, however, provides conflicting data on the roles of perceptual (surface) and relational (structure) similarity. These contradictory outcomes suggest that further investigation on the roles of surface and relational similarity in memory is needed. Bridging the two fields, in this symposium, we will present findings that not only is episodic relational retrieval possible but under some conditions, it can be preferred. We will discuss the role that structural similarity and abstract schemas play in the retrieval of autobiographic memories while surface and structural similarity are not correlated. The ADAPTER (As Deep As Possible Target Encoding and Retrieval) model will be presented as it can be used to explain the

contradictory findings regarding the roles of surface and structural similarity in retrieval. Finally, some methodological alternatives for capturing relational retrieval of complex material will be considered. The closing discussion will focus on the role of relational similarity in memory retrieval and propose further directions in the field.

Retrieval of Relationally Similar Events

Margarita Pavlova, New Bulgarian University

Classical computational models of memory predict that events that share common surface features are more likely to be retrieved (McClelland, 1995; Metcalfe, 1990; Murdock, 1995). Similarly, research on analogical reasoning demonstrates that while people may judge relational similarity as more sound for making inference, they tend to recall surface-similar information (Gentner et al., 1993; Trench & Minervino, 2015). On the other hand, the AMBR model of analogy-making and memory (Kokinov, 1988; Kokinov & Petrov, 2001) predicts that analogical episodes are more likely to be recalled than superficially similar ones. This prediction stems from the fact that AMBR represents the relations among episodes' elements, and not lists of features with no internal structure, and views recall as a reconstruction by analogy. Two sets of experiments show that analogical episodes are more probable sources of intrusions than surface similar or dissimilar ones using verbal (Feldman & Kokinov, 2009) and non-verbal materials (Pavlova & Kokinov, 2014). The results of these studies are discussed in a broader view of the role of relational similarity and the representation of structure in memory retrieval.

Relational Categories Bridge the Retrieval Gap: An Empirical Study

Lucas Raynal, University of Geneva

I will present an empirical study showing that non-experts are not doomed to relying on surface similarities during analogical retrieval. Participants were presented with anecdotes embodying familiar relational categories (e.g., reacting to a missed gift) and asked to report potential retrievals of personal memories. In the first experiment, the target cues preserved surface features shared by many instances of the category (e.g., reacting to a missed gift involving a cloth), causing many close analogs to compete for

retrieval alongside distant analogs. In Experiment 2, a more direct competition was created between surface matches and distant analogs by using target cues involving uncommon associations between surface features and structure (e.g., reacting to a missed gift involving a school supply). The findings showed that close analogs are preferentially retrieved over distant analogs when both are available (Experiment 1), but distant analogs overcome surface matches when close analogs are sparser (Experiment 2). These results suggest that structural similarities are the primary determinant of retrieval mediated by relational categories, with surface similarities playing a complementary role in selecting a specific instance.

The Adapter Model: As Deep as Possible Target Encoding and Retrieval

Emmanuel Sander, University of Geneva

Making an analogy typically requires retrieving a source analog from memory. However, the literature presents seemingly contradictory findings regarding the roles of surface and structural similarities in retrieval. In this presentation, we introduce a conceptual model of analogical retrieval (ADAPTER: As Deep As Possible Target Encoding and Retrieval), which provides a unified account of both successes and failures in driving structurally-based retrievals. According to the model, encoding relies on the deepest available categories (with superordinate relational categories > familiar relational categories > entity categories) and constrains retrieval. The success or failure of retrieving distant analogs is primarily explained by the availability of familiar relational categories (e.g., making up an excuse) that participants can use to encode the structure of the situations. Other factors (e.g., encoding contexts) integrated into the model account for cases in which familiar relational categories fail to support structurally-based retrieval. We illustrate how the model can be used to explain previous findings post hoc and generate novel predictions regarding patterns of structurally-based retrievals.

An Attempt to Study the Gap in Relational Retrieval Differently

Penca Hristova, New Bulgarian University; Patric Pförtner, New Bulgarian University

The retrieval gap research employs several experimental procedures to show that humans fail to retrieve relationally similar information when object similarity is missing. The two main paradigms require recall and analogy generation and yield mixed results. The contradictions are usually explained by the inability of these paradigms to discriminate fabricated (“fake”) analogies from episodic or autobiographical recall. This presents a methodological pitfall as memory is a constructive and contextually sensitive process and therefore different responses may be expected under different occasions, particularly for recall of relatively complex situations that had happened in the personal past. Furthermore, retrieval of relations is achieved with less complex stimuli, such as word-pair lists, in better-controlled recall and recognition memory paradigms, especially when cued by typical exemplars of given relations. Experiment 1 investigates whether event segmentation can be an alternative way to capture the effect of relational similarity. Experiment 2 focuses on the role of expertise in generating analogies in chess while controlling for the source of analogy (past or fantasies) and the perception of similarity, such as pixel overlap.

Symposium Discussion

Vencislav Popov, University of Zurich
Symposium Discussion

SYM-38: New Trends In Measuring Attentional Control

Chair(s): Anna-Lena Schubert, University of Mainz; Alodie Rey-Mermet Vinzenz Pallotti University, and UniDistance Suisse

Symposium Abstract

Accurately measuring attentional control is crucial for understanding individual differences in goal-directed behavior. Currently, however, this is hindered by conceptual and methodological challenges. This symposium presents four talks addressing these challenges and proposing improvements. Rey-Mermet and Schubert outline key obstacles, including low reliability and validity, and unclear conceptualizations, providing a foundation for the following talks. Kempkens et al. explore whether distinguishing post-congruent and post-incongruent trials enhances attentional-control measures, finding limited benefits. Schaefer and

colleagues apply Drift Diffusion Models with Amortized Bayesian Inference to isolate attentional-control processes and improve reliability. Robinson advocates linking computational models to attentional-control measures, emphasizing predictive validity to refine theories and validate tasks. The final talk will conclude with a discussion between speakers and audience, aiming to promote the development of more robust, generalizable, and theoretically grounded measures of attentional control.

What Key Obstacles Are We Facing When Measuring Attentional Control?

Alodie Rey-Mermet, Vinzenz Pallotti University, and UniDistance Suisse; Anna-Lena Schubert, University of Mainz

Attentional control refers to the ability to maintain and implement a goal and goal-relevant information in the face of distraction. Recent research has highlighted major challenges in developing reliable and valid measures of attentional control. These challenges are twofold: methodological and conceptual. Methodologically, the low reliability and validity of attentional control measures have been attributed, for example, to the use of difference scores, the neglect of individual differences in speed-accuracy trade, or the difficulty of isolating attentional control from measurement error. Conceptually, challenges stem from disagreements over how attentional control should be conceptualized, resulting in ambiguity about what the attentional-control measures should assess. The goal of the present talk is to present these methodological and conceptual challenges. This is intended to lay the groundwork for subsequent talks, which will focus on proposing improvements to the measurement of attentional control.

Does Distinguishing Post-Congruent and Post-Incongruent Trials Improve Cognitive Control Measures?

Niels Kempkens, UniDistance Suisse; Julia Haaf, University of Potsdam; Anna-Lena Schubert, University of Mainz; Alodie Rey-Mermet, Vinzenz Pallotti University, and UniDistance Suisse

Cognitive control is typically assessed as the performance difference between trials triggering a

response conflict (i.e., incongruent trials) and trials triggering no or low response conflict (i.e., congruent trials). Previous research using this measure has reported low reliability and low correlations across tasks. These issues may result from failing to consider that cognitive control demands vary depending on the congruency of the previous trial. In line with this argument, Moretti et al. (2023) have suggested assessing cognitive control by selecting only the trials that maximize response conflict, that is, post-congruent trials. However, this approach discards potentially valuable information from post-incongruent trials. Moreover, post-incongruent trials may be more valid because cognitive control is thought to be upregulated after incongruent trials. We addressed these limitations by incorporating the distinction between post-congruent and post-incongruent trials in a single model. Preliminary results showed that reliability and between-task correlations were generally not improved. Thus, distinguishing post-congruent and post-incongruent trials may not solve the measurement problems recognized in the field.

Enhancing the Measurement of Attentional Control: Experimental Validation of Drift Diffusion Models With Time-Varying Drift Rates Using Amortized Bayesian Inference

Simon Schaefer, University of Mainz; Jan Göttmann, University of Mainz; Anna-Lena Schubert, University of Mainz

Conflict tasks like the flanker paradigm are widely used to study attentional control, focusing on phenomena such as the congruency effect and its interactions. The congruency effect interacts with manipulations like the proportion of congruent trials (PC), stimulus onset asynchrony (SOA), and the congruency sequence effect (CSE). However, individual differences research in attentional control faces challenges, including inconsistent delta function patterns, low reliability, and limited convergent validity across conflict tasks. To address these psychometric issues and enhance understanding of cognitive processes, we applied Drift Diffusion Model (DDM) variants to flanker task performance using Amortized Bayesian Inference. Specifically, BayesFlow, a deep learning-based framework, efficiently estimated model parameters. Simulation studies assessed parameter recovery, calibration, and reliability. Experimental studies

examined how spacing, SOA, PC, and prior-trial congruency affected model parameters. This demonstrates computational modeling's potential to advance measurement of individual differences in conflict processing.

Formally Linking Computational Models of Attentional Control Tasks to Validate Measures and Constrain Theory

Maria M. Robinson, University of Warwick

Attentional control, the ability to (de)prioritize task-(ir)relevant information, is core to goal-driven thought and action. Recent research has identified several challenges for developing theories and measures of attentional control and collectively highlights the importance of integrating principles from mathematical psychology into this domain. First, it is critical to move beyond the subtraction method and examine a wider range of mapping functions between latent variables and behavior. One promising approach is to test theory-driven computational models that isolate attentional control from nuisance variables. Second, it is important to move beyond assessing models solely based on their post-hoc fits, toward their capacity to make a priori predictions in novel experimental conditions and variations in task structure. Adopting this predictive approach serves the joint purpose of helping validate and revise models, as well as identify boundary conditions on theories that postulate attentional control as a domain-general construct.

Panel Discussion: Charting a Path Forward for Measuring Attentional Control

Anna-Lena Schubert, University of Mainz; Alodie Rey-Mermet, Vinzenz Pallotti University, and UniDistance Suisse

The discussion will synthesize insights from the preceding talks to evaluate the current challenges and future directions for measuring attentional control. Key topics will include the implications of methodological refinements, such as distinguishing trial types and employing advanced computational models for improving reliability and validity. We will also explore the conceptual boundaries of attentional control and discuss how theory-driven approaches can integrate experimental and individual differences perspectives. Emphasis will be placed on identifying practical strategies for resolving

inconsistencies across tasks and linking measures to cognitive theories. This discussion aims to foster collaboration and guide the field toward developing more robust, generalizable, and theoretically informed measures for studying attentional control.

SYM-39: The Interplay of Orthography and Phonology in Language Production and Learning

Chair(s): Tanja C Roembke, RWTH Aachen University

Symposium Abstract

The orthographic and phonological representations of a word have been found to interact in many situations: For example, a typo can reflect the homophone spelling of the intended word (e.g. their vs. they're), suggesting co-activation of phonology during writing. Similarly, seeing a word written may interfere with the acquisition of its spoken form. A better understanding of such cross-modal interactions between orthographic and phonological representations can give us insights into the cognitive architecture of the lexicon, the language production system, and, in the case of bilinguals, into the dynamics of language control. In this symposium, we will therefore explore how orthography and phonology interact both during language production (Contributions 1-3) and learning (Contribution 4). Contribution 5 will add a meta-analytic perspective on these cross-modal effects in language production. Across contributions, we will consider how the interplay between orthography and phonology may differ depending on participants' language proficiency, output modality, age, or the specific task setting they are in.

The Role of Phonology and Orthography in Spoken and Written L1 and L2 Production: Evidence From Two Picture Naming Studies

Merel Muylle, Ghent University; Zita Meijer, Ghent University; Tamara Bijmens, Ghent University; Séverine Casalis, Université de Lille; Gonja Jarema, Université de Montréal, and Centre de Recherche de l'Institut universitaire de la gériatrie Montréal (CRIUGM); Robert Hartsuiker, Ghent University

L1 research shows strong sound activation during writing, but only weak letter activation during speaking. This pattern may be different in the L2: while the L1 is acquired first in spoken and later in written

modality, the L2 is often acquired simultaneously in both modalities, creating stronger word-letter associations in the L2. Thus orthography may play a larger role in L2 vs. L1. In two studies, we compared phonological and orthographic priming in spoken and typed picture naming across L1 and L2. In Study 1, French-English bilinguals performed a typed picture-word interference task with phonologically (P) related, phonologically + orthographically (PO) related, or unrelated prime words. We found significant PO priming, but no P priming, suggesting that phonological overlap alone does not enhance typing. This effect was similar across L1 and L2, contrary to our predictions. In Study 2, L2 and L1 speakers of English and French performed a dual task in which lexical decision items served as P, PO or unrelated primes for subsequent spoken picture naming. Here, we found phonological and orthographic priming in the L2, but only phonological priming in the L1, suggesting a larger role for orthography in L2 vs. L1 speaking.

The Impact of Phonological Co-Activation on Written Language Switching

Tanja C Roembke, RWTH Aachen University; Elena Benini, RWTH Aachen University; Andrea M. Philipp, RWTH Aachen University

When writing in a target language, bilinguals may activate translation-equivalent words in the non-target language at both the phonological and orthographic levels. In this preregistered experiment, we examined whether the phonological activation of the non-target language can be down-regulated when the task only involves writing and when activating phonology exacerbates between-language conflict. Thus, we conducted a language-switching experiment wherein German-English bilinguals (N=49) switched between writing the names of pictures which were either homographs (e.g., Tiger/tiger [German/English] or quasi-homographs (e.g., Engel/angel [German/English]) in both languages. Importantly, the to-be-written words were never identical in their phonology. Participants responded by typing the word, and simultaneously spoke the same word in the corresponding language, tapped their tongue or did neither. As predicted, we found larger language-switch costs when typing and speaking than in the other conditions, indicating that the conflicting phonology was more active in the former. We propose that people can gauge phonological activation when

typing, for example downregulating it when conflicting and not directly necessary for the task.

Becoming Biliterate: How Children and Adults Integrate Sublexical and Lexical Information When Spelling in EAL

Olivia Afonso, Oxford Brookes University; Paz Suárez-Coalla, University of Oviedo; Carmen Hevia-Tuero, University of Oviedo; Cristina Martínez-García, Universitat Oberta de Catalunya

Spelling is a complex skill involving to correctly apply phonology-to-orthography (PO) correspondences and to store whole-word orthographic forms in the lexicon. In this talk, we summarise the results obtained in two studies conducted with children and adults with English as an additional language (EAL) addressing how biliterates integrate information from both routes during writing. In the first study, 9-11-year-old Spanish children spelt English words to dictation. Younger children were more affected by the length of the stimulus, while older children showed a greater sensitivity to lexical and semantic variables. The effects were found in accuracy, letter duration and inter-letter interval duration. These findings confirm a shift from a sublexical to a lexical strategy when spelling in EAL. In a typing study (ongoing), adult EAL speakers copied English words in which PO regularity and lexical frequency were orthogonally varied. Bayesian analyses conducted on the response latencies and the target inter-key intervals will be presented. These results will shed light on how EAL speakers integrate the spelling routes during production and how this affects the handwriting and typing speed of biliterates.

Tanja C Roembke, RWTH Aachen University

their eye movements measured. In the learning phase, novel words were presented in the same sentence repeated four times or in four different sentences. In the pre- and post-learning phases, novel words were embedded in neutral sentences, and the invisible boundary paradigm used (Rayner, 1975). For each novel word (e.g., faddle), a valid (e.g., faddle) and an invalid (e.g., hobbta) preview were created. Results showed a replication of the contextual diversity effect (as per Pagán & Nation, 2019). Importantly, the orthographic preview benefit was greater at post-learning; suggesting that only words that are stored in memory can be parafoveally processed during reading. These findings indicate that orthographic parafoveal preview can serve as a sensitive index of word learning.

Symposium Discussion

18:00 – 19:00: Blitz Talks

B-10: Learning & Memory II

Truth in Inconsistency? The Potential of Differential Mnemonic Consistency in Deception Detection

Ana Philippsen, Heinrich Heine University; Nils Brandenburg, Heinrich Heine University; Raoul Bell, Heinrich Heine University; Axel Buchner, Heinrich Heine University

The common (mis-) conception among laypeople as well as law-enforcement personnel that consistency between statements signals truthfulness is challenged by a lack of evidence and the natural fallibility of human memory. The concept of differential mnemonic consistency offers a promising alternative perspective in that regard. It implies that certain elements of an event are more consistently reported than others and that liars fail to mimic this natural difference in mnemonic consistency between elements of high and low expected consistency. Lange et al. (2020) were the first to empirically test and validate the potential of this proposed criterion in differentiating between experienced-based and fabricated reports. Here, we replicate and extend their study by incorporating methodological refinements and a novel quantification of consistency that accounts for the frequently reported possibility of reminiscences in experienced-based reports. In doing

Does contextual diversity influence the orthographic parafoveal processing of novel words?

Ascensión Pagán, University of Exeter, UK

Pagán and Nation (2019) showed that words learnt in different contexts are acquired slowly during learning but have a larger learning advantage at post-test, suggesting that contextual diversity contributes to context-independent semantic representations (e.g., Jones et al., 2017). This study, therefore, investigated whether contextual diversity modulated the orthographic parafoveal processing of novel words. Adults read novel words embedded in sentences and

so, we not only replicate support for the concept of differential mnemonic consistency but also find that this new quantification may be even better suited to discriminate between truth-tellers and liars.

Do We All Evoke the Same Details When Recalling a Public Event? Shared Memories for the Eurovision Song Contest

Andreia Ribeiro, Faculdade de Psicologia, Universidade de Lisboa; Pedro B. Albuquerque, Escola de Psicologia, Universidade do Minho; Ana Raposo, Faculdade de Psicologia, Universidade de Lisboa

When recalling a public event, individuals retrieve similar details in their narratives. Yet, the extent to which memory representations are identical remains unclear. We examined if the recollected details for Portugal's victory in the Eurovision Song Contest are the same among the community and if there is a pattern in the recall order of details. Participants (N=46) reported freely their event memories. Representational similarity analysis revealed that participants shared 42% of details in their narratives. Recall order analysis showed that the most frequently mentioned details were the artist's name (98%) and the song's title (78%), with 76% of participants recalling the song title immediately after mentioning the artist. When the song was not evoked, the song's authorship (30%) or the singer's features (30%) were recalled. Results show that people share similar details, suggesting the existence of a collective memory. This shared recall follows a structured pattern, with details acting as mnemonic cues that prompt the retrieval of related information, guiding participants' recollection of the event. The consistency in recalling core details underscores the relationship between memory and shared cultural knowledge.

Piloting a Screener Questionnaire for Identifying Children With Working Memory Difficulties

Harry Bennett, University of Leeds; Richard Allen, University of Leeds; Susan Gathercole, University of Cambridge; Amanda Waterman, University of Leeds

Working memory (WM) underpins several key aspects of classroom learning. As such, it is vital to identify children who may be experiencing WM difficulties as early as possible so they can receive the best support. Despite this, barriers remain in the identification of children with WM difficulties. This study piloted a 15-

item, free-to-use, teacher-administered screening tool designed to quickly identify children who may have WM difficulties. Standardised WM assessments were administered to 243 children (age 6–10 years) from two UK primary schools, and class teachers completed the screener for each child. Academic attainment outcomes and SEND status were also provided. As expected, WM performance was correlated with academic attainment. There was also a significant correlation between screener scores and WM performance, controlling for age and SEND. This suggests the screener is a quick and effective tool for identifying children likely to have WM difficulties, enabling timely interventions to support their learning.

Tracking Bilingual Eye Movements: The Impact of Dual Subtitles on Visual Attention

Inka Romero-Ortells, CINC-Nebrija University; Manuel Perea, Universitat de València; Jon Andoni Duñabeitia, CINC-Nebrija University

Videos are widely recognized as effective tools for language learning, with subtitles playing a key role in enhancing comprehension, particularly for second language (L2) learners. However, little is known about how bilingual subtitles (L1-L2) influence gaze behaviour and comprehension as a function of the audio language. This experiment examined how intermediate-to-advanced L2 speakers process dual subtitles compared to no subtitles, focusing on visual attention and comprehension. Spanish-speaking participants with intermediate-to-advanced English proficiency watched videos with either L2 (English) or L1 (Spanish) audio. Each participant viewed six videos under three counterbalanced conditions: no subtitles, bilingual subtitles (L1-top, L2-bottom; or vice versa). An eye-tracker measured gaze behaviour, and comprehension was assessed through true/false questions. Comprehension levels were high across all conditions. Moreover, participants focused more on the speaker's eyes when listening to L1 audio and attended more to subtitles—preferentially the upper ones—when listening to L2 audio. Thus, the cognitive demands of bilingual subtitle processing and the impact of subtitle positioning on visual attention.

Investigating the Impact of Slide Structure on Students' Cognitive Load and Comprehension

Mohammad Alsager Alzayed, KUWAIT UNIVERSITY; **Badria Alajmi**, KUWAIT UNIVERSITY

Engineers normally use presentation slides that are habitually projected in conferences, meetings, and classrooms in the field of engineering to deliver main principles and concepts. The most common PowerPoint slide format used by engineers is the topic-subtopic structure. Unlike the traditional PowerPoint structure, assertion evidence (AE) slides have a succinct sentence replacing the default phrase headlines to summarize the main idea of the slide. The main goal of this study is to investigate the impact of slide structure (AE or Traditional PowerPoint) on students' cognitive load and material comprehension. To accomplish this goal, an experiment was conducted with 95 undergraduate engineering students and 34 graduate engineering students from different engineering courses at Kuwait University where a group of students were asked to view slides presentation using Assertion Evidence style and another group using Traditional PowerPoint. The main findings from this study was that participants in the Assertion Evidence group had a lower perceived cognitive workload than participants in the Traditional PowerPoint group. The results can be used to guide multimedia design to drive effective communication of technical presentations.

Retrieval Advice Can Remediate Decreased Memory Formation During Tech-Based Problem Solving

Patrick P. Weis, Julius-Maximilians-Universität Würzburg; **Wilfried Kunde**, Julius-Maximilians-Universität Würzburg

With increasingly powerful computers at our service, problem solving is getting increasingly “hybrid”, i.e. Containing mental and environment-based components. Complementing our mental processes comes with benefits and challenges. The present talk focuses on the latter: using the environment for problem solving can lead to decreased performance due to decreased memory formation. The underlying rationale is that accessible memory traces are incredibly efficient and thus hard to outperform by environment-based memory. In our study, participants who decided to solve problems with help of a computer rather than with mental processes in a choice block performed worse in a subsequent mental block. Intriguingly, participants who received ‘try internal retrieval first’ advice in the

choice block performed better in the internal block than participants who received no advice ($d = .76$). Benefits were due to more functional memory traces and possibly also due to improved strategy choice. In sum, we showed that simple strategy advice can greatly help users navigate cognitive environments and that uninformed tech-based problem solving bears the risk of not developing more superior mental strategies.

B-11: Learning & Memory III

Category Label Influences on Scene Recognition Memory

Aaron Cousins, University of York; **Karla Evans**, University of York; **Silvia Gennari**, University of York

How does labelling stimulus categories modulate recognition memory? Previous studies argue for two contrasting accounts: (a) labelling distorts memory encoding toward typical features, and (b) it enhances encoding by increasing distinctiveness. Here, we address these accounts in scene memory while improving prior experimental designs. Participants viewed scenes belonging to 6 categories (e.g., kitchens or living rooms) while performing 3 blocked encoding tasks: aloud or button-press categorisation and rating preference on a scale. 108 images and task orders were counterbalanced across participants and tasks (within-subject design). An old/new recognition test followed the encoding tasks. We found an effect of task on memory performance ($F(2,104)=57.6$, $p<.05$): the preference task was significantly higher than both labelling encoding conditions ($d'=1.11$, $d'=1.26$), but aloud categorisation was significantly higher than button-press categorisation ($d'=0.37$). The results suggest that category labelling leads to poorer memory, consistent with the distortion account. However, aloud categorisation reduced this deficit, implying that distinctiveness also plays a role.

“In Germany, It Is Legal to Marry a Cat”: The Role of Plausibility in Memory for Truth and Falsity

Daria Ford, University of Mannheim; **Lena Nadarevic**, Charlotte Fresenius Hochschule

In this preregistered experiment, we aimed to conceptually replicate a study by Vorms et al. (2022) by examining how plausibility influences memory for true and false statements and corresponding veracity

feedback. Participants (N=328) studied four types of statements—plausible true, plausible false, implausible true, and implausible false—before completing a recognition test that assessed memory for both statements and feedback. We successfully replicated the interaction between statement plausibility and veracity feedback on feedback attributions: Plausible statements were more often correctly identified as true than as false, while implausible statements showed the opposite trend. Using a multinomial model, we estimated contributions of statement memory, feedback memory, and guessing to this effect. Results showed that statement memory improved with expectation-consistent veracity feedback, whereas feedback memory was better when feedback was inconsistent with expectations. Additionally, participants' guesses aligned with plausibility expectations. These findings provide more information on the underlying cognitive processes of the observed plausibility effect.

Affective Congruency Modulates Generalisation Gradients

José A. Alcalá, Universidad Rey Juan Carlos; Celia Martínez-Tomás, Universidad Complutense de Madrid; Gonzalo P. Urcelay, University of Nottingham; José A. Hinojosa, Universidad Complutense de Madrid

Generalisation, the ability to apply past experiences to new situations, is a critical phenomenon that enables organisms to navigate their environment efficiently. Recent research highlights affective valence as key in shaping generalisation responses. Here, we examined whether cue-outcome affective congruency enhances access to the valence dimension (i.e., the hedonic tone of a stimulus, from negative to positive) during generalisation of responses. In an online predictive learning task (N=229), participants were trained under affective congruency (matching cue-outcome valence, e.g., a positive stimulus paired with a positive outcome) or incongruency (mismatched valence). During the generalisation test conducted with non-trained (new) stimuli, congruency sharpened the generalization gradient, with responses declining more steeply as a function of affective distance. Additionally, congruency decreased response times to novel stimuli. These findings confirm that valence is a crucial dimension in generalisation and reveal that affective congruency amplifies its influence. This study advances our understanding of how emotional

information modulates cognitive flexibility in learning and generalization.

The Impact of Event Structure and Duration on Time-Compressed Memory Replay

Nathan Leroy, ULiège; David Stawarczyk, ULiège; Arnaud D'Argembeau, ULiège

Everyday events are represented in memory as a sequence of experience units—each corresponding to a moment of past experience—separated by temporal discontinuities. As a result, mentally replaying events is faster than their actual duration. In two studies, we investigated how temporal compression rates vary with event duration and segmentation (i.e., the number of sub-events they contain). Participants watched 32 videos of daily activities lasting 30 or 60 seconds (Study 1, n = 37), or 20 or 40 seconds (Study 2, n = 29), with either few or many event boundaries (EBs), which mark sub-event transitions. Immediately after watching each video, participants mentally replayed and then verbally described its content. Results showed that temporal compression was greater for longer videos and those with fewer EBs. Participants recalled more experience units when videos contained many EBs, and the number of recalled units was negatively associated with temporal compression. Moreover, moments spanning EBs were more likely to be recalled. These findings support the idea that experience units in memory are formed during the perception of EBs, with event duration and segmentation jointly shaping temporal compression in memory representations.

Rediscovering Vladimir Bekhterev: His Contributions, Life, and the Twists of History

Reut Said, Achva Academic College; Daniel Algom, Tel Aviv University

Vladimir Bekhterev was a leading scientist in medicine, neuroscience, and psychology in the twentieth century. It is on this background that the glaring contrast between his scientific greatness and his relative unfamiliarity today comes as a surprise. In the psychological community alone, his name is hardly recognizable. The vagaries of history played a crucial role in creating this stark contrast. This article describes Bekhterev's tumultuous life and mysterious death. It uncovers hitherto unknown episodes in his life and in his professional development. Notably, we

discuss Bekhterev's significant contributions to psychology, at topic which has been relatively underreported in the literature.

B-12: Attention & Cognitive Control II

APOE-Specific Cognitive Effects of Levetiracetam in Mid-Age Adults

Claire Lancaster, Brighton & Sussex Medical School; Nicholas Dowell, Brighton & Sussex Medical School; Arnold Bakker, Johns Hopkins; Chris Bird, University of Sussex; Naji Tabet, Brighton & Sussex Medical School; Jennifer Rusted, University of Sussex

Low-dose levetiracetam (an anti-seizure medication) is under investigation as a potential treatment for slowing Alzheimer's Disease (AD) progression, likely via its effects on pathological brain hyperactivity. This study tests whether levetiracetam has acute cognitive benefits in mid-age adults, and whether drug effects differ in carriers of an APOE4 risk gene for AD. 58 adults (45-65 years; 27 APOE33; 31 APOE4+) participated in a double-blind, placebo-controlled study of low-dose levetiracetam (125mg bidaily for two-weeks). Following each treatment phase (placebo, levetiracetam), participants completed an executive switch-inhibition task. Independent of treatment, APOE4+ showed slower response times (RT) across all trial types. Levetiracetam treatment significantly enhanced accuracy and RT in APOE33 individuals but did not alter performance in APOE4+ individuals. Consistent with existing findings that an 18-month intervention with low-dose levetiracetam selectively slows cognitive decline in non-APOE4+ individuals with Mild Cognitive Impairment, this drug potentially may be more valuable if used prophylactically in those who don't carry an APOE4 risk variant.

Statistical Learning (SL) of Categories: The Effect of Age and Individual Variability in Neural Responses and Behaviour

Claudia Ruzza, International School of Advanced Studies (SISSA); Davide Crepaldi, University of Pavia

Humans use statistical cues to extract basic units of information from complex sensory input. Using a Fast Periodic Visual Stimulation (FPVS) paradigm coupled with EEG recordings, skilled readers were exposed to stimuli (words and pseudofont strings), which were

arbitrarily divided into two groups of relatively high-frequency vs. low-frequency items. Previous work (De Rosa et al., 2022) showed strong grouping effects in the EEG signal. In an original study (N=41) and a conceptual replication (N=42), we tested whether the grouping effect extends to behaviour. In a second study, we compared young (Mage=23) and elderly (N=57, Mage=68) adults' performance. Frequency-domain EEG analyses replicated De Rosa's findings, though elderly adults showed significantly reduced neural responses. Memory performance for frequent and infrequent items was similar between groups, though a negative correlation with age was observed in elderly adults, opening questions about SL and age-related effects. Despite substantial individual variability underlying null group effect, subject-wise correlation analyses suggested no connection between neural signal and behaviour, pointing to a separation between early-perceptual grouping and its emergence in memory.

May the Force Be With You, but Not Always: Aware, but Not Unaware Errors, Are Characterised by Reduced Response Force

Josh Khoo, University of Nottingham; Claudia Danielmeier, University of Nottingham; Roland Pfister, Trier University; Jan Derrfuss, University of Nottingham

Error cancellation is a reduction in response duration and response force during erroneous responses, indicating a rapid error correction process (Foerster et al., 2022). A critical unresolved question is how error cancellation is related to conscious error awareness. The current study investigated this by using a modified go/no-go task, the Error Awareness Task, and a force-sensitive button box. Participants made response accuracy judgements immediately following each response, allowing us to identify aware and unaware errors. We compared the force profiles for aware errors, unaware errors and correct responses. Preliminary results (n = 34, planned n = 40) showed a reduction of peak force for aware error trials, but not unaware error trials, relative to correct trials. These results suggest that error cancellation is strongly related to conscious awareness of error commission. Future work will need to clarify the direction of this relation: Does error awareness trigger cancellation efforts or is error cancellation a trigger of error awareness? Exploring this question promises novel insights into the relationship between automatic and

conscious components of performance monitoring and error processing.

The Interplay of Task Selection and Response Selection in Dual-Task Processing

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In psychological refractory period (PRP) studies, two tasks—Task 1 (T1) and Task 2 (T2)—are performed with varying degrees of temporal overlap. The overlap is defined by the stimulus onset asynchrony (SOA), which refers to the time between the onsets of the stimuli for T1 and T2. Typically, T2 performance is worse with a short SOA than with a long SOA, reflecting the PRP effect, which is believed to arise due to a response-selection bottleneck. In addition to the SOA, the present study also varied the task sequence between T1 and T2. T2 performance was worse in T1-T2 switch trials than in T1-T2 repetition trials, reflecting switch costs. To examine the impact of temporal overlap on switch costs, we introduced a new index of temporal overlap: the response-stimulus interval (RSI), defined as the time between the response to T1 and the onset of the stimulus for T2. The RSI helps differentiate between trials with and without a PRP effect. The analysis revealed that switch costs did not differ between these two trial types, suggesting that switch costs—assumed to arise at the level of task selection—and the PRP effect—assumed to occur at the level of response selection—rely on independent cognitive processes.

Age-Related Differences in a Reference-Back Task With Irrelevant Distractors

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Older adults are more prone to allowing irrelevant stimuli into working memory (WM), likely due to declining inhibitory processes. Our study aimed to identify which WM subprocess might be affected by

this “leakage.” We tested 29 younger (18–30 yrs) and 24 older (60–75 yrs) adults using the reference-back paradigm, which separates WM subprocesses. Using reference and comparison trials – where the current target is compared to the last reference – the paradigm enables the separation of maintenance and updating functions in WM, as well as gate opening (switch cost in reference trials) and gate closing (switch cost in comparison trials), as assumed in the prefrontal cortex–basal ganglia WM model. Task-irrelevant distractors (faces and scrambled faces) were added to assess their impact. Results showed no significant age main effect. Faces influenced reaction times (RT) across all subprocesses, with age-group differences in gate opening and substitution: younger adults showed no RT difference between face and scrambled face conditions, while older adults did. Our findings suggest that gate opening is the critical subprocess responsible for the sensitivity to irrelevant stimuli, contributing to weaker WM performance in older adults.

Embodied Executive Function: The Impact of Body Engagement on Cognitive Control

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Executive function (EF) tasks, such as Simon, Stroop, and Flanker tasks, are critical for understanding cognitive processes, particularly inhibition. However, the potential impact of various types of body engagement—including sensorimotor processes and physical responses—on performance in EF tasks remains poorly understood. We conducted a systematic search across PsycINFO, PubMed, and Scopus, identifying 68 studies that included physical responses beyond conventional finger key presses. Our findings suggest that foot-based responses may exhibit greater susceptibility to interference effects compared to finger presses. Furthermore, a significant proportion of studies evaluated participants in seated positions, indicating a notable gap in exploring standing and dynamic movement involvement in EF tasks. To address this gap, we conducted an experiment comparing the effects of lower and upper limb involvement on Simon task performance. Our findings emphasize the critical

need for integrating body movements into EF research to deepen our understanding of cognitive performance. Future EF studies should consider and account for whole-body problem-solving capacities in both experimental and clinical settings.

B-13: Reasoning & Language

The Importance of Relational Integration vs. Relation Representation for Relational Reasoning Ability

Adam Chuderski, Cognitive Science Centre, Jagiellonian University

What process is crucial for individual differences in relational reasoning, an ability to grasp relations for making inferences? Is it ability to integrate complex relations from elementary role-element bindings, or a simpler ability to mentally represent these bindings? We applied a novel transitive reasoning task to 205 young adults. Premises included an asymmetric relation “above” (/) or “below” (\). Depending on a condition, a response required integrating relations from two premises, recognizing a single but reversed premise, or just noticing its exact copy. In half trials, one premise included a symmetric relation “next to” (|), facilitating both the relation integration and reversed premise conditions. A correlation with the relational reasoning factor (three established tests) showed how much a given condition involved relational reasoning. For asymmetric relations, the correlation was constant across the conditions (mean $r = .63$). For symmetric ones, relational integration yielded only marginally stronger correlation ($r = .62$) than reversed premise ($r = .49$). These results indicate that representing single relations is crucial for relational reasoning, while integrating them into more complex structures has a minor role.

Narrative Identity and Decision Making Among UAE and Hong Kong University Students

Michael O’Sullivan, United Arab Emirates University

Narrative identity (NI) refers to how individuals narrate their lived and remembered past and how they store and retrieve autobiographical memory to integrate and create continuity and meaning out of these memories. Narrative identity has a significant relationship with psychological well-being;

interviewees describe how narrative identity draws from exposure to narratives (O’Sullivan, 2025). Exposure to eudaimonic narratives is consistently positively related to mentalizing (Mulder et al., 2021). This study examines the impact of awareness of narrative identity through online narratives on decision making. Stories and self-constructed narratives can lead to imagined sequences of events, inadequate adjustments for the unexpected, and overconfidence (Barron, 2000; Rogerson et al., 2011). The study examines undergraduate students in the UAE and in Hong Kong in terms of the impact of awareness of narrative identity on decision making. The study uses the Awareness of Narrative Identity Questionnaire (ANIQ) (Hallford & Mellor, 2017) and the Melbourne Decision-Making Questionnaire (MDMQ). The data collection is ongoing in a collaboration between United Arab Emirates University and the Chinese University of Hong Kong.

Individual Differences in Mental Imagery and Vocabulary: Do They Influence Word Imageability Ratings and Visual Word Recognition?

Stephanie Mathey, University of Bordeaux, Labpsy UR4139; Aka Sandra, University of Bordeaux, Labpsy UR4139

Word imageability, the ease with which a word is evoking a mental representation, was shown to facilitate its visual recognition. Many imageability studies rely on mean imageability ratings. Yet, little is known on the role of individual factors in imageability effects. This study investigated whether individual differences in vividness of mental imagery and in vocabulary knowledge influence both word imageability ratings and visual word recognition. We selected 110 words of high or low mean imageability, and controlled several linguistic factors. All stimuli were presented to 66 young adults in a progressive demasking task. The participants then rated word imageability and completed vocabulary and trait mental imagery vividness tests. As expected, high vocabulary facilitated word recognition, and individuals with more vivid imagery rated words as more imageable. However, the facilitating effect of imageability that we found on visual word recognition was not influenced by either mental imagery or vocabulary, and individual’s imageability ratings did not outperform norm-ratings’ predictive power. We discuss the data in terms of dissociation between

variability in semantic judgements and visual word recognition performance.

The Role of Language in Inductive and Deductive Reasoning

Yael Benn, Manchester Met University; Isobel Hammond, Manchester Met University; Rhianna Ledward, Manchester Met University; Rosemary Varley, University College London

As humans are marked by sophisticated cognitive capacities and by the possession of language, the debate regarding the role of language in human reasoning is ongoing. Some propose that grammar (sequential/combinatorial processing) is necessary for inductive and deductive reasoning; implying that significant language impairment should disrupt logical reasoning. This talk will explore the performance in a unique sample of people – those with severe agrammatic aphasia, and examine whether a human mind, with little access to grammatical resources, can employ inductive/deductive reasoning rules. To this end, we use complex Sudoku puzzles which require the application of rules such as *modus ponens*. In addition to behavioural data, we use fMRI to determine brain activation in neurotypical and aphasic participants while solving Sudoku grids. Behavioural data collection reveal that patients with severe agrammatic aphasia retain capacity in both inductive and deductive reasoning and point to considerable autonomy between language and reasoning in the established/adult cognition.

The Effect of Vertical Reading on Saccade Programming and Lexical Processing in the Roman Script?

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Although computational models of eye movement control in reading have focused on horizontal text layouts, vertically oriented text is also encountered in daily life in the Roman script. To examine the interplay between saccade programming and lexical processing under vertical reading in the Roman script, we manipulated the layout of words in a sentence (horizontal vs. vertical) and word frequency (high vs low). In the vertical layout, the words remained in standard orientation but were arranged vertically. Eye-

movement measures at the sentence level showed a cost for the vertical arrangement, primarily reflected in longer fixation durations rather than a greater number of fixations. Critically, at the target-word level, the word-frequency effect— which increased in later eye-fixation measures— remained similar in size across both layouts. The additive pattern of word frequency and text layout, supported by Bayesian factors, suggests that slower saccade programming in the vertical format does not substantially impact lexical processing. Thus, while lexical processing can influence saccade programming, delays in saccade programming do not alter lexical processing, thus posing constraints on models of eye movement control in reading.

B-14: Reading & Writing

Are Letters Basic Units for All Orthographies? Evidence of Cost Involved With Maatraa Processing in Hindi

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Most models explaining visual word recognition work around mental representations of letters as these models are based on experimental findings in languages which have letters as basic functional units. There are many orthographies whose basic units are not as simple as individual letters, e.g.: Chinese characters are made up of radicals and strokes, Arabic characters are made up of letters and diacritics. In Hindi (Devanagari), each segment of a word is called a *varna* and each *varna* is made up of *aksharas* and *maatraas*. Rimzhim et al. (2021) showed that all three, i.e. *varnas*, *aksharas*, and *maatraas* are functional units for Hindi. To pursue universality in understanding the basic units of languages, an LDT based experiment with 790 4-*varna* Hindi words with equal no. of 0-*maatraa*, 1-*maatraa*, 2-*maatraa*, 3-*maatraa* and 4-*maatraa* words was conducted (N=27). Fitting linear mixed effects model showed significant linear and quadratic trends with increase in RTs with increase in no. of *maatraas*. Difference between RTs of 3 and 4 *maatraa* words was found to be significant. The results are motivation to explore more orthographies to find out their basic units so that existing models can be suitably modified to accommodate more orthographies.

Cross-Linguistic Differences and Similarities in Sensitivity to Letter Co-Occurrence Statistics

Elisabetta De Simone, Università di Pavia; Valentina Pescuma, Humboldt-Universität zu Berlin; Davide Crepaldi, Università di Pavia

Letter co-occurrence statistics (n-gram frequency) have been found to be a source of information in beginning and skilled reading. However, empirical studies on n-grams effects have yielded mixed results (Chetail, 2015), likely due to the different metrics and languages utilised. Moreover, reading modelists have assumed a privileged role of bigrams, but their importance has never been directly compared to other n-gram sizes. For these reasons, in this study we have investigated the impact of bigrams, trigrams, and quadrigrams in English, German and Italian, to see whether sensitivity to n-grams would change as a function of orthographic depth, morphological complexity, and word length. To this end, we have employed the data of the Multilingual Eye-tracking corpus (Siegelman et al., 2022) and performed separate type and token-based analysis in each language for first-of-many fixation duration, single fixation duration and gaze duration. Our findings speak against a privileged role for bigrams. Readers in each of the three languages were sensitive to n-gram statistics, although at different stages of processing, mostly as a function of mean word length and morphological complexity, rather than orthographic depth.

The English Pseudoword Lexicon Project - a Megastudy for Investigating Pseudoword Processing

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Linguistic strings that are not attested in a given language have received increasing attention in psycholinguistic research. We introduce the English Pseudoword Lexicon Project (EPLP), a megastudy dedicated to the processing of English pseudowords, nonwords, and words. While a number of psycholinguistic megastudies exist, none of them have specifically targeted pseudowords. EPLP fills this gap by considering three types of English-like non-lexical stimuli: 1) simple pseudowords generated to

resemble English words; 2) morphologically complex pseudowords obtained by combining existing morphemes; and 3) nonwords, violating English orthotactics. We will collect data for about 13500 non-lexical stimuli and 4400 words from more than 3500 English speaking participants across four online lexical decision studies. The first three studies will each focus on a specific class of stimuli. The fourth study will combine all classes in a unique list. We will analyze the collected behavioural responses to evaluate differences in the processing of the various classes of stimuli, resulting in a public resource including performance-based measures (reaction times and accuracy) and a number of relevant psycholinguistic variables.

Words on Strike: When Is Top-Down Facilitation Needed in Degraded Word Recognition?

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Visual word recognition involves both bottom-up and top-down processes, but how they interact remains debated. To examine this, we conducted two lexical decision experiments manipulating word frequency and the visual format of the items (intact vs. strikethroughs). One possibility is that a degraded visual input increases reliance on top-down feedback, amplifying the word frequency effect. Conversely, degradation may produce a general processing cost, resulting in additive effects of word frequency and visual degradation. In Experiment 1, words (high- vs. low-frequency) and pseudowords were presented intact or with a single strikethrough. In Experiment 2, the degraded items had a double strikethrough, further increasing interference. In both experiments, degraded words were processed more slowly and less accurately, but the word frequency effect remained stable across visual formats. Notably, only double-strikethrough words showed an increase in the exponential RT component. Thus, while greater visual degradation engages additional processing, word frequency effects remain stable, supporting models in which letter detectors are resilient to moderate visual degradation without increased top-down feedback.

How Statistical Learning and Explicit Phonics Instruction Work Together at the Very Beginning of Reading Acquisition?

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Research has shown that while systematic phonics Explicit Instruction (EI) effectively supports reading development from Grade 1 (Castles et al., 2018) and Statistical Learning (SL) mechanism plays a crucial role in the acquisition of literacy skills (Sawi & Rueckl, 2018), limited research has explored their synergy during reading acquisition (Seidenberg et al., 2020). To address this research gap, we conducted a study examining the effect of the order of these two processes (SL->EI vs. EI-> SL) with a T1-Training-T2-Training-T3 protocol, on the initial literacy skills of French-speaking pre-readers (N = 37). The SL process was promoted by a training on letters-syllable pairs that comprise grapheme-phoneme correspondence regularities (Doignon-Camus & Zagar, 2014; Vazeux et al., 2020), while phonics instruction served as the basis for EI training. Preliminary results suggest that the two orders lead to different literacy gains depending on the task. By focusing on a period when pre-readers have not yet developed mental ortho-phonological representations, these findings provide insights into the synergy between EI and SL and how their different combinations can shape early reading development.

A Matter of Font: Investigating the Neural Activity Behind Brand Name Recognition

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Consistent with abstractionist models of word recognition, lexical access for common words is

resilient to changes in surface elements (e.g., font, letter case), as these variations are rapidly lost in early visual processing. However, behavioral and ERP studies suggest that brand names, a word category commonly encountered in a consistent visual format, are more sensitive to changes in font and letter case. To investigate the neural mechanisms underlying brand name recognition, this fMRI study examined whether the visual word form area (VWFA) and related regions respond to font and letter case modifications when brand names appear within logotypes, during a semantic categorization task (categorizing brands as transportation-related or not). Participants viewed brand names either in their conventional logotype format or with a modified font or case. Whole-brain analyses revealed greater activation in visual regions, including the VWFA, when brand names appeared in a modified font. These findings suggest that font variations are not fully abstracted out during visual processing but instead modulate neural responses, challenging abstractionist models while supporting instance-based accounts of word recognition.

B-15: Language & Bilingualism II

How Do Multilingual Experiences and Familial Genetic Risk for Alzheimer's Disease Affect Attentional Control in Middle-Aged Adults? An ERP Study

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Aging is associated with cognitive decline (Ferguson et al., 2021) and can be conceived of as the interaction between modifiable factors (e.g., lifestyle) and fixed factors (e.g., genes). Multilingualism has been identified as one such modifiable lifestyle factor, supporting the brain's resilience against cognitive decline and delaying the onset of Alzheimer's Disease (AD) symptoms (Anderson et al. 2020; Berkes & Bialystok, 2022). The effect of multilingualism in middle-aged adults and its interaction with genetic predispositions is currently understudied, despite its potential to improve healthy aging specifically in these populations. The present project examines how multilingual experiences affect reaction time (RT) and N200/P300 characteristics (EEG) during a Stroop-

Arrows task in 45- to 65-year-old adults. We examine in what way their familial history of AD modulates task outcomes. Data collection is ongoing (aim $n = 75$). We predict that greater degree of multilingual engagement is associated with a smaller Stroop effect (Freeman et al., 2022), and with shorter N200/P300 latencies (Grundy et al., 2017). We expect longer N200/P300 latencies without RT differences in people with a familial history of AD (Elverman et al., 2021).

The Integration of Emotions Into Reading Processes: EEG Correlates in Children

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Several electroencephalographic (EEG) studies in children have suggested that the emotional content of stimuli influences cognitive processes. However, most research has focused on emotional faces and images, overlooking the role of emotional words. Emotional words play a crucial role in emotional development by supporting the formation of emotional concepts, which are key to organizing thought and behaviour. For these reasons, we administered an emotional word categorization task to 20 children (8-10 years old) while recording EEG. The word lists were designed to maximize differences in emotional characteristics while controlling for linguistic variables. Additionally, resting-state EEG was recorded, and frontal alpha asymmetry (FAA) was calculated, a measure previously linked to emotion regulation. Results show that the Late Positive Potential (LPP) varies as a function of words' emotional content, and the differences in LPP amplitude between emotional and neutral words are associated with individual differences in resting FAA. These findings offer new insights into how emotional meaning is integrated in childhood and highlight

potential EEG markers of emotion regulation, with implications for early assessment and intervention.

Softly Female and Carelessly Male? The Implicit Role of Adverbs in the Attribution of Gender in English

Javier Aguado Orea, Sheffield Hallam University; **David Reynolds**, Sheffield Hallam University; **Jane Morgan**, Sheffield Hallam University; **Oliver Hawkins**, Sheffield Hallam University

Past work has provided evidence for gender biases in the association of male/female with a specific semantic domain (e.g. science/arts), traits (e.g. funny, beautiful), and occupations (e.g. surgeon, maid). This study extends this research by examining whether adverbials of manner (e.g. "angrily", "precisely", "moodily" etc.) also convey gender semantics. For instance, in "Working carelessly on the project because she/he had little time" carelessly might facilitate processing of the male pronoun over the female one. Fifty-nine (35 Female) participants read 24 sentences (12 male and 12 female) with 24 different adverbs in either congruent (e.g. angrily + he) or incongruent (e.g., angrily + she) pronoun versions (counterbalanced). A linear regression model was fitted to predict the potential effect of adverb bias and gender of pronoun. The model explains a significant proportion of variance ($F(4,1411) = 3.20$, $p = 0.013$, adj. $R^2 = 6.17e-03$). The effect of congruence is significant ($\beta = -0.52$, 95% CI $[-0.92, -0.13]$, $t(1411) = 2.59$, $p = 0.010$; Std. $\beta = -0.08$, 95% CI $[-0.15, -0.02]$). The significance of the hidden semantics of adverbs is discussed over other features also analysed, such as relative prevalence in colloquial speech.

Grammatical and Stereotypical Gender Violations in Subject-Verb Agreement: ERP Evidence

Martina Abbondanza, University of Modena and Reggio Emilia; **Luana Serafini**, University of Modena and Reggio Emilia; **Francesca Pesciarelli**, University of Modena and Reggio Emilia

Previous ERP research has shown that violations of stereotypical gender expectations elicit responses similar to those seen in morphosyntactic gender agreement violations. These studies did not report any expected semantic effect. The present work aims to investigate the effect of stereotypical and grammatical gender on subject-verb agreement

processing. Participants (N=44) silently read sentences presented word by word on a computer screen while EEG was recorded. Sentences contained nouns in subject position that were stereotypically[S] or grammatically[G] masculine (e.g. dirigente[S, M], “manager”; contadino[G, M], “farmworker”) or feminine (e.g. badante[S, F], “caregiver”; vicina[G, F], “neighbor”) and were followed by masculine or feminine verb forms (e.g. “è entrato[M]/entrata[F]). Results showed a gender asymmetry for grammatical gender: agreement violation following a masculine noun elicited an N400; a violation after a feminine noun elicited a P600. No significant effect was found for stereotypical gender. These findings suggest a distinct processing status for masculine forms, where gender may remain underspecified and integrated contextually, unlike feminine forms, which require explicit morphosyntactic agreement.

Parent-Child Emotion Talk in Singapore: Insights From a Wordless Picture Book Narration Activity

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In the monolingual English literature, parent-child emotion talk has been positively associated with children’s development of emotion understanding. As language may activate associated cultural belief systems around emotions, parents may differ in their expression of emotion across different languages. The present study examines parental emotion talk in 117 English and English-Mandarin parent-child interactions in Singapore (child age: 8-40 months, median = 18.6). 1,276 emotion events in Singapore’s variety of English and Mandarin were elicited from a wordless picture book narration activity (‘Little Orangutan: What a Scary Storm’; Styles, 2020). While complexity of emotion talk and lexical diversity of emotion words were hypothesised to correlate with child age, findings showed that parents did use more emotion labels and explanations with older than younger children, but did not differ in diversity of emotion words used. Interestingly, parents who spoke in a mix of two languages used a greater lexical diversity of emotion words than parents who spoke in only one, suggesting that some elements of emotion talk may be language-dependent. Together, these

findings provide novel insights into child-directed emotion talk in Singapore.

Does Entrainment to Rhythmic Speech Speed up Turn Taking?

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The transition between speakers in conversation (so-called turn-taking) is remarkably fast. Average silent intervals (gaps) between turns last for only about 200 ms. The synchronization of neural activity with acoustic modulations before the turn boundary has been proposed as a viable mechanism to govern turn-taking. Specifically, prior studies suggest that neural activity in the delta (0.5-2) and theta range (4-8 Hz) synchronizes with rhythmic modulations, thus aiding temporal prediction. Previously, we found sentences with stronger rhythmic modulations and with higher subjective rhythmicity ratings to accelerate turn-taking. In order to confirm that neural entrainment is at the basis of this mechanism, we are conducting an MEG study where we auditorily present Yes/No-questions that thirty participants have to respond to in the context of a “Guess Who”-game. We are expecting that faster response times to more rhythmic sentences also coincide with a greater cortical-acoustic coherence and ITPC in the delta and theta bands, in support of a role of neural entrainment to speech in anticipating turn boundaries and accelerating turn-taking.

B-16: Embodied Cognition

Spatial Abilities and Domain Expertise: The Case of Combat Sports Athletes and Their Athletic Identity

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Past research has shown that elite athletes in combat sports such as Judo, Wrestling, and Fencing outperform novices on small-scale spatial tasks, such as mental rotation tasks (MRT). However, these findings are limited to these specific combat sports and performance on small-scale spatial abilities. In this study, we explored the previously unexamined combat sports of Muay Thai and Kickboxing,

assessing athletes' performance on both small- and large-scale spatial ability tasks, including the MRT and Spatial Orientation Test (SOT). We also examined athletic identity using the Athletic Identity Measurement Scale to determine its influence on spatial task performance. To do so, we assessed 80 adult Muay Thai and Kickboxing athletes across four experience levels (novice, intermediate, advanced, elite) on the MRT, SOT, and their athletic identity. Preliminary results indicated a significant overall effect of experience level and strong athletic identity on both small- and large-scale spatial tasks. These findings contribute to research in spatial cognition and sports psychology, suggesting that a stronger athletic identity may influence both sports performance and spatial abilities.

Challenging Embodied Cognition: Insights From Human and ChatGPT Conceptual Representations

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The rapid advancements of Large Language Models (LLMs) like ChatGPT raises questions about their ability to approximate human cognition. This study examines the embodied cognition framework by comparing human and ChatGPT-generated ratings of sensorimotor and dominance attributes for 959 Italian words. Based on the premise that cognition needs bodily experiences, we hypothesized that ChatGPT would align poorly with human judgments for sensory and motor dimensions but demonstrate better correspondence for abstract dominance ratings. Our results confirmed that correlations between human and ChatGPT ratings were negligible for sensory modalities and that the AI failed to generate motor ratings. However, a significant correlation emerged for dominance ratings, suggesting that LLMs can approximate conceptual dimensions less dependent on bodily experience. These findings underscore the limitations of LLMs in replicating human cognition and highlight the essential role of sensory-motor grounding in conceptual processing. Our study contributes to the ongoing discourse on the cognitive mechanisms underlying artificial intelligence and their divergence from human cognition, reaffirming the centrality of embodiment in mental representations.

Surviving in L2: Survival Effect Variability in the Bilingual Mind

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Introduction: The Survival Effect (word recall facilitation in imagined scenarios of extreme survival) has never been replicated in the L2 of bilingual individuals (Saraiva et al., 2021). In this ongoing study, we aim to verify this pattern in Polish-English bilinguals. **Method:** Participants read passages in their L1-Polish and their L2-English regarding their survival or the need to move to a foreign country. This is followed by word ratings and a surprise recall of those very same words. **Results:** In our pilot study, our participants recalled more words from the Survival than Moving condition in L2-English, and they ascribed slightly higher relevance and valence to the words in the Survival condition. In L1 Polish, participants recalled words from Survival and Moving conditions equally well, although they ascribed higher relevance and lower valence to the words in the Survival condition. **Conclusion:** Preliminary results indicate the presence of a Survival Effect in L2-English but not in L1-Polish, and language-specific patterns of relevance and valence results. These results may suggest an atypical presentation of the foreign language effect or the presence of more complex socio-cultural effects affecting the data.

Spatio-Temporal Dynamics of Neural Semantic Spaces

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The nature of our conceptual representations – how they're grounded in our experience of the world – remains unclear. Comparing neural semantic maps with vector space models promises to offer insight; yet, large-scale studies are lacking. We addressed this issue by building large neural spaces for 1,080 abstract and concrete words. We collected EEG data from 40 participants in a Rapid Serial Visual Presentation paradigm (RSVP) and computed each pairwise distance (N=582,660) for each electrode (N=128) and time point. We compared these neural spaces with both language- and image-based models (Word2Vec vs. ViSpa) to examine how visual and

linguistic information integrates across time and space. Initial results from five Regions of Interest (ROIs) along the ventral stream show that image-based models account best for neural maps. Notably, semantic coding seems to arise already in the occipital pole, early after word presentation (~100ms). This coding persists to the left Anterior Temporal Pole/Inferior Frontal ROI at later time points (~350ms), particularly for abstract words. Overall, this suggests that image-based semantic models effectively capture the structure of the neural conceptual system in the ventral stream.

Motor Expertise Modulates Memory for Emotional Action Sentences

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Despite evidence that both performing congruent actions and emotional stimuli enhance memory, their interaction has received little attention. Our previous work demonstrated that enactment and emotional valence independently contribute to memory in an additive manner, extending enactment benefits beyond neutral stimuli to emotional action phrases. The present study investigates how motor expertise might modulate this relationship. Expert athletes not only show enhanced memory for domain-specific content but also tend to recruit additional motor processes during various cognitive tasks. We hypothesized that this enhanced sensorimotor recruitment might amplify the enactment effect independently of emotional content. Sixty expert athletes encoded action phrases with negative, neutral, or positive valence through either enactment or verbal reading. In the verbal condition, participants exhibited memory enhancement for emotional stimuli compared to neutral content. However, in the enactment condition, performance improved uniformly across all valence categories, and the emotional advantage disappeared. These findings suggest motor expertise shapes embodied memory processes, making them less susceptible to emotional modulation.

B-17: Statistical & Computational Modelling

Linguistic Context Promotes Learning of Novel Meanings by Leveraging Distributional Features of Words: An EEG Study

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Language is used in everyday life to communicate meanings from one person to another, but it can be also leveraged to generate novel meanings, even in the absence of direct experience with a word's referent. Specifically, novel semantic information associated with unfamiliar words can be inferred by the linguistic context in which they appear during learning. In the present study, integration of novel meanings was fostered by merging two existing concepts. 40 participants read two naturalistic sentences, each referring to a distinct concept, in which the labels of the original concept were replaced by a single novel label. Then, a third sentence that could be congruent (same linguistic context/same label) or incongruent (different linguistic context/same label) was shown. Each context/label combination was shown only once per subject (one-shot learning). We found a N400 congruency effect, suggestive of a context-mediated integration of novel meanings. Moreover, context-sensitive data-driven computational semantic measures (of similarity and surprisal) were found to predict ERPs. Our results show that statistical features of language are exploited during functional integration of novel meanings inferred from linguistic context.

Women Under Stereotype Threat Change Their Response Strategies: Diffusion Model Analyses of the Cognitive Mechanisms Underlying Gender-Related Performance Differences

Kim Keller, Heidelberg University; Mischa von Krause, Heidelberg University; Andreas Voss, Heidelberg University

Stereotype threat refers to the negative impact of salient social stereotypes on cognitive performance. This research investigates the cognitive mechanisms underlying gender-specific stereotype threat effects using drift diffusion model analyses. Three online experiments with over 900 female and male

participants examined performance in mathematical tasks under stereotype threat compared to a control condition. The drift diffusion model was used to estimate parameters reflecting decision-making processes, such as speed of evidence accumulation (drift rate) and response tendencies (threshold separation). Women performed worse than men in the mathematical tasks. Bayesian analyses revealed an effect of the stereotype threat induction on the threshold separation parameter of the drift diffusion model, indicating differences in response patterns. No substantial changes in drift rate were observed, contradicting theories linking stereotype threat to working memory depletion. These findings can help counteract the negative effects of stereotype threat on performance by specifically addressing response strategies.

Advisor Credibility and the Dynamics of Informed Advice-Taking

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The integration of social and individual learning is fundamental to decision-making, yet the processes underlying advice-taking remain underexplored. Prior research distinguished between informed and non-informed advice-taking using a computational model (Pereg et al., 2024), showing that individuals update reliance on advisors based on prior experience. The current study examines how advisor accuracy shapes these dynamics using a reinforcement learning framework. Participants (N=57) completed a two-armed bandit task with accurate and less accurate advisors. Results replicated the "advice-reveal effect," yet participants followed the less accurate advisor less frequently. Moreover, behavioral updating based on previous rewards was diminished when interacting with the less accurate advisor, supporting the view that informed advice-taking is a selective, credibility-driven process. These findings provide critical insights into how individuals generalize advisor credibility, demonstrating that advice-taking reflects both trial-by-trial fluctuations and broader social generalization mechanisms, with implications for trust and epistemic learning.

Long-Term Memory and Mathematical Skills: A Fuzzy-Trace Theory-Driven Study

Michał Obidziński, Jagiellonian University; Nina Bażela, Jagiellonian University; Mateusz Hohol, Jagiellonian University

Despite extensive research on the relationship between math skills and basic cognitive functions, the role of long-term memory in mathematical cognition remains relatively understudied. In this study, we investigated the relationships between numerical long-term memory and various math skills in a sample of 123 participants. We applied methods based on fuzzy-trace theory, which enable the testing of fine-grained memory processes related to two memory traces: verbatim (exact numbers) and gist (general magnitude intuition). We found a significant correlation between performance in the numerical memory task and proficiency in mathematical reasoning, arithmetic fluency and level of math self-concept, but not with approximate number processing. Different math skills were associated with both gist and verbatim processes, with more associations observed for gist-based processes. Math-self concept was associated only with verbatim processes, suggesting that only exact memory of numbers (as opposed to fuzzy intuitions) is positively associated with self-evaluation of math skills. Our study shows the complex role of long-term memory in mathematical skills and the value of examining fine-grained memory processes.

Modelling Group-Level Implicit and Explicit Attitudes With Language Models

Manokamna Singh, Maynooth University; Dr Katarina Domijan, Maynooth University; Dermot Lynott, Maynooth University

A person can have favourable or unfavourable attitudes about a group, based on gender, race, nationality etc., which can influence their behavior towards that group. To capture such attitudes, researchers use both explicit (asking people directly) and, especially for more sensitive topics, implicit measures (e.g., Implicit Association Test IAT). Separately, linguistic experience is an important source of attitudinal information, and people are sensitive to the statistical patterns between words (i.e., if a concept is associated with positive or negative attributes). Here, we examined a range of language models (n-gram, count-vector, word2vec; manipulating training corpora, semantic distance measures, and other parameters) in their ability to capture people's group-level implicit and explicit attitudes for topics of social significance (e.g., marriage, gun control). Our results suggest that a wide range of language models captures both explicit and

implicit attitudes, but with language models showing stronger and more consistent correlations with implicit than explicit measures. Notably, even very simple (ngram) language models effectively measure implicit bias, suggesting bias information is encoded very generally in language.

B-18: Individual Differences

How Expectation Shapes Episodic Memory: The Role of Emotional Valence and Individual Differences

Alex Kafkas, University of Manchester

Episodic memory is shaped by novelty and expectation, with unexpected stimuli often enjoying a recollection advantage. Across three experiments using mixed or purely emotional-content lists, we examined how emotional valence (negative, neutral, positive) modulates this effect. Participants developed expectations that were sometimes violated at encoding. Unexpected stimuli enhanced recollection for negative and neutral items, but not for positive ones, especially in mixed-content lists, revealing an intriguing asymmetry in expectation modulation. In another two experiments, we tested whether the unexpectedness benefit is shaped by anxiety, risk-taking, and personality traits. High trait anxiety and risk-taking blunted the memory advantage of unexpectedness, whereas low scores amplified it. High extraversion lowered recollection for expected items, while high negative emotionality reduced the recollection advantage for unexpected items. Overall, these findings demonstrate that prioritising unexpectedness in memory depends on emotional valence and is modulated by individual differences. These insights underscore the interplay of valence, expectation, and personality traits.

Ongoing Thoughts in Daily Life Reveal Individual Differences in Emotion Processing

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Patterns of on-going thought have crucial implications on emotional health. This study examined how people's thought patterns can be modulated by

individual differences in emotional awareness across socio-emotional contexts. Over 5 days, participants completed 7 random probes of multidimensional experience sampling per day for reporting thoughts alongside emotional states and social settings. Principal Component Analysis identified 4 thought patterns: meaningful future-self focus, unpleasant intrusive distraction, sensory engagement and external task focus. Using Linear Mixed Models, we found that people with low emotional awareness struggled to think meaningfully about their own future, particularly during strong negative emotions. On the other hand, they were more likely to focus on immediate sensory details under a positive mood or in social settings. Furthermore, people who tend to focus on external events over inner experiences/feelings showed more rigid unpleasant intrusive thoughts across emotional states. By revealing how everyday thought patterns are related to clinically relevant emotional traits under different socio-emotional contexts, this study provides insights that may contribute to improved emotional well-being.

What Makes a "Super-Pronouncer"?

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This study explores the cognitive basis of exceptional pronunciation talent in a late-learned second language (L2) in individuals we call Super-pronouncers (SP). SPs are a small fraction of the population who manage to acquire a native-like accent in a late learned L2, independent of external factors like training or immersion. Based on the Complementary Learning Systems Theory (McClelland et al., 1995), we hypothesized that SPs may possess longer lasting, detailed episodic memory (EM) traces for speech, along with superior auditory perception. To understand the difference in the cognitive profile of SPs, they are compared to a control group on a battery of 21 tests that assess EM, musical ability, auditory perception, and more. Data collection is ongoing. Preliminary analysis (n=119, 50 SPs) on five tests showed that SPs outperformed the control group in recognizing voices (EM) and discriminating melodies. A trend towards better pitch discrimination was also noted. No group differences were observed in tone duration discrimination and a picture memory task (EM). The results suggest that

SPs have better musical ability and EM for speech, and possibly superior pitch perception. Complete results will be included in the presentation.

Perpetrators of Sexual Coercion: Experts of Vocal Emotion Recognition?

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Literature suggests that individuals using coercive strategies to achieve unwanted sexual acts detect vocal vulnerability. It is possible that perpetrators develop specific vocal emotion recognition skills, allowing them to better recognize fear. Several characteristics of this population may impact emotion recognition, such as a strong presence of dark triad traits (psychopathy, narcissism, Machiavellianism), cognitive distortions, as well as low emotional capacities. This study analyzes the ability to recognize vocal emotions based on coercive history, to observe if perpetrators recognize fear better than non-perpetrators. Two hundred participants completed questionnaires about the characteristics cited above and a vocal emotion recognition task. The division into two groups (Perpetrators vs. Non-perpetrators) was made a posteriori based on their declarations. Preliminary results show that perpetrators recognize vocal emotions better than non-perpetrators, particularly fear. The lower the perpetrators' interpersonal emotional capacities, the more efficient the fear recognition. These initial results suggest that perpetrators develop expertise in recognizing vocal emotions, which they could use to select their victims.

Individual Differences in Top-Down and Bottom-Up Prospective Memory Processing: A Bi-Factor Model Approach

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In this study (N = 178), we investigated individual differences in prospective memory (PM) by differentiating between top-down and bottom-up PM processes using a bifactor modeling approach.

Participants performed a 2-back task with embedded PM targets. PM target difficulty was manipulated by presenting either specific words (focal PM; relying more on spontaneous retrieval) or two starting letters (non-focal PM; relying more on top-down control). Attentional control was assessed with the Three-Minute Squared Test, and reasoning ability was measured using the HeiQ-S. Results replicated the cue focality effect, showing better PM performance and faster response times in the focal condition. Structural equation modeling confirmed separate PM factors for top-down and bottom-up processing. As expected, top-down PM correlated with attentional control, whereas bottom-up PM did not. Reasoning ability was only marginally related to top-down PM, and this effect disappeared when attentional control was included as a mediator, suggesting that reasoning ability does not directly enhance PM but exerts its influence via attentional control.