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Impairment in Visual-Motor Coordination in Children and Adolescents with Autism Spectrum Disorder and Intellectual Disability.

Background: Difficulties in visual behaviour are frequently reported in children with autism spectrum disorder (ASD), as well as motor impairments, which several authors described as pervasive in this population. Moreover, early visual-motor abilities predict social communication skills during childhood. However, although the importance of sensory-motor coordination is recognized in neurodevelopment, its evaluation is not always considered, particularly in low-functioning ASD individuals. Conversely, visuomotor assessment could play a crucial role in planning specific interventions, in particular in ASD children with intellectual disability who show worse difficulties in adaptation to the social environment.

Objectives: To assess visual-motor coordination in children and adolescents with autism spectrum disorder and intellectual disability.

Methods: Thirty low-functioning ASD subjects (age range: 5-13 years; 23 males) were recruited. Global functioning was investigated using the Vineland-II - Adaptive Behaviour Scale and Childhood Autism Rating Scale – Second Edition (CARS-2). Sensory Profile - Second Edition (SP-2) and Repetitive Behaviour Scale - Revised (RBSR) questionnaires were administered to caregivers to investigate the sensory-motor profile. Moreover, neuro-visual assessment, including ocular motility (i.e. visual pursuit and saccadic movements), visual acuity resolution, stereopsis, visual field and contrast sensitivity, and the Developmental Coordination Disorder Questionnaire (DCD-Q) used as a checklist were performed by neuro-psychomotor therapists with specific expertise. The Spearman Correlation Test was used to analyze the relationship between different outcome measures. A p-value <0.05 was considered as significant.

Results: In our sample, 53.33% of children showed difficulties in visual pursuit, 40% showed dysfunctions in saccadic movements, and 23.33% deficit in contrast sensitivity. Moreover, a partial correlation analysis, corrected for the severity of autistic symptoms, showed that a more compromised neuro-visual profile seemed to correlate to a higher visual reactivity at SP-2 ($\rho = -0.382$; $p = 0.048$). CARS-2 scores were negatively correlated to total and subtotal DCD-Q scores ($\rho = -0.773$; $p < 0.001$), to Vineland Motor Subscale ($\rho = -0.641$; $p < 0.001$) and Vineland Daily-life Abilities Subscale ($\rho = -0.408$; $p = 0.025$) (see Figure 1). There were no correlations between CARS-2 scores and the other Vineland subscales. Finally, partial correlation analysis, corrected for age, highlighted that poorer motor performances at the general motor coordination subscale of DCD-Q were negatively related to higher intensity of stereotyped behaviours ($\rho = -0.385$; $p = 0.028$) and to higher intensity ($\rho = -0.553$; $p = 0.002$) and frequency ($\rho = -0.505$; $p = 0.005$) of self-injures behaviours assessed with the RBSR questionnaire. Similarly, poorer performances at the fine motricity subscale of DCD-Q were negatively correlated to higher intensity ($\rho = -0.430$; $p = 0.020$) and frequency of stereotyped behaviours ($\rho = -0.386$; $p = 0.038$) and to higher intensity ($\rho = -0.412$; $p = 0.027$) and frequency of self-injuries behaviours ($\rho = -0.386$; $p = 0.039$).

Conclusions: Our findings highlight the frequent presence of visual and motor impairments in children and adolescents with ASD and intellectual disability. Since visual-motor difficulties in low-functioning ASD children may be considered a clinical sign of difficulty integrating perception with action to control movement, with cascading effects on overall functioning, these results emphasize the link between motor and "core" symptoms in ASD and underline the importance of explicitly considering visual-motor skills in early interventions, as in low-functioning children.

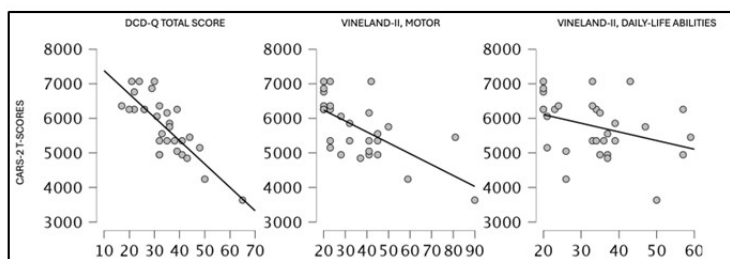


Figure 1: Significant correlations between motor and daily-life abilities and T-scores at CARS-2.

Title*

Impairment in Visual-Motor Coordination in Children and Adolescents with Autism Spectrum Disorder and Intellectual Disability.

Preferred Presentation Format*

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If not accepted as a panel, are you willing to present an individual presentation?*

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This work was unfunded

In studies with humans, does the study population include individuals with intellectual disabilities, who are minimally verbal, and/or are non-speaking?

Yes

Second Preferred Category*

N/A

Affirmations

giulio.valagussa@gmail.com

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First Author

Giulio Valagussa

Email: giulio.valagussa@gmail.com **Alternate Email:**

giulio.valagussa@unimib.it -- Will not be published

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Villa Santa Maria SCS
Autism Research Unit
Tavernerio Como
Italy
University of Milano-Bicocca
School of Medicine and Surgery
Lecturer
Milano Milano 20126
Italy
University of Milano-Bicocca
PhD Program in Neuroscience
PhD candidate
Piazza dell'Ateneo Nuovo, 1
Milano Milano 20126
Italy

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Signed on 10/19/2024 by *Giulio Valagussa*

Second Author

Francesca Ilaria Bianchi

Email: francescailaria83@gmail.com -- Will not be published

Villa Santa Maria SCS
Autism Research Unit
Tavernerio Como
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Francesca Ilaria Bianchi*

Third Author

Alessandra Mari

Email: marialessandra999@gmail.com -- Will not be published

Villa Santa Maria SCS
Autism Research Unit
Tavernerio Como
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Alessandra Mari*

Fourth Author

Petra Della Cagnoletta

Email: p.dellacagnoletta@campus.unimib.it -- Will not be published

University of Milano-Bicocca
School of Medicine and Surgery
Milano Milano
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Petra Della Cagnoletta*

Fifth Author

Eleonora Castagna

Email: eleonora.castagna@villasmaria.org -- Will not be published

Villa Santa Maria SCS
Autism Research Unit
Tavernerio
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Eleonora Castagna*

Sixth Author

Enzo Grossi

Email: enzo.grossi51@gmail.com

Villa Santa Maria SCS
Autism Research Unit
Scientific Director
IV Novembre
Tavernerio Como
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Enzo Grossi*

Seventh Author

Cecilia Perin

Email: cecilia.perin@unimib.it -- Will not be published

University of Milano-Bicocca
School of Medicine and Surgery
Associate Professor
Milano Milano 20126
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Cecilia Perin*

Eighth Presenting Author

Presenting Author

Giulia Purpura

Email: giulia.purpura@unimib.it -- Will not be published

University of Milano-Bicocca
School of Medicine and Surgery
Milano Milano 20126
Italy

I (or an immediate family member) have a real or potential conflict of interest or received travel support or honoraria from a commercial business to attend this meeting. No

Signed on 10/19/2024 by *Giulia Purpura*

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