

Electrophysiological correlates of context-based semantic integration of linguistic chimeras

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Language is a powerful tool that allows humans to learn new concepts even in absence of direct experience with words referents. Language itself can be conceived as a source of experience and it can be used to manipulate semantic knowledge underlying known conceptual representations. Recent studies showed that humans can attribute meanings to novel concepts by integrating semantic information conveyed by short texts. Such merged representations are called “chimeras”. Crucially, humans’ behavioral performances on semantic similarity judgement between chimeras and related/unrelated concepts were predicted by a distributional semantic model (DSM), suggesting that it is possible to model humans’ intuitions on semantic representations for novel concepts from the linguistic context in which these are learned.

We designed an experiment to explore the electrophysiological correlates of such context-based learning process. During an encoding phase, pairs of naturalistic sentences related to chimera’s components are presented to participants. Crucially, each target concept is replaced with a pseudoword, constituting the label indexing our chimera. The successful integration of novel word’s meaning is then tested by measuring the N400 in a third sentence that could be either semantically congruent or incongruent with the information provided in the encoding phase. We mainly expect to predict the N400 amplitude by computing similarity between the distributional semantic representation of the testing sentence and the semantic representation of the chimera.

With the current study we wanted to expand previous results by 1) testing whether exposure to minimal linguistic context can induce integrated representations of novel words’ meaning that are measurable at the neural level, 2) predicting neural responses of novel words integration in semantic context using computational measures derived from linguistic context, 3) comparing predictions derived from different computational measures.

As the data collection is currently ongoing, the experimental design, theoretical relevance, and eventual preliminary results will be discussed.