

Investigating a potential link between semantic prediction and action prediction in toddlers

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Previous research has demonstrated that children from a very young age can predict upcoming words based on semantic information (Mani & Huettig, 2012) and physical movements based on knowledge about actions (Hunnius & Bekkering, 2010). However, the potential connection between predicting language and predicting non-linguistic actions remains an intriguing question. The present study aimed to investigate the relationship between toddlers' abilities to predict semantic meaning and non-linguistic action movements. Drawing on the integrated theory of language production and comprehension by Pickering and Garrod (2013), which posits that language production and comprehension share underlying cognitive mechanisms with action and action perception, we hypothesized that there is a positive relationship between toddlers' ability to predict physical actions and their ability to predict semantic information. 85 2-year-olds participated in the study. Using an eye-tracking visual world paradigm, toddlers were exposed to auditory sentences containing semantically constraining verbs (e.g., "eat"), along with four pictures (where only one picture corresponded to the verb, e.g., a picture of chocolate). This set-up allows us to assess toddlers' ability to predict semantic meaning. To assess their capacity for predicting actions, toddlers watched videos in which a hand would grab one object (e.g., a spoon) and move it to a corresponding object (e.g., a bowl of soup), together with two unrelated objects. Proceeding with the hypothesis that linguistic prediction and action prediction rely on shared, domain-general predictive mechanisms in the brain, we expect that toddlers who exhibit better abilities to predict physical actions will also display a better ability to predict semantic information. Our findings can shed light on the cognitive foundations of predictive processing in early language and action perception, providing valuable insights into the development of these cognitive capacities in early childhood. Pre-registration: <https://osf.io/t8m3q>