Speech requires converting a thought into a sequence of words. Contrasting theories have posited two possible routes for this conversion [1]. Meaning could be mapped first to an abstract structural frame that is only subsequently populated with specific words. Alternatively, word retrieval could occur first, leading to sentence construction based on lexically specific syntactic information. Available evidence supports both sides [1,2]. Thus, whether sentence formulation relies on abstract structural versus verb-specific representations is debated. We tested a rationalist alternative to this dichotomy: The cue validity [3] hypothesis states that structural choices during speech (e.g., double-object versus prepositional-object dative) will prioritize different cues according to how reliably those cues predict structure when listening to input [4]. Competition between cues during learning can cause neural networks to reorganize such that reliable cues come to guide language production more than less reliable cues. Thus, sentence production could flexibly depend on one or the other kind of the representation depending on the input.

The studies used a language exposure + sentence production paradigm. During language exposure, participants watched videos and heard and repeated the accompanying sentences. We manipulated the statistical properties of the input, specifically how well an individual verb versus broader (e.g., semantic) properties predicted the structure. During the subsequent sentence production phase, participants watched new videos and described them as they saw fit. Analysis of the structures produced allowed us to evaluate whether participants adhered to verb-specific patterns or verb-general rules as predicted by the cue validity manipulation.

Study 1 involved artificial languages where the exposure phase indicated higher validity for verb-specific than verb-general cues, or vice versa. Consistent with our hypothesis, participants’ subsequent sentence production adhered to the statistical preference of each verb in the former case, and to verb-general mappings between event type and structure in the latter case. Studies 2 and 3 extended the investigation to a natural language (English). In study 2, adults’ production of dative sentences followed verb-specific or verb-general patterns depending on the relative validities of the cues. In study 3, four- and five-year-old children’s production of dative sentences followed or overrode verb-specific patterns depending on whether individual verbs predicted structure reliably during exposure.

Together, these results provide evidence that the sentence production architecture can reorganize flexibly, using alternative pathways as dictated by cue validity. We are exploring this flexibility using neural measures as well. Future endeavors could add computational modeling to obtain a comprehensive picture of how speakers choose sentence structures.