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Conditional probability of novel word sequences predicts immediate serial recall performance

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Abstract

Many theories of verbal working memory have claimed that novel word lists are unlike natural language. As a result, recall of the novel word lists is not affected by sequential statistics in natural language and must be governed by short-term memory. We analyzed memory for novel, dative-like word lists (e.g., ADJ-NOUN-GAVE-ADJ-NOUN-NOUN) across three experiments. We used a powerful neural language model (Ng et al., 2019) to compute the surprisal associated with the critical words in each list, because surprisal indexes psycholinguistic processing difficulty (Levy, 2008). Surprisal at critical words strongly predicted the number of words recalled in each list. These results demonstrate lexico-syntactic factors can support syntactic structure even in novel word lists and that continuous measures of processing difficulty may be used to characterize similarity of novel lists to natural language. We discuss implications for theories of verbal working memory.