# Memory and Locality in Natural Language

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I explore the hypothesis that the universal properties of human languages can be explained in terms of efficient communication given fixed human information processing constraints.

First, I show corpus evidence from 37 languages that word order in grammar and usage is shaped by working memory constraints in the form of dependency locality: a pressure for syntactically linked words to be close to one another in linear order.

Next, I develop a new theory of language processing cost, based on rational inference in a noisy channel, that unifies surprisal and memory effects and goes beyond dependency locality to a new principle of information locality: that words that predict each other should be close. I show corpus evidence for information locality.

Finally, I show that the new processing model resolves a long-standing paradox in the psycholinguistic literature, structural forgetting, where the effects of memory appear to be language-dependent.