Understanding and producing language requires language users to process the grammatical structures of sentences, with the goal of comprehending or expressing meaningful ideas. Most natural sentences are both structurally well formed and meaningful. This allows, but does not require, that the processing of structure be supported by the meaningfulness of the sentence. Three experiments investigate the extent to which language users process the structures of sentences independently of the meaningfulness of those sentences.

This issue was explored using a syntactic priming paradigm. In Experiment 1, on each trial, subjects (N = 24) (a) heard a prepositional dative or double object prime sentence from the experimenter that was more meaningful ("The agent offered [an ad] [to the buyer] / [the buyer] [an ad]") or less meaningful ("The seven offered [an embrace] [to the shoe] / [the shoe] [an embrace]"); (b) answered a question about it ("Did the shoe offer an embrace?"); then (c) described a meaningful target picture back to the experimenter ("The burglar is offering [the book] [to the artist] / [the artist] [the book]"). Prime and target sentences shared verbs. We measured how often subjects produced the same prepositional dative or double object structure in their target descriptions that they heard in the prime sentences. Results showed large priming effects that were about equal after more meaningful (21.4%) as after less meaningful (20.0%) sentences, suggesting that structure is processed independently of meaning. (In a separate norming experiment, we assessed the relative meaningfulness of prime sentences with an explicit memory test [Marks & Miller, 1964]. Subjects had much poorer explicit memory for less meaningful sentences.)

It may be that asking subjects questions about the less meaningful primes imbued them with meaning, so in Experiment 2 (N = 24), the questions were eliminated. Priming effects diminished somewhat, but were still about equal after more meaningful (17.5%) as after less meaningful (14.1%) primes. Another possibility is that repeating verbs from prime to target sentences somehow underlies the roughly equal priming that was observed, so in Experiment 3, primes and targets had distinct verbs. Priming effects (unsurprisingly) were cut in half, and whereas numerically, priming effects were larger after more meaningful primes (7.6%) than after less meaningful primes (4.7%), statistically these effects did not differ, even after testing 72 subjects. Finally, combining data across all experiments did not provide any evidence of different levels of priming after the two kinds of primes.

In all, these results show that as assessed by syntactic priming, sentence structures are processed similarly whether they are more or less meaningful. This suggests that we process the structures of sentences in a manner that does not depend heavily on the meaning of those sentences.