

Semantic Combinatorial Processes in Argument Structure: Evidence from *Light Verbs*

We examine the hypothesis that compositional processes associated with argument structure are carried out exclusively in the semantic component of language. To this end, we investigate “light verbs”. A verb is *light* when the main thrust of semantic relations of the predicate that it denotes is found not in the verb itself, but in its object (e.g., Jespersen 1954, Jackendoff 1974, Cattell 1984, Grimshaw & Mester 1988, Baker 1989, Culicover & Jackendoff 2005). For example, *Sue made a dash across the road* means SUE DASHED ACROSS THE ROAD. Following some, but not all, of this previous work, we hypothesize that this composed meaning results from the combination of the argument structure of the main verb with that of its object. We take this process, which we call “argument sharing”, to be purely semantic in nature, and crucially not syntactically represented.

We test this hypothesis from a processing perspective through the assumption that semantic composition exerts a cost to the comprehension system beyond that observed for syntactic composition (Piñango 2003). We do so via the dual task interference paradigm. In this task, sentences are presented auditorily to subjects. At a certain point in each sentence, a letter string (probe), totally unrelated to the sentence, is presented visually. At this moment, the subject is required to make a lexical decision for that probe i.e., to decide whether or not the letter string forms a word in English. The dependent measure is the reaction time (RT) to this decision. The key assumption underlying the task is that a hypothesized processing load involved in the comprehension of one of conditions will “interfere” with the processes associated with executing the lexical decision task. This interference will be revealed in a higher RT for that condition over its counterparts.

In the present case, the factor hypothesized to cause higher processing load is the presence of argument sharing. Three conditions that differ in terms of the presence or absence of argument sharing are compared: a *light* condition, where the verb and the object must “share” their argument structures e.g., *Mr. Olson gave an order[^] last night to the produce guy*, a *dark* condition, where the object has no argument structure e.g., *Mr. Olson gave an orange[^] last night to the produce guy*, and a *heavy* condition, where the verb is not *light* e.g., *Mr. Olson typed an order[^] last night for the produce guy*. For all three conditions, a probe is presented at the end of the matrix object ([^]). The RT to the lexical decision is taken to be an indicator of the processing load at the post-object position of the *light* condition as opposed to the *dark* and *heavy* conditions.

Our hypothesis that argument sharing is a purely semantic process predicts that it should be observable independently of syntactic composition. In the three conditions tested, (overt) syntactic structure is held constant and only in the *light* version is argument sharing expected to occur. Consequently, our hypothesis predicts that the processing cost of the *light* condition will be higher than the *dark* and *heavy* conditions. This cost will be reflected in a statistically significant higher RT to the lexical decision for the *light* condition over the *dark* and *heavy* conditions.

Initial results support this prediction. *Light* sentences elicited a significantly higher RT over both *dark* and *heavy* counterparts ($p < .01$). Crucially, frequency cannot account for this contrast. All three conditions were matched in terms of frequency of the matrix verb and matrix object. In addition, corpus work also carried out by our lab shows that for the verbs used, the *light* sense occurs with significantly higher frequency than the *dark* sense.

Altogether, these results are consistent with the view that argument sharing occurs on the basis of syntactic composition (through the process that creates the constituent containing the verb and its object NP) yet is not syntactically expressed in that the process has no morpho-syntactic reflections. In terms of the architecture of language, the results are also consistent with the view, implicit in some, but not all, models of language representation, that the semantic system can carry out compositional processes of its own, independent of the combinatorial powers of syntax.

References

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