

FORUM: GSURC 2013

TITLE: Interactions between lexical and syntactic knowledge during incremental processing of the causative construction in English

AUTHORS: Brooks, G. T., Wise, J.R., and Frishkoff, G.A.

FACULTY SPONSOR: Gwen Frishkoff, Department of Psychology and Neuroscience Institute

PRESENTATION TYPE: Poster

Introduction: We examine event-related potential (ERP) responses during comprehension of the Causative construction. Event-related potentials are brain-responses that are directly-correlated to cognitive or sensory event. Both the P600 and N400 are ERPs that respectively correlate to syntactic and semantic anomalies when participants are processing presented sentences. A construction is a mapping between sentential form (syntax) and meaning. The English Causative is syntactically specified as 'NP-V-NP-PP', and means 'Someone-CAUSED-Something-toChangeLocation'. Importantly, only certain verbs are permitted within this construction: e.g., “walk” is allowed (“Jack walked his sister to the party”), but “arrive” is not (*“Jack arrived his sister to the party”). Our goal was to test whether word-to-construction mismatches would elicit semantic or syntactic ERP effects, or both. Particularly we sought to test whether syntax-first theories are viable in relation to construction grammar theories. Syntax-first theories hold that once a syntactic error is recognized all further processing ceases. Construction grammar theories hold that sentence processing is ongoing and thus are in direct contrast to syntax-first theories

Method: 17 native English-speaking adult participants viewed sentences, presented one phrase at a time, while we recorded their EEG. The task was to say whether each sentence was acceptable (speeded task). The response probe could come after the verb (intransitive construction), after the object NP (transitive construction), or after the PP (Causative/to-Dative construction).

Results: According to syntax-first theories, “arrive” should elicit a P600 syntactic response to the object NP (*“Jack arrives HIS SISTER...”), but no N400 semantic response. Results supported this prediction. Interestingly, however, the final PP (*“Jack arrives his sister TO THE PARTY”), elicited a pronounced N400 effect. This suggests that subjects continued to process the sentence meaning, even after they recognized the syntactic error earlier in the sentence.

Conclusion: These results are inconsistent with syntax-first theories, which predict that semantic processing will discontinue once the reader has detected a syntactic error. Results are more compatible with Construction Grammar, which emphasizes ongoing meaning integration at the level of words and higher-level structures, such as sentences.