

PROSODIC FOCUS STRENGTHENS SEMANTIC PERSISTENCE

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Research on post-repair representations of garden path sentences has found that readers systematically arrive at misinterpretations even after displaying evidence of reanalysis. These comprehension errors have been attributed to the semantic interpretation associated with the incorrect parse lingering past disambiguation, but it is unclear what drives this phenomenon. Previously, the extent of local coherence – influenced by factors such as semantic fit and structural probability – have been reported to contribute to this effect. Here, we provide evidence for the depth of semantic processing as an independent factor influencing semantic persistence.

We draw on known effects of pitch accent on semantic processing to examine the effect of the depth of semantic processing on the persistence of the locally coherent analysis. In a speeded auditory comprehension experiment, we manipulated the location of pitch accent in sentences with local attachment ambiguity. Participants ($n=60$) listened to 24 critical sentences as in (1), with an initial adjunct clause that is locally ambiguous between an intransitive (*Anna dressed*) and transitive (*Anna dressed the baby*) parse of the adjunct verb. Stimuli were resynthesized to have a rising pitch accent (H^*) over the subject (*Anna*) or verb (*dressed*) of the adjunct. Both accent conditions had a short pause after the adjunct verb that was ambiguous as a cue to a prosodic phrase boundary. After each sentence played, participants were given 5000ms to answer a yes/no comprehension question as in (2).

(1) While Anna dressed the baby stopped crying. (2) Was the baby dressed?

To isolate the effect of the depth of semantic processing, the local coherence of the transitive and intransitive analyses was modeled based on the transitivity bias of the adjunct verb and the semantic fit of the following noun phrase as the direct object. Frequency-normed bias scores were obtained from two off-line norming experiments and entered into the statistical models as independent predictors.

We hypothesize that an accented word induces deeper semantic processing when the accent marks semantic focus. Since the default location for accent is on the phrase-final content word [6], the accented subject (*ANNA dressed the baby*) is unambiguously focus marking, while the accented verb is unambiguously focus marking only in the incorrect late-closure parse (*Anna DRESSED the baby*). Thus, we predict the verb accent condition to result in an enriched semantic representation with evoked semantic alternatives for the incorrect parse, leading to lower accuracy on comprehension questions compared to in the subject accent condition.

Accuracy and response times on the comprehension questions were recorded for analysis. A logistic mixed-effects regression model was fitted to the accuracy of responses with pitch accent location, semantic fit, and transitivity bias as independent predictors. Additionally, a linear mixed-effects regression model was fitted to response time with the same three predictors of interest in addition to accuracy on the comprehension question.

We find that a pitch accent on the verb decreases accuracy even after controlling for local coherence effects ($p<0.01$), providing evidence that the semantic processing of focus-related meaning in the incorrect parse made the erroneous interpretation more likely to persist in memory. While this effect could be attributed to the verb pitch accent forcing an early closure of the adjunct clause, a non-significant difference in response times between the pitch accent conditions suggest that listeners were garden-pathed for all resynthesized stimuli and subsequently forced into reanalysis regardless of the location of the pitch accent.

In sum, our findings indicate that a pitch accent on the verb facilitated deeper semantic processing for the incorrect parse in the garden path and did so without biasing the parser to prefer the corresponding syntactic analysis during ambiguity resolution. We demonstrate that the strength of semantic persistence is affected by the depth of semantic processing in the incorrect parse, providing further insights into the nature of the semantic persistence effect and the role of prosody in reanalysis.