

## Pre-lexical morphological parsing of ambiguous roots: Evidence from a cross-modal task

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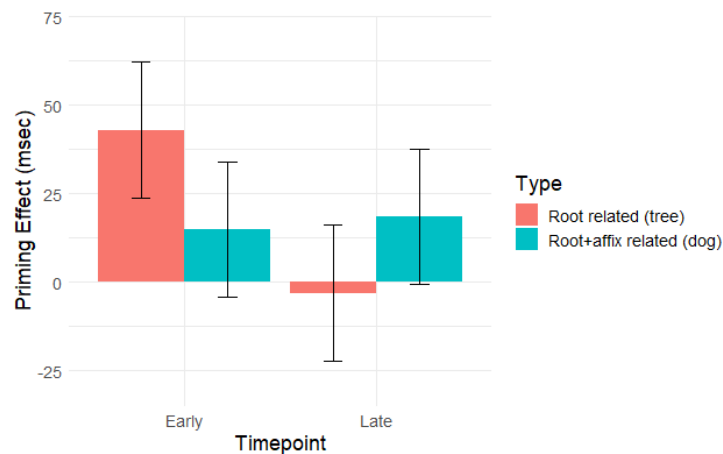
Words like “bark”, have two associated meanings (i.e., the noise that dogs make and the outer layer of a tree). At the earliest moments of lexical processing, regardless of contextual constraints, semantically ambiguous words have often been shown to prime associates of both of their meanings (Swinney, 1979; Onifer & Swinney, 1981; but see Tabossi, 1988, and Swinney, 1991). However, if the word is suffixed (e.g., *barking*), it is no longer ambiguous. In this case, it is unclear whether all meanings of the ambiguous root (i.e., *bark*) are still accessed. If all senses are accessed early in processing, this would provide evidence for the existence of a pre-lexical morphological parser; a mechanism that breaks down words into their constituent morphemes before recognition (see Libben & de Almeida, 2002). On the other hand, if only the contextually appropriate meaning of the root is accessed, this would indicate that the suffixed word was not parsed into its constituent morphemes before interpretation.

Thus far, only two studies investigated the phenomenon of semantically ambiguous roots with disambiguating suffixes, one employing masked priming with words in isolation (Libben & de Almeida, 2002) and another employing eye-tracking and a maze paradigm (de Almeida, Gallant, & Libben, in prep.). Both studies showed evidence of meaning activation for ambiguous roots, despite the disambiguation provided by suffixation. However, it is not clear whether the activation of root meanings is governed by a purely visual procedure, which is taken to separate roots from affixes based on morpho-orthographic regularities. In the present study we investigated whether this phenomenon could also be obtained during speech comprehension. In a cross-modal lexical decision task (Swinney, 1979), we measured the activation of different meanings of the root (e.g., *bark*) over two timepoints. Participants listened to sentences containing a suffixed root (e.g., *He heard loud barking during the night...*) and were required to make word/non-word lexical decisions to masked visual targets presented for 80 msec at the word’s recognition point or 500 msec later. The recognition point was determined by norming study employing the gating paradigm (Grosjean, 1996). The visual targets were either the semantic associates of the two meanings of the ambiguous root (*dog*, *tree*) or unrelated (e.g., *term*). We predicted that both meanings of *bark* would be activated at the recognition point but only the biased meaning (*dog*) would remain active at the later point, if *barking* is parsed during recognition.

Response times from 82 participants were entered into a linear mixed effect model with priming, timepoint and target types as fixed effects, participant and target item as random effects and logged target word frequency scores as a covariate. Results showed a significant main effect of priming ( $\chi^2(1) = 5.47$ ,  $p = 0.019$ ; see Figure 1) with no other significant main effects or interactions. Planned comparisons revealed that priming was only significant for root-related targets at the early timepoint. This effect is consistent with previous studies investigating the same phenomenon but with visual stimuli, which may facilitate the parsing of highly frequent morpho-orthographic patterns such as ‘-ing’. These data further suggest that pre-lexical

morphological parsing is obtained during comprehension, regardless of modality, thus highlighting the role of morphological knowledge in the early moments of language processing. Overall, the present study provides support for a pre-lexical morphological parser, yielding exhaustive conceptual access when encountering a semantically ambiguous morpheme, even within an unambiguous suffixed root.

**Figure 1:** Ambiguous root priming ( $RT_{\text{CONTROL}} - RT_{\text{EXPERIMENTAL}}$ ).



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