

## The Contribution of Semantic Transparency to the Morphological Decomposition of Prefixed Words

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Linguists typically assume that words are lexically decomposed into constituent parts even when the root morphemes cannot be ascribed any meaning (e.g. *sub-mit*, *de-cide*, *pre-cise*) (cf. Hockett 1954, Aronoff 1976). To date the psychological evidence supporting the decomposition of these words is conflicting and controversial. In fact, some word recognition research supports the opposite view, that semantically opaque complex words do not pattern behaviorally with semantically transparent complex words (e.g., *insincere* & *unfasten*) (Marslen-Wilson et. al 1994). This paper presents data from three segment shifting studies (Feldman & Fowler 1987) which suggest that speakers do decompose words that are derived from a semantically opaque bound root provided the prefix is semantically transparent. Additionally, no evidence was found that a morphophonemic alternation (e.g. *submit* ~ *submission*; *remit* ~ *remission*) aids in the classification of these words as morphologically complex, as predicted by Aronoff (1976).

The segment shifting task is designed to interrogate speakers' lexical representations by having them create words from the parts of other words. This task has been successfully used to identify suffix boundaries in several languages; however neither prefixes nor bound roots have been previously examined in English.

In the first study, thirty sets of experimental items were constructed utilizing thirteen different prefixes (e.g. *pre-*, *sub-*, *il-*). Participants were presented with a source word from one of three conditions: morphologically complex with a free stem (COOPERATE), morphologically complex with a bound root (COHESIVE), or morphologically simple with a pseudo-prefix (COCONUT). After a 750 ms presentation of the source word, the (pseudo-)prefix was highlighted simultaneous with the presentation of a target word (AUTHOR). Participants were instructed to shift the highlighted portion of the source word (the (pseudo-)prefix CO-) onto the target word and pronounce a response word (COAUTHOR).

Consistent with prior segment shifting studies (e.g. Feldman, Frost, & Pnini 1995), I predicted that the presence of a morpheme boundary between a prefix and a free stem (COOPERATE) should facilitate the production of the response word (COAUTHOR) relative to when there is no morpheme boundary in the source word (COCONUT). Complex words with bound roots (COHESIVE) should only facilitate the production of the response word if speakers encode the presence of a morpheme boundary between the prefix and the bound root.

Prefix shifting response times were recorded for thirty-five participants. Response times after complex words with free stems were an average of 25 ms faster than after morphologically simple words, replicating the pattern of results previously found for suffixes. This result suggests that speakers do encode a morphological boundary between prefixes and free stems. Response times for complex words with bound roots were not statistically different from the morphologically simple words, suggesting that these words were not represented as morphologically complex.

One possible explanation for the null difference between the bound root condition and morphologically simple condition may be that both conditions have no semantic evidence to support a morphological analysis; some words in the bound root condition had semantically opaque prefixes in addition to the semantically opaque

roots. Many prior studies of word recognition have revealed an effect of semantic transparency of the stem on morphological decomposition. Since bound roots are rarely semantically transparent, I examine the effect of the semantic transparency of the prefixes. Indeed, many of the experimental items in the bound root condition had prefixes that clearly contribute to the meaning of the word (e.g. PRECEDE, INGEST). Thus, I conducted a rating study to determine which items consisted of a semantically transparent prefix. Based on these results, the experimental items were divided into 5 conditions for a post hoc analysis: a) bound roots with transparent prefixes, b) bound roots with opaque prefixes, c) free stems with transparent prefixes, d) free stems with opaque prefixes and e) morphologically simple words.

The post hoc analysis revealed within-condition differences. Words composed of a semantically transparent prefix and bound root had significantly **slower** response times than the morphologically simple control condition (920 ms vs. 890 ms respectively). Words composed of semantically opaque prefixes and bound roots behaved no differently from the morphologically simple condition (894 ms vs. 890 ms respectively). The slowed response times for words composed of a bound root and semantically transparent prefix suggest that these words are stored differently from morphologically simple words or words composed of a bound root and semantically opaque prefix. I propose that the bound root items with a semantically transparent prefix are, in fact, represented as internally complex but that some interference process is slowing the shifting times.

An alternative explanation for the null difference discussed above is that some of the bound root items were not associated with a phonological alternation (e.g. *result* ~ *resultant*). A non-alternating bound root may be harder to identify as a morpheme, since very little distinguishes it from a non-morphemic string. Thus, these items may be patterning differently from the alternating roots. A post-hoc analysis investigating the role of a morphophonemic alternation was conducted. It revealed no benefit to shifting times for bound root items that alternate compared to those items that do not, suggesting that the presence of an alternation is not a crucial cue for distinguishing complex words from morphologically simple words.

Two additional studies which explicitly examine these two explanations will also be discussed. One study compares the shifting times for bound root items with semantically transparent (REFLECT) and semantically opaque (REFUSE) prefixes to the morphologically simple control word (REMORSE). Shifting times for free stem items with semantically transparent (REFRESH) and opaque (REACT) prefixes are also compared. A second study compares the shifting times for bound roots that have a phonological alternation (*receive* ~ *reception*) to those that do not (*respect* ~ *respectful*, *result* ~ *resultant*). These two studies will provide more compelling evidence than do the two prior post-hoc analyses because confounding factors will be controlled for in a way that was not possible in the post-hoc analyses.

These studies demonstrate that words can be lexically decomposed regardless of whether the stem is free or bound, provided that the prefix supplies sufficient semantic content. Contrary to previous word recognition research, it provides psychological evidence for linguists' assumptions that speakers decompose words derived from bound roots. However, transparency of the prefix turns out to be a more important factor for morphological decomposition than does the presence of a morphophonemic alternation, contrary to the more common linguistic view (Aronoff 1976).

## References:

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