

Studying Variation in the Lab with Larger Scale Production Experiments

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This study reports an influence of syntactic structure on the choice of allomorph of English *-ing* which interacts with previously observed phonological factors. The results bear directly on morphological theories of allomorph selection. A broader methodological point is that forced alignment makes larger-scale production studies feasible that can help us identify factors in variation that were hitherto hard to observe.

Factors in allomorph-selection. English *-ing* varies between two allomorphs, [in] and [ɪŋ]. Across different varieties of English this variation has been shown to depend on gender, speaking style, and class (Fischer, 1958; Labov, 1972; Trudgill, 1972). Lexical and phonological factors also play a role (Houston, 1985, i.a.), e.g., the allomorph [in] is more likely when a coronal segment follows.

This study explores the effect of syntactic constituent structure. As illustrated in (1), we crossed the manipulation of the syntactic environment (early closure vs. late closure) with the manipulation of the phonological environment (the—[ð] vs. a—[ə]). Strictly localist theories of morphology (e.g., Bobaljik, 2000; Embick, 2010) predict that the phonological context should be able to affect the choice of allomorph in late closure sentences (1a vs. 1c), but not in the early closure conditions (1b vs. 1d).

Methodology: 35 native speakers of English produced 45 sentences each in a Latin-square-design (4 test conditions + 1 control) in pseudo-random order, leading to a total of 1530 utterances. Prosodic phrasing was analyzed using forced alignment (HTK), and subsequent extraction of various acoustic cues. Allomorph choice was determined by perceptual annotation and by looking at spectral properties of the nasal.

Results: A mixed-model analysis with item and subject as random-effects found main effects of both syntax and phonology on allomorph choice. The phonological effect was significant even within the early-closure sentences, unexpected by strictly localist theories. There was furthermore a significant effect of verb duration and the pause following the verb *within each syntactic condition*—i.e., allomorph choice gradiently depended on the phonetic strength of the boundary and the phonetic distance from the following article. We also found effects of gender, in tune with previous results.

Discussion. At least this case of allomorph selection is not constrained in the way predicted by localist theories. The pattern of phonological conditioning can be accounted for by a production model that assumes that the segmental content of an upcoming word can have an effect on allomorph choice if its phonological form is readily available, and that the same factors that influence availability (syntactic locality, frequency,...) affect the duration of the present word. This approach provides an explanation why the dialects investigated literature only seem to vary in their overall proportion (from almost always [in] to almost always [ɪŋ]), but none seem to show a complementary distribution: the conditioning environment is only probabilistically available depending on how much planning is possible given the structure of sentence and other factors. In other words, there is a reason why *ing*-allomorph selection is consistently a variable process.

- (1) a. Late Closure, *the*
Whenever the boy was browsing the book the game would fall off the table.
- b. Early Closure *the*
Whenever the boy was browsing the book would fall off the table.
- c. Late Closure, *a*
Whenever the boy was browsing a book the game would fall off the table.
- d. Early Closure, *a*
Whenever the boy was browsing a book would fall off the table.

References

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