

Listeners make use of subphonemic information in comprehension

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Recent research has shown that seemingly homophonous elements show unexpected effects of morphological structure on their phonetic realisation. For example, word-final /s/ in English is longest as non-morphemic segment, shorter as suffix, and shortest as clitic, e.g. [1], [2]. Such findings highlight the relevance of the debate in language comprehension on whether, and if so, how, subphonemic information may influence lexical access, e.g. [3]–[5].

Previous research, e.g. [6]–[8], indicates that listeners are sensitive to the acoustic correlates indicating whether a stem is part of a suffixed word or not, and that listeners use such information in comprehension. The present paper tests whether listeners make use of the durational differences of English plural /s/ vs. *is*- and *has*-clitic /s/. That is, whether listeners' comprehension is influenced by the subtle morphological information that is part of the signal.

We conducted a number-decision task in a mouse-tracking setup similar to that of [8] with forty participants. All items consisted of pseudowords adopted from [2] to rule out potentially confounding effects of lexical properties [9], [10] and context [11], [12]. Two types of stimuli were created for the experiment: matched and mismatched. Matched stimuli consisted of stems and endings from one category (e.g. a plural stem followed by a plural /s/). Mismatched stimuli combined a substring from one category (e.g. a plural stem) with the ending from another category (e.g. a *has*-clitic /s/). Importantly, both types of stimuli, matched and mismatched, were spliced. This was done to counteract the potential issue of mismatched items sounding manipulated, while matched items did not. All items were embedded in real word carrier sentences to allow for disambiguation. An example of such a carrier sentence is *The prut's drinking tea with the glaif*, where the /s/ in *prut's* was either of matched *is*-clitic /s/ duration or of mismatched plural /s/ duration. The expectation was that, if subphonemic durational detail influences processing, the mouse-tracks of the mismatched items should be different from those of the matched items.

The coordinates of the mouse-tracks were analysed using smooth additive quantile regression models [13], allowing for a detailed picture of given effects. The analysis shows that the type of stimulus, that is matched vs. mismatched, indeed led to significantly different mouse trajectories. Thus, comprehension of word-final /s/ was affected by subphonemic detail.

The present results indicate that listeners' comprehension is influenced by subtle acoustic differences in the stimuli. As all items were pseudowords, we can rule out lexical and contextual effects as explanations for our findings. Listeners can perceive subphonemic morpho-phonetic detail and make use of such information in comprehension. This finding has important theoretical implications, as in most extant models of language production and language comprehension morpho-phonetic effects are unexpected and unaccounted for, e.g. [14], [15]. This paper adds to the literature that calls for more adequate models.

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