

Subtle morpho-phonetic differences in English stems and word-final /s/ influence listeners' comprehension

Recent research has shown that phonologically identical morphological entities in English show systematic differences in their phonetic realization. For example, stems of morphologically complex words are longer than stems of mono-morphemic words (Engemann & Plag, 2021; Seyfarth et al., 2017), and word-final /s/ is longest as a non-morphemic segment, shorter as suffix, and shortest as clitic (Plag et al., 2017; Schmitz et al., 2021). While such morpho-phonetic effects in production are well-established by now, it is still unclear whether such differences also play a role in speech perception and language comprehension.

To investigate whether listeners perceive such differences and whether they make use of them in comprehension, we conducted two kinds of experiments. The first involved a more meta-linguistic task, i.e. a same-different task, where participants hear two words and need to decide whether they heard the same recording twice, or whether there was a difference. The second kind of experiment is less metalinguistic and involves a mouse-tracking setup comparable to that of Blazej & Cohen-Goldberg (2015). Participants listened to a recording and were shown two options on the computer screen (e.g. *days* and *daze*). They were asked to use their mouse to click on the word that they think they heard, and the track of the mouse was recorded. In each experimental paradigm we carried out two experiments, investigating stems and word-final /s/, respectively.

In the same-different tasks, listeners showed large inter-individual differences. For stems, listeners started perceiving differences a 25 ms difference, while for word-final /s/ listeners showed less sensitivity, and only indicated differences reliably beyond a threshold of 75 ms.

Two kinds of spliced stimuli were used in the mouse-tracking experiments, matched and mismatched. Matched forms consisted of stems and endings from one category (a plural stem glued to a plural ending, or a mono-morphemic substring glued to the final /s/ of a mono-morphemic word). Mismatched forms combined a substring from one category (e.g. a plural stem) with the ending from the other category (the final /s/ of a mono-morphemic word form). The expectation was that, if phonetic detail influences processing, the mouse tracks of the mismatched items should be different from those of the matched items. Using smooth additive quantile regression models (Fasiolo et al., 2017), we found that indeed the type of matching significantly affected the comprehension of stems, leading to a detour of the mouse-track for mismatched stimuli. This also holds for word-final /s/.

Our results demonstrate that listeners indeed are affected by the subtle acoustic differences in the stimuli. Listeners can perceive morpho-phonetic information and make use of such information in comprehension. This result has important theoretical implications. In most extant models of language production and language comprehension morpho-phonetic effects are unexpected and unexplained (e.g. Roelofs & Ferreira 2019, Turk & Shattuck-Hufnagel 2020, Cutler 2021). This paper adds to the literature that calls for more adequate models.

References

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