

Learning morphology with the help of subphonemic detail?

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Recent research has shown that morphological structure leaks into subphonemic detail. In these cases, traces of morphological structure may be apparent on the phonetic level. One example of this is word-final /s/ which takes several morphological roles in English. While there are words with a non-morphemic final /s/ (e.g., *bus*), final /s/ can also denote number and case information (e.g., *two pots*, *the cat's fur*) as well as a cliticized form of auxiliary verbs (e.g., *it's been a long time*, *it's me in the picture*). Phonetic differences among morphological distinct types of /s/ have been found for several English varieties in corpus studies (Plag et al., 2017; Zimmermann, 2016): several types of final English /s/ come with a unique duration. Experimental studies have also addressed this question (e.g., Walsh & Parker, 1983; Seyfarth et al., 2017) on production differences between categories, however, mostly with mixed results. Recently, a carefully designed production study (Schmitz et al., 2021a) confirmed the central finding from corpus data (Plag et al., 2017; Zimmermann, 2016) with non-morphemic /s/ being the longest in duration, followed by suffix /s/, then followed by clitic /s/.

On a theoretical level, these differences are unexpected when the architecture of language production does not allow for an effect originating from the morphological level to leak down to the subphonemic level (Levelt et al., 1999; Kiparsky, 1982). More recent experience-based models allow for such an influence and only recently it has been shown that the aforementioned subphonemic differences could be explained as emerging from the lexicon on account of naive or linear discriminative learning (Tomaschek et al., 2019; Schmitz et al., 2021b).

The accumulating evidence for the effects in production has raised the question as to whether these durational differences also play a role in comprehension. A recent PhD dissertation (Schmitz, 2022) addressed this question and investigated in a perception and two comprehension experiments whether subphonemic differences play a role in decoding morphological categories. Indeed, it was found that durational differences cannot only be perceived by English speakers but also significantly affected their comprehension process.

The present study now aims at investigating whether language users not only produce, perceive and comprehend durational differences, but also whether these cues are strong enough to guide a learner in morphological learning. We set out to investigate whether the differentiation of morphological categories based on durational cues enables the learner to build up a new representation and whether there is a disadvantage compared to learning morphological categories that differ in phonemes. To avoid native language influences we invented an artificial language with varying final /f/ durations to be learned by adult German native speakers. Participants learn a certain alternation pattern which determines the encoding of singular and plural forms in their artificial language. The alternation pattern varies between experimental groups.

In an ongoing artificial language learning experiment, we are currently collecting data comparing the learning behaviour of these three experimental groups: The 'Phonemic group' learns an artificial language in which plurality is indicated by a phonemic change in the final sound of the word [f~p alternation]. Two 'Phonetic groups' learn an artificial language where plurality is indicated by a shorter or a longer durational difference in the word-final sound [f~f: alternation]. After a short training phase, participants are requested to perform a number decision task to demonstrate what they have learned. In addition to accuracy, we measure mouse tracks to reveal possible fine differences among groups. First results indicate that learners of the 'Phonemic group' have a clear learning advantage over those in the 'Phonetic groups'. Control groups with no specific learning tasks will reveal whether we are actually dealing with true learning behaviour. Our results will tell us whether information exchange between the domains of phonetics and morphology can be beneficial for language learners as they would be able to use durational cues to identify morphologically relevant units.

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