Morphological structure modulates the phonetic realization of complex words – A pilot study with Turkish-German bilinguals

Can Kablan & Jasmin Pfeifer
Heinrich-Heine Universität, Düsseldorf

We investigate the influence of morphological segmentability on the phonetic realization of morphologically complex words. So far, several studies showed that the duration of a sound may be codetermined by its morphological function. For example, the duration of English /s/ may differ depending on whether it is part of the stem or part of a suffix [1]. The observed morphological effects are subtle and have only been observed for English [2], Dutch [3], and Spanish [4]. The previous studies were primarily focused on suffixes within monolingual speakers of one language.

Our study broadens the research on the effects of morphological structure on the phonetic realization along multiple dimensions. First, we focus on prefixes, rather than on suffixes, as morphological acoustic cues in prefixes may be more relevant for speech processing than the acoustic cues in suffixes. Second, we not only investigate duration, but also voice onset time (VOT) and center of gravity (CoG), thereby expanding the investigated acoustic parameters. Third, we took the relation between the prefixed word and its stem as expressed by their relative frequency [5] and their semantic relation [6] into consideration. Fourth, we are the first to test the influence of a second language by testing whether Turkish as L1 has an influence on the morphological processing in German as a L2.

We conducted a production study in German. We tested 15 Turkish-German bilinguals and 15 German monolinguals. We selected 50 verbs with the prefixes aus-, auf-, durch-, nach- and controlled for their frequency based on CELEX [7] and on the Leipzig Corpora Collection [8]. The prefixes were selected to end in fricatives so that we were able to measure center of gravity. Half of the verbs were semantically opaque, half transparent. The verbs were embedded in semantically meaningful sentences with a similar phonetic context and then read by our participants. We measured whether semantic transparency had an influence on the acoustic parameters and whether Turkish as an L1 had an influence on the morphological processing in German as a L2.

Our preliminary results show a significant influence of semantic transparency on prefix duration, but also voice onset time (VOT) and center of gravity in the monolingual German speakers. However, no difference based on semantic transparency was found for the Turkish-German bilinguals.

Our dataset indicates that the morphological structure of a word may co-determine several acoustic properties of its segments, not just duration. However, at least in our dataset, this only seems to hold for monolingual speakers.

References

[1] Plag, I., J. Homann & G. Kunter (2017). Homophony and morphology: The acoustics of word-final S in English. Journal of Linguistics 53(1). 181–216

[2] Zimmermann, J. 2016. Morphological status and acoustic realization: Is there a difference between Bra[d] Pitt and a grille[d] cheese omelet, or between Kate Mo[s] and killer robot[s]? In J. Wahle, M. Köllner, R. H. Baayen, G. Jäger & T. Baayen-Oudshoorn (eds.), Proceedings of 6th conference on quantitative investigations in theoretical linguistics, Tübingen: Universität Tübingen.

[3] Zee, T., L. ten Bosch, M. Ernestus & I. Plag (2021). Paradigmatic relations interact during the production of complex words: Evidence from variable plurals in Dutch. Frontiers in Psychology 12.

[4] Torreira, F. & M. Ernestus (2012). Weakening of Intervocalic /s/ in the Nijmegen Corpus of Casual Spanish. Phonetica 69(3). 124–148.

[5] Hay, J. & Baayen, H. (2001). Parsing and productivity. Yearbook of Morphology 2001, pp 203-235. Baayen, R. H., Piepenbrock, R., & Gulikers, L. (1995).

[6] Creemers, A., Goodwin Davies, A., Wilder, R. J., Tamminga, M., & Embick, D. (2020). Opacity, transparency, and morphological priming: A study of prefixed verbs in Dutch. Journal of Memory and Language 110: 1-20.

[7] The CELEX lexical database [CD-ROM]. Philadelphia: University of Pennsylvania, Linguistic Data Consortium.

[8] Goldhahn, D., Eckart, T. & Quasthoff, U. (2012). Building Large Monolingual Dictionaries at the Leipzig Corpora Collection: From 100 to 200 Languages. In: Proceedings of the Eighth International Conference on Language Resources and Evaluation (LREC'12), 2012.