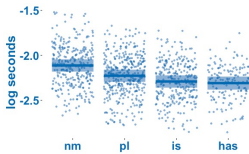


Background

- Recent research has shown that seemingly homophonous elements show phonetic effects of morphological structure that are unexpected in established models of speech production [1,2]
- Most prominently, in English word-final /s/ durational differences are produced, perceived, and part of comprehension [3-5]

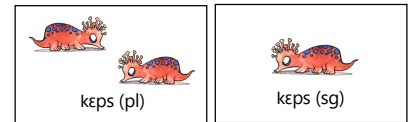


- However, such findings on subphonemic differences induced by morphology are mostly limited to English and Dutch [6,7]
- The aim of the present study is to investigate whether similar patterns are also found in another language, German

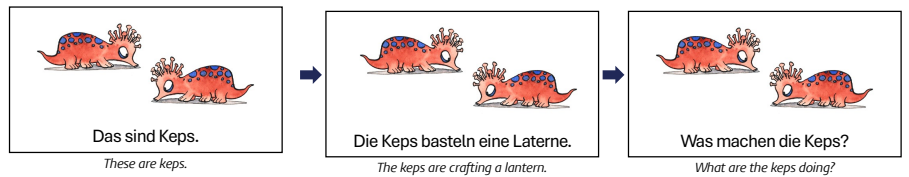
Method

- Following the highly controlled and most recent study on English word-final /s/, a production task using pseudowords was designed [3]
- Pseudoword stimuli representing alien creatures [9] consisted of either one syllable (CVCs) or two syllables (CV.CVCs), following the phonotactic constraints of German [8]
- 42 target items + 21 filler items (11 singular items without word-final /s/; 10 items with -en as plural suffix)

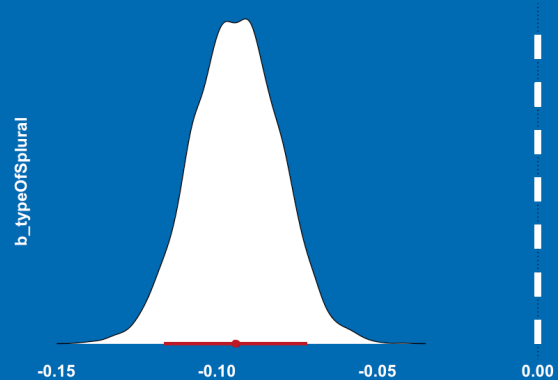
German example	monosyllabic	Example items
<i>Fuchs</i> `fox-sg`	fʊks	mɪps, flɔts, boeks
<i>Jobs</i> `job-pl`	dʒɔps	
	disyllabic	
<i>Rotfuchs</i> `red fox-sg`	ʁoːtʃuks	leːgaps, duːmets, vaːloeks
<i>Bisons</i> `bison-pl`	bizɔns	



- Each trial consisted of three parts and only one step was visible at a time, ensuring that speakers parsed all content

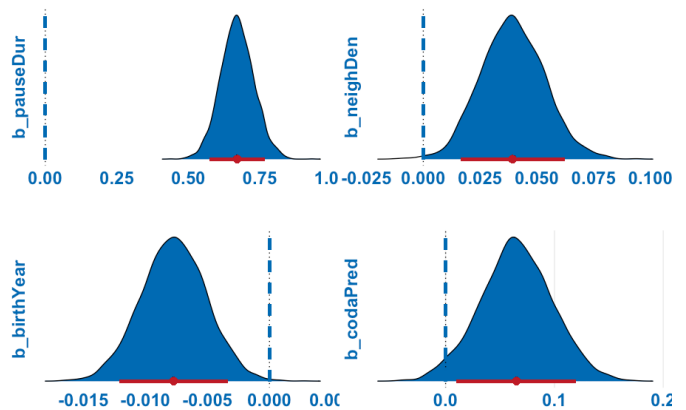


Homophones are not homophonous: The case of word-final /s/ in German



Analysis

- Data: 1621 data points : 811 non-morphemic, 810 plural (3.5% data loss)
- Bayesian regression models
- $s_{duration}(\log) / \text{relative duration} \sim \text{type of S} + \text{following segment} + \text{vowel} + \text{neighbourhood density} + \text{L1 likelihood} + \text{Coda Predictability} + \text{syntagmatic Pred.} + \text{trial} + \text{pause duration} + \text{speechrate}(\log) + \text{birth year} + \text{preceding segment} + \text{number of syllables} + \text{article} + (1 | \text{speaker}) + (1 | \text{itemProd}) + (1 | \text{additional Ls})$



Discussion

- Subphonemic durational differences induced by morphology emerge in German word-final /s/ — similar in nature to those found in English
- Findings call into question established models that cannot account for such differences — discriminative learning [10,11] might provide insight into the nature of our findings
- Overall, our findings call for
 - similar studies in unrelated languages
 - revisions of established models of speech production
 - models beyond the established ones that can account for subphonemic differences induced by morphological structure

References

[1] Kiparsky, P. (1982). Lexical morphology and phonology. In I. Yang (Ed.), *Linguistics in the morning calm: Selected papers from SICOL1* (pp. 3–91). Hanshin. [2] Roelofs, A., & Ferreira, V. S. (2019). The architecture of speaking. In P. Hagoort (Ed.), *Human language: From genes and brains to behavior* (pp. 35–50). MIT Press. [3] Schmitz, D., Baer-Henney, D., & Plag, I. (2021). The duration of word-final /s/ differs across morphological categories in English: Evidence from pseudowords. *Phonetica*, 78(5–6), 571–616. [4] Plag, I., Homann, J., & Kunter, G. (2017). Homophony and morphology: The acoustics of word-final S in English. *Journal of Linguistics*, 53(1), 181–216. [5] Schmitz, D. (2022). Production, perception, and comprehension of subphonemic detail: Word-final /s/ in English. (*Studies in Laboratory Phonology 11*). Language Science Press. [6] Kemps, R. J. J. K., Ernestus, M., Schreuder, R., & Baayen, R. H. (2005). Prosodic cues for morphological complexity: The case of Dutch plural nouns. *Memory & Cognition*, 33(3), 430–446. [7] Kemps, R. J. J. K., Wurm, L. H., Ernestus, M., Schreuder, R., & Baayen, R. H. (2005). Prosodic cues for morphological complexity in Dutch and English. *Language and Cognitive Processes*, 20(1–2), 43–73. [8] Wiese, R. (2000). The phonology of German. Oxford University Press. [9] van de Vijver, R., & Baer-Henney, D. (2014). Developing biases. *Frontiers in Psychology*, 5. [10] Schmitz, D., Plag, I., Baer-Henney, D., & Stein, S. D. (2021). Durational differences of word-final /s/ emerge from the lexicon: Modelling morpho-phonetic effects in pseudowords with linear discriminative learning. *Frontiers in Psychology*, 12. [11] Tomaschek, F., Plag, I., Ernestus, M., & Baayen, R. H. (2019). Phonetic effects of morphology and context: Modeling the duration of word-final S in English with naïve discriminative learning. *Journal of Linguistics*, 2019, 1–39.