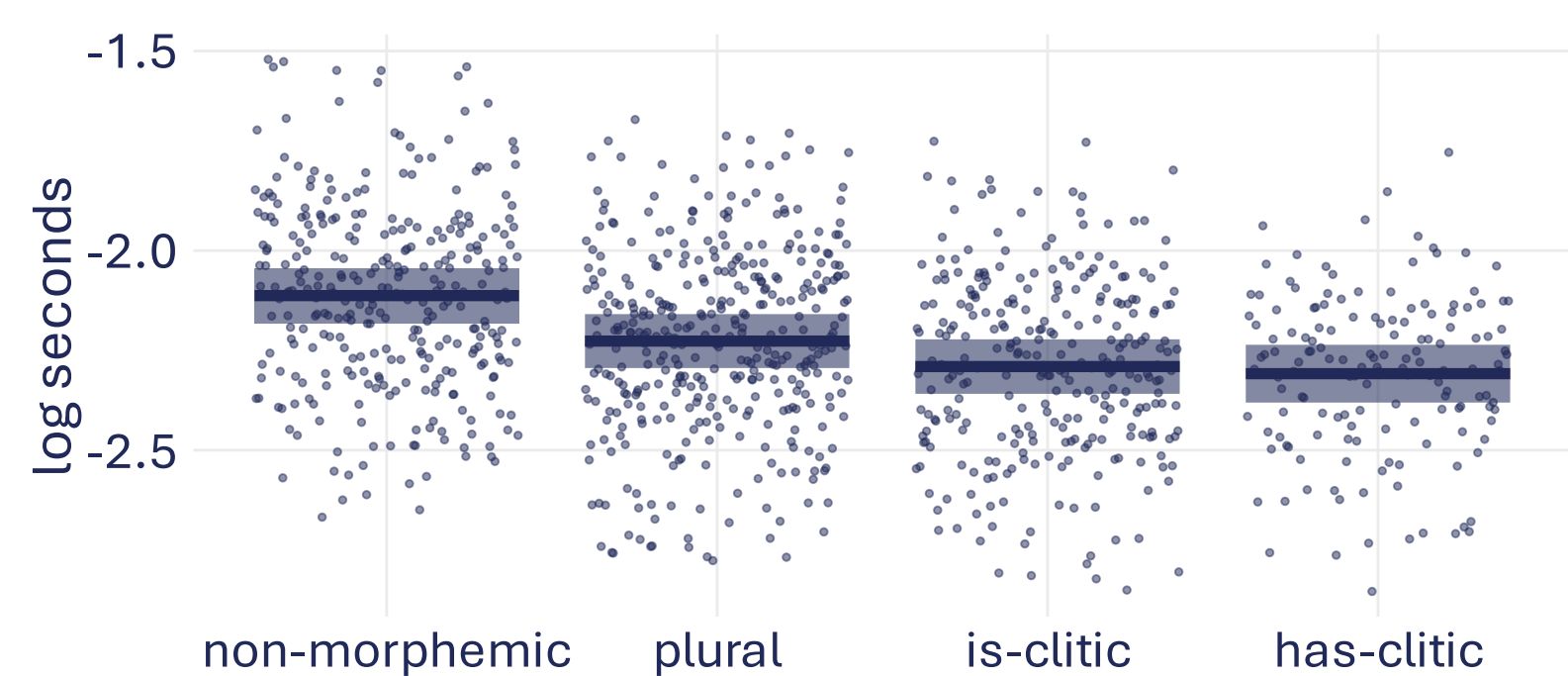


Background

- 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]



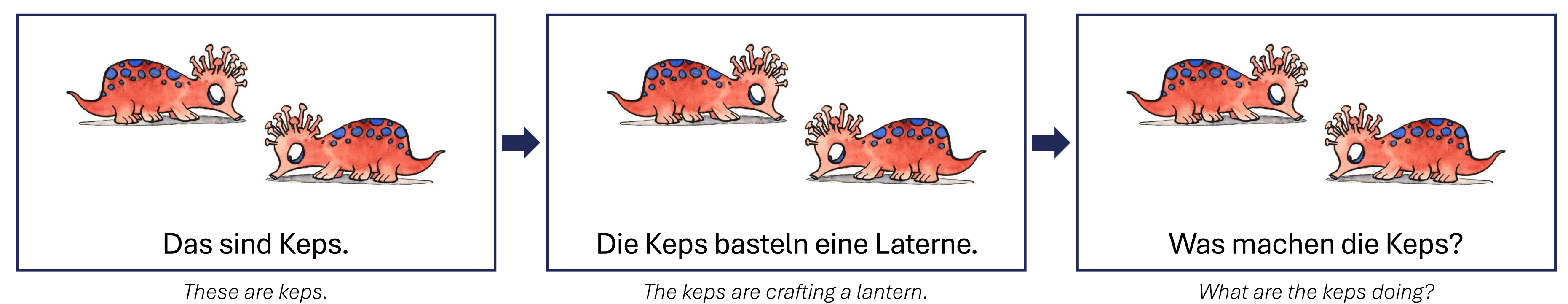
- However, such findings on subphonemic differences induced by morphology are mostly limited to English and Dutch [6,7]
- The aim of the present study is to investigate whether similar patterns are also found in another language, German

Method

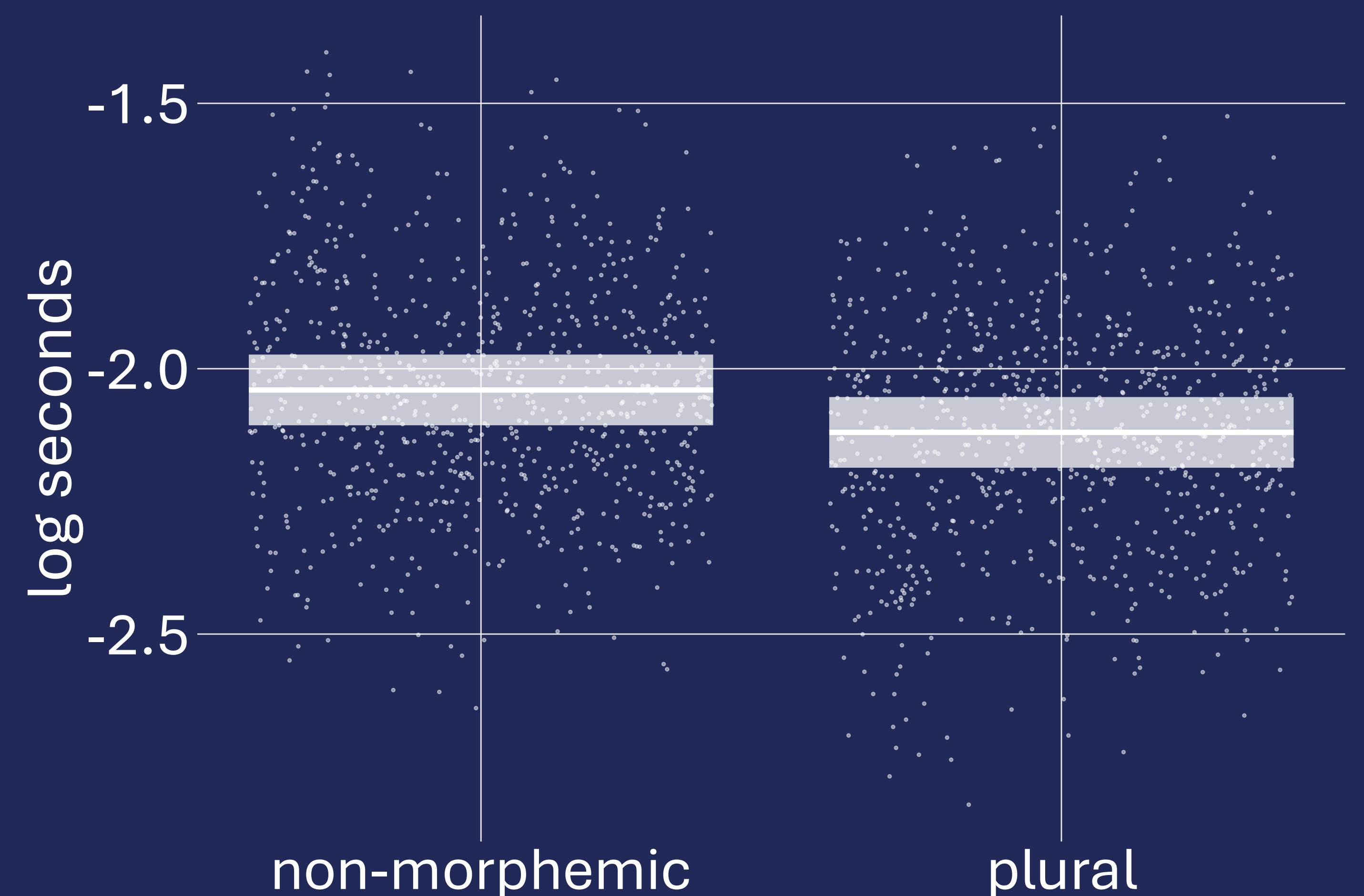
- Following the highly controlled and most recent study on English word-final /s/, a production task using pseudowords was designed [3]
- Pseudoword stimuli representing alien creatures [8] consisted of either one syllable (CVCs) or two syllables (CV.CVCs), following the phonotactic constraints of German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

monosyllabic			disyllabic		
hyps	gvts	tvks	to:gvps	fo:kvts	lu:dvks
nɔps	kɔts	dɔks	ga:lɔps	pi:mɔts	mi:tɔks
mɪps	dɪts	bɪks	nu:kɪps	ka:nɪts	no:bɪks
keps	re:ts	nɛks	ki:tɛps	du:mɛts	te:mɛks
lɔps	flɔts	hɔks	ra:nɔps	re:nɔts	di:nɔks
lœps	poets	bœeks	hu:tœps	hu:noets	va:lœeks
daps	gats	taks	le:gaps	mi:vats	zu:taks

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



Subphonemic durational differences in word-final /s/ are induced by morphological categories in German

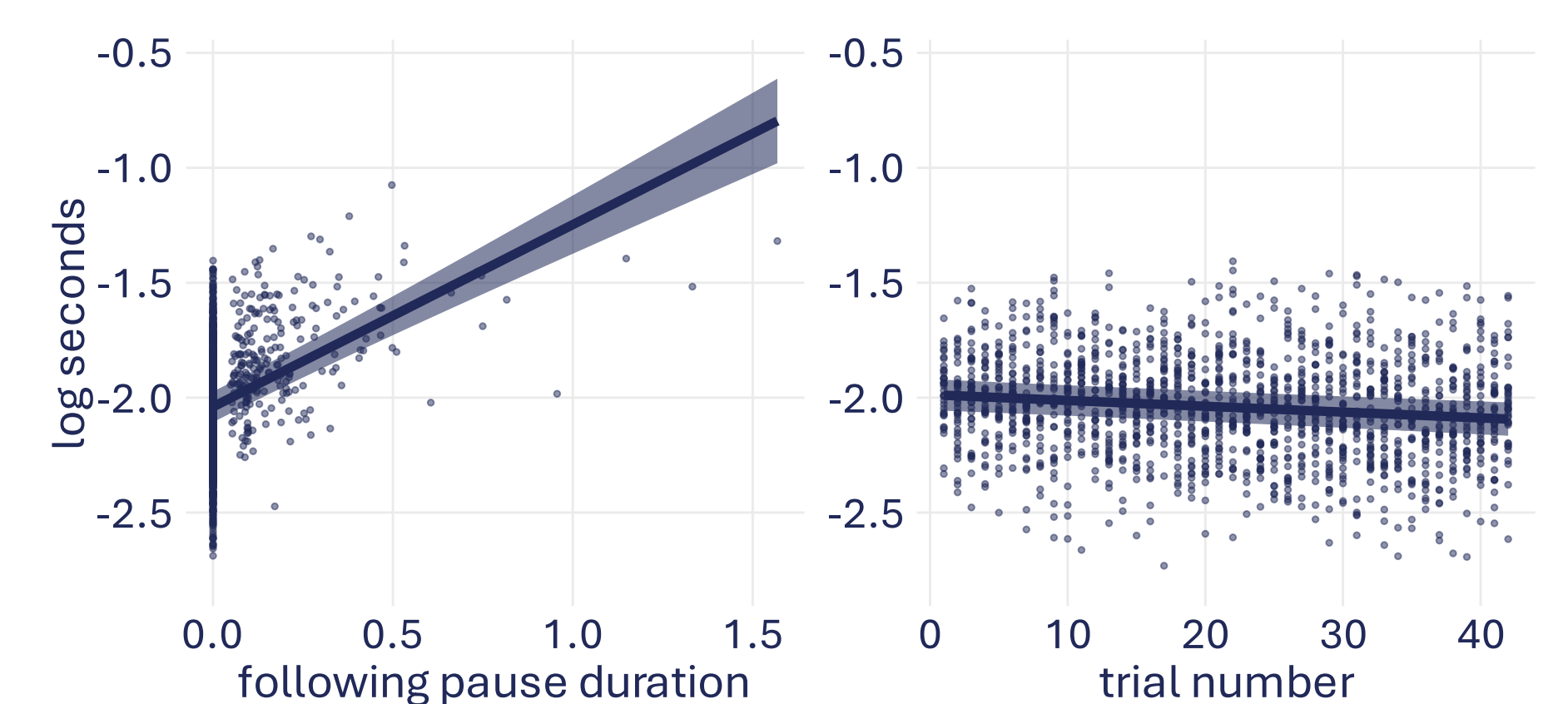


Analysis

- Overall, 1622 data points were retained for analyses
 - 812 non-morphemic, 810 plural
 - total data loss of 3.5 %
- Statistical analysis was carried out using linear mixed effects regression models
 - Dependent variable: /s/ duration
 - Explanatory variable: type of /s/, i.e. non-morphemic vs. plural
 - Control variables
 - Fixed: grammatical gender, number of syllables, phonological neighbourhood density, preceding vowel, preceding sound, following sound, speaking rate, following pause duration, trial number, age
 - Random: speaker ID, transcription of produced item, additional L1s

Discussion

- Subphonemic durational differences induced by morphology emerge in German word-final /s/
- The differences are similar in nature to those found in English
- Our findings call into question established models of speech that cannot account for such differences
- One framework that might provide insight into the nature of our findings is discriminative learning [10,11]
- 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



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