Acoustic nuances in phonologically identical words: On the interface between phonetics and morpho-syntax

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Homophony, polysemy, and syncretism are well-known phenomena in the world's languages. In the recent past, however, several examinations have shown that phonologically identical forms actually differ in the acoustic detail. Several factors seem to be responsible for these nuances, among others, frequency (the less frequent *thyme* is articulated with a longer duration than the more frequent *time*), syntactic category (*answer* is produced differently depending on whether it serves as a verb or noun), and morphological complexity (the English *s* is realized with a heterogenous duration across its diverse occurrences, such as its non-affixal and affixal status) (see, e.g., Gahl 2008; Sereno & Jongman 1995; Seyfarth et al. 2018). The present paper expands this line of research and examines whether the morpho-syntactic feature of number is reflected acoustically.

We asked whether German singular genitive and plural genitive syncretisms (e.g., *Neffen* 'of the nephew(s)') can be acoustically distinguished although they do not differ on the phonological level. For this purpose, the two conditions in (1) with 11 sentences in each condition were contrasted in a reading study, in which 32 female native speakers of German participated. The sentences in the two conditions were exactly identical, except for the determiner, which served to trigger the number contrast. Inserting an adjective between the determiner and the target noun aimed at excluding the possibility that the phonetics of the determiner affect the acoustics of the noun. Overall and apart from the determiner, the two conditions were identical in terms of their phonetic, phonological, morphological, and syntactic aspects as well as in their length (measured in syllables, phonemes, phones, and letters). Further, an analysis with the COSMAS corpus interface revealed that the two do not differ in their frequency (Absolute occurrences in the 9.5 billion words collection: Mean singular: 1135; SD singular: 971; mean plural: 1135; SD plural = 986). Note that only relevant cases were manually included in the frequency counts, that is, only singular genitive and plural genitive cases, respectively; other cases, such as accusative, were ignored. Predictability was further excluded as a potentially confounding variable as the word preceding and the word following the target noun were held constant. To control for the possible influence of speaker variability, all subjects read both the singular and plural version of an item. The order of the conditions was balanced across all participants, the order of the items varied across subjects, all sentences were presented in the same way on the computer screen, and twice as many filler as test items were inserted in the material to increase the distance between an item in one condition and the same item in the other condition. On the basis of an acoustic analysis conducted with Praat, it is shown that the nouns are spoken with a significantly longer word and stem, but not suffix, duration in the plural than in the singular (see Tables 1 and 2; dependent t test in subject analysis (t_1) and in item analysis (t_2): D_{WORD}, $t_1 = -2.51$, $p_1 = .017$; $t_2 = -2.90$, $p_2 = .016$; D_{STEM}, $t_1 = -3.15$, $p_1 = .004$; $t_2 = -3.13$, $p_2 = .011$). The effect goes in the expected direction and is interpreted as a compensation strategy speakers rely on in the absence of other lexical, morphological, or phonological markers of number. Specifically, it is claimed that the universal trend that plural forms are often more complex / more formally marked than their singular counterparts (see, e.g., Corbett 2000; Dryer 2013; Greenberg 1963; Haspelmath 2006) is reflected in the acoustics and in a more extended form if other indicators do not occur. Interestingly, if only those items were analyzed in which the plural was more frequent than the singular, the trend persisted and plural forms were still longer (not significantly longer, which might be partly, however, due to the lower sample size this time). This is surprising as items of higher frequency have been shown to be shorter in duration than comparable items of a lower frequency. The outcome is considered against the background of the interface between phonetics and morpho-syntax and the adequacy of speech production models.

Example sentences

(1) a. *Die Freundlichkeit des kleinen **Neffen** kommt häufig zum Vorschein.*
'The friendliness of the little **nephew** is often evident.'
b. *Die Freundlichkeit der kleinen **Neffen** kommt häufig zum Vorschein.*
'The friendliness of the little **nephews** is often evident.'

All test nouns

Neffen (of the nephew(s)), *Hasen* (of the hare(s)), *Hirten* (of the shepherd(s)/herdsman/herdsmen), *Laien* (of the layman/laymen), *Schöffen* (of the lay judge(s)), *Raben* (of the raven(s)), *Schurken* (of the villain(s)), *Lotsen* (of the pilot(s)), *Rüden* (of the male dog(s)), *Pagen* (of the pageboy(s)), *Korsen* (of the Corsican(s))

Tables

Table 1. Descriptive statistics of D_{WORD} of t_1, t_2 in brackets, in ms.

	Singular	Plural
Number of cases	32 (11)	32 (11)
Mean	401 (406)	410 (413)
Standard deviation	35 (53)	37 (53)

Table 2. Descriptive statistics of D_{STEM} of t_1, t_2 in brackets, in ms.

	Singular	Plural
Number of cases	32 (11)	32 (11)
Mean	293 (295)	299 (301)
Standard deviation	23 (50)	23 (49)

References

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