**Supplementary analyses**

**1. Analysis of difference in spectral balance**

As a further acoustic parameter, the spectral balance of each syllable was calculated, a measure that has been found to be a reliable correlate of lexical stress (Sluijter & van Heuven, 1996). Spectral balance is a measure of intensity levels at different frequency bandwidths. Sluijter and van Heuven (1996) show that stressed syllables are characterized by a greater intensity in higher frequency bands than unstressed syllables. Spectral balance was operationalized here as in Plag, Kunter and Schramm (2011). First a long-term average spectrum with a bandwidth of 100 Hz was created. Mean intensities (in dB) were then calculated for a low frequency band ranging from 0 to 1,000 Hz (Ilow) and for a high frequency band ranging from 1,000 to 4,000 Hz (Ihigh). Spectral balance was then calculated as the difference between the two intensity values (B=Ihigh - Ilow). Since stressed syllables are expected to be characterized by a higher intensity in especially the high frequency band, the value for B should be higher for stressed than for unstressed syllables.

Table S1. Fixed-effect model output for the models fitted to the difference in spectral balance (n = 2,532)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | β | *SE* | *t* | *p* |
| Intercept | | |  |  | 2.325 1.568 1.483 | | |  |
| Category = verb | | | |  | 0.107 0.192 0.557 | | | 0.59 |
| Stress = iambic | | |  |  | -3.746 1.527 -2.453 | | | 0.02 |
| Noun ratio | | | |  | 1.375 1.246 1.103 | | | 0.28 |

**2. Analysis by individual speaker**

As Sereno and Jongman (1995) report that some of the acoustic effects were speaker-specific, models were fitted for each speaker’s pronunciations individually. These models were linear models without random effects predicting the acoustic parameter in question and testing the effect of category, stress pattern and noun ratio, as well as interactions between these predictors.

Table S2. Overview of effects by individual speaker

Abbreviations used in this table are: P = Effect of stress pattern (iambic vs. trochaic), C = Effect of grammatical category, N = Effect of noun ratio. Letters combined by ‘x’ signify interaction effects, the ‘+’ or ‘-’ in parentheses indicates whether the effect found was in the expected direction (+) or in the opposite direction (-).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Speaker | Duration ratio | Δ F0 | Δ Intensity | Δ Spectral balance |
| 1 | P (+) | P (+) | P (+) | - |
| 2 | P (+) | - | P (+) | - |
| 3 | P (+) | - | - | - |
| 4 | P (+) | P (+) | P (+) | P (+) |
| 5 | P (+) | P (+) PxC (+) | P (+) | - |
| 6 | P (+) | - | P (+) | P (+) N (+) |
| 7 | P (+) | P (+) | P (+) | - |
| 8 | P (+) | P (+) PxC (-) | - | - |
| 9 | P (+) | - | - | P (+) |
| 10 | P (+) | P (+) | P (+) | P (+) |
| 11 | P (+) | - | P (+) | P (+) |
| 12 | P (+) | - | P (+) | - |
| 13 | P (+) | - | P (+) | P (+) |
| 14 | P (+) | P (+) C (-) | P (+) | - |
| 15 | P (+) | P (+) | P (+) C (+) | P (+) N (+) |
| 16 | P (+) | P (+) | P (+) | P (+) |
| 17 | P (+) | - | P (+) PxC (+) | P (+) |
| 18 | P (+) | P (+) | P (+) | P (+) |
| 19 | P (+) | P (+) | P (+) | P (+) |
| 20 | P (+) | - | P (+) | P (+) |
| 21 | P (+) | - | P (+) | P (+) |
| 22 | P (+) | PxC (+) | PxC (+) | P (+) |
| 23 | P (+) | PxC (+) | P (+) | - |
| 24 | P (+) | P (+) C (-) | P (+) | P (+) |
| 25 | P (+) | P (+) | P (+) | P (+) N (+) |
| 26 | P (+) | - | P (+) | P (+) |
| 27 | P (+) | P (+) | - | P (+) |
| 28 | P (+) | C (+) | C (-) | P (+) |
| 29 | P (+) | P (+) PxC (-) | P (+) PxC (+) | - |
| 30 | P (+) | - | P (+) C(-) | P (+) N (+) |
| 31 | P (+) | - | P (+) | - |
| 32 | P (+) | - | - | P (+) |
| 33 | P (+) | - | P (+) C(+) | - |
| 34 | P (+) | - | P (+) | P (+) |
| 35 | P (+) | P (+) | P (+) | P (+) |
| 36 | P (+) | - | P (+) C(+) | - |
| 37 | P (+) | - | P (+) | - |
| 38 | P (+) | P (+) | P (+) | P (+) |
| 39 | P (+) | P (+) | P (+) | P (+) |
| 40 | P (+) | P (+) PxC (+) PxC(-) | P (+) PxC (+) | P (+) |

**3. Model comparison via Bayes Factor**

The regression models calculated do not provide evidence for an impact of grammatical category on the acoustic parameters of interest. Further insight into the significance of a null result can be obtained via Bayesian modeling, and more specifically via the comparison of competing models through the calculation of Bayes Factors. Bayes factors indicate the likelihood that a given dataset has come about given a certain statistical model compared to an alternative model (see Vasishth, Nicenboim, Beckman, Li, & Kong, 2018; for an application, see Kentner & Franz, 2018). In the current context, we may compare whether the data observed is better explained by a model including an effect of grammatical category (the +category model), or by a model in which this effect is assumed to be zero (the -category model). In the following an analysis employing the *brms* package (Bürkner, 2016) in *R* is reported. Since Bayes factor analyses have been shown to be affected by the prior distributions assumed for the crucial model coefficients, calculations for different priors were performed, as suggested by Vasishth et al. (2018). The priors were chosen based on the results for the effect of stress position in the *lmer* models calculated (see Section 4.2.) and a reanalysis of the original data by Sereno & Jongman (1995). As a weakly informative prior Vasishth et al. (2018) suggest a distribution with a standard deviation of half the upper limit of the effect in question. Since the effect of stress position can be considered to constitute the upper limit of the category effect, I used the coefficient for stress position of the *lmer* models as a starting point and employed a prior distribution with a standard deviation half its value as the prior with the widest spread. For example, for the model fitted to the duration ratio, the coefficient for stress position is close to the value -0.5 (see Table 3). As the prior with the widest spread I therefore employed a distribution with sd=0.25. This wide spread was then narrowed taking into account the models calculated based on the original results by Sereno & Jongman (1995). As the prior with the narrowest spread I employed a prior distribution with a standard deviation about half the size of the category effect in an *lmer* model based on the original dataset. For example, since the reanalysis of the original data via *lmer* models indicates a category effect on the duration ratio of -0.019, I set the narrowest prior distribution for the category effect at sd=0.01. The prior distributions for the models fitted to F0 and intensity were determined in the same manner. Narrowing the prior distribution for the effect of category increases the probability that even a small effect of grammatical category will be detected, that is, the likelihood that the +category model is preferred increases.

Both the +category and the -category models contained fixed effects of stress pattern and log-transformed noun ratio and the maximal random effects structure specified above (see Models, Section 4.2). The results of the Bayes Factor analysis are provided in Table S3. Values greater than 1 indicate a preference for the -category model, with greater values indicating a greater preference. Values below 1 indicate a preference for the +category model.

The results indicate a universal preference for models in which the effect of grammatical category is zero. As the spread of the prior distributions is narrowed, the values become closer to 1, the value which indicates equal support for both competing models. However, none of the values is smaller than 1, showing that the +category model is never the preferred one. In consequence, the analysis of Bayes Factors lends support to the conclusion of a null effect of grammatical category on the acoustic parameters analyzed.

Table S4. Results of a Bayes Factor analysis with different prior distributions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Duration ratio | | Δ F0 | | Δ Intensity | |
| Prior (0, 0.25) | 22.72 | Prior (0, 1.3) | 4.23 | Prior (0, 2.5) | 5.34 |
| Prior (0, 0.1) | 11.63 | Prior (0, 0.15) | 1.15 | Prior (0, 0.1) | 1.23 |
| Prior (0, 0.01) | 1.39 | Prior (0, 0.015) | 1.02 | Prior (0, 0.01) | 1.12 |

**Additional references**

Bürkner, P. C. (2016). brms: An R package for Bayesian multilevel models using Stan. *Journal of Statistical Software*, *67*(1), 1–48.

Kentner, G., & Franz, I. (2018). No evidence for prosodic effects on the syntactic encoding of complement clauses in German. *Glossa: A Journal of General Linguistics*, *4*(1), 18.1-29.

Plag, I., Kunter, G., & Schramm, M. (2011). Acoustic correlates of primary and secondary stress in North American English. *Journal of Phonetics*, 39(3), 362–374.

Vasishth, S., Nicenboim, B., Beckman, M. E., Li, F., & Kong, E. J. (2018). Bayesian data analysis in the phonetic sciences: A tutorial introduction. *Journal of Phonetics*, 71, 147–161.