Dictionary-Based and Judged Stress Variability in Visual Lexical Decision

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Background: Reaction times in visual lexical decision tasks are known to be sensitive to lexical properties of words, including frequency, length, and consistency between orthographic form and pronunciation. Lexical representations have been argued to encode multiple pronunciation variants as part of their internal structure [1]. In languages with stress variation, some word forms are associated with more than one pronunciation pattern. Such variation is marked in orthoepic dictionaries but may not always be reflected in speakers'explicit judgements. We hypothesize that dictionary-based stress variability will be a stronger predictor of reaction times than speakers'explicit judgements, as it reflects accumulated usage patterns encoded in lexical representations rather than post-hoc metalinguistic awareness.

Method: Sixty-two native speakers of Russian completed a visual lexical decision task (LDT) including 96 real Russian words and 96 pseudowords. The present analysis includes only correct responses to real words. The stimulus set consisted of 48 words with fixed stress and 48 words with variable stress *(binary variable StressType)* according to the orthoepic dictionaries of Russian. Words were presented in standard orthography; stress was not marked. After the lexical decision task, participants indicated for each word whether they considered its pronunciation to be variable or not, yielding a binary variable *(JudgementVar)*. Words marked as variable in dictionaries were much more likely to be judged as variable by participants in the post-task judgement (OR ≈ 24). Despite this strong correspondence, we next examined which of these two measures better predicts reaction times in LDT. Reaction times (s) from LDT were log-transformed *(lnRT)* and analyzed using linear mixed-effects models with random intercepts for participants and lexemes. All models included the same covariates: word length (letters), log-transformed word-form frequency from the Russian National Corpus [2], and part of speech. Two alternative models were compared: one including dictionary-based variability *(StressType)* and one including subjective judgements *(JudgementVar)*. A full model including both predictors was also fitted, and nested models were compared using likelihood-ratio tests.

Results: The model including *StressType* provided a better fit than the model including *JudgementVar* (ΔAIC = 10.7). In the full model, removing *StressType* significantly worsened model fit ($\chi 2 = 12.66$, $p < 0.001$), whereas removing *JudgementVar* did not ($\chi 2 = 1.99$, $p = 0.158$). Collinearity diagnostics for the full model showed low GVIF values (all adjusted GVIFs < 1.16). The final model retained *StressType* but not *JudgementVar*. In this model, words with dictionary-based stress variability elicited longer reaction times than words with fixed stress ($\beta = 0.090$, $p < 0.001$), corresponding to an increase of approximately 9% in RT (≈ 70 ms). Frequency and word length showed the expected effects.

Discussion: Stress variability affected reaction times even though stress was not marked in the written input, indicating that pronunciation variability influences lexical access during visual word recognition. Reaction times were more accurately predicted by dictionary-based stress variability than by speakers' explicit judgements. Although the two measures closely corresponded, subjective judgements did not account for additional variance once lexical information was included in the model. This suggests that the observed slowing for variable-stress words is tied to properties of lexical representations, possibly reflecting competition between alternative stress patterns during phonological activation. These findings are compatible with usage-based approaches to language processing [3], in which such variability reflects accumulated usage patterns, but is not always fully reflected in speakers'explicit judgements.

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