The role of specified prosody in word recognition

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Background: Some psycholinguistic models argue in favor of abstract representations of lexical items that only include non-default information [1]. The placement of the Danish laryngeal prosody *stød* is generally predictable from segmental and morphological structure [2, 3] and may thus be underspecified when assigned post-lexically. We used a violation paradigm to test the importance of prosody for lexical access, hypothesizing that prosodic mismatch should lead to lexical inhibition only in words with lexically specified prosody (see Table 1 for example stimuli). In pseudowords with the same affixes, we expected a stronger morpheme interference effect [4, 5] if the prosody matched the expectations associated with an affix with lexically specified prosody.

Method: Forty normal-hearing listeners participated in a lexical decision task with recorded event-related potentials (ERPs). Two affixes with lexical prosody were compared to an affix without prosodic specifications. Reaction time was measured from word onset, and the ERPs were time-locked to the disambiguation point. The data were analyzed using mixed effects models [6] in R [7].

Results: Generally, prosodic mismatch led to slower responses for real words (see Figure 1), but the magnitude of the effect differed across affixes: Real words affixed with *-hed* were less affected than those affixed with *be-* ($\hat{\beta} = 33.7, p < 0.001$) or *-isk* ($\hat{\beta} = 88.5, p < 0.001$). Prosody did not influence pseudowords systematically ($\hat{\beta} = 2.5, p = 0.5$). In the ERPs (Figure 2), prosodic mismatch led to larger N400 amplitude for real words ($\hat{\beta} = 0.94, p < 0.001$), but pseudowords were unaffected by prosody ($\hat{\beta} = 0.18, p = 0.14$). Prosody had no effect on constructions with *-hed* ($\hat{\beta} = -0.03, p = 0.78$), but prosodic mismatch led to larger N400 in words with lexically specified prosody (*be-*: $\hat{\beta} = 0.51, p < 0.001$, *-isk*: $\hat{\beta} = 0.37, p = 0.002$). An exploratory analysis of the pseudoword ERPs showed that, when ignoring expectations associated with the affixes, deviations from the default prosody resulted in larger N400 ($\hat{\beta} = -0.38, p = 0.005$).

Discussion: As has been found in other languages [8, 9], mispronunciations involving default prosodic patterns appear to be less salient in perception than those involving lexically specified prosody. Prosodic mismatch does not systematically inhibit lexical access if the prosody can be computed post-lexically by the default phonology. We found no evidence that prosody modulates morpheme interference in pseudowords. The exploratory analysis indicates an initial pre-lexical, "monomorphemic" parse of pseudowords using the default prosody, similar to [10] who found larger N400 amplitude in phonotactically legal compared to illegal pseudowords. In conclusion, prosody seems to be more strongly associated with the whole word than with the affix.

Prosody	Affix	Translation	Real word		Pseudoword	
			Match	Mismatch	Match	Mismatch
Specified	*be-*	*enlighten*	[pe.’lyːʔs.ə]	[pe.’lyːs.ə]	[pe.’neːʔl.ə]	[pe.’neːl.ə]
Specified	*-isk*	*ceramic*	[k^{h}e.’ɹaːʔm.isk]	[k^{h}e.ɹa.misk]	[ɹæ.’muːʔn.isk]	[ɹæ.mu.’nisk]
Default	*-hed*	*beauty*	[’skœn.,heðʔ]	[’skœnʔ.,heðʔ]	[’p^{h}yl.,heðʔ]	[’p^{h}ylʔ.,heðʔ]

Table 1: Example stimuli.

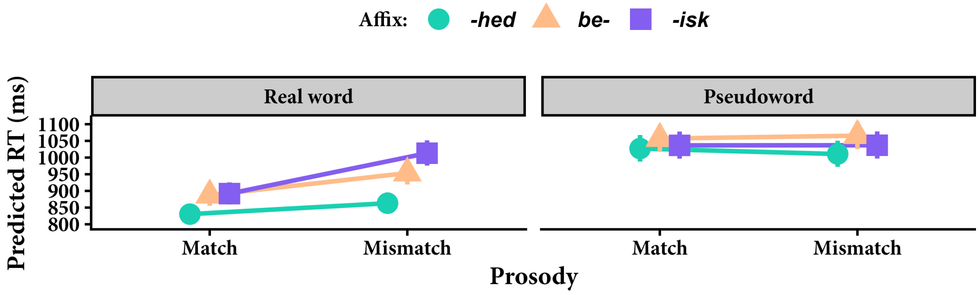

Figure 1: Reaction time model predictions (interaction: Prosody × Lexicality × Affix).

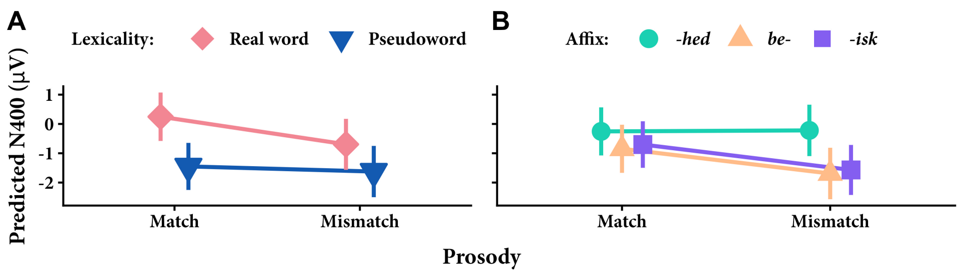

Figure 2: N400 model predictions (interactions: Prosody × Lexicality and Prosody × Affix).

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