

Neighborhood effects in Estonian spoken word recognition

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Background: Words can be related to one another through both form and meaning, and such relationships have been shown to influence spoken word recognition. For example, words with many phonological neighbors, such as *cat*, which has neighbors like *cap*, *cab*, and *cut*, are recognized more slowly due to increased lexical competition [1]. In contrast, words with larger morphological or inflectional families, e.g., *teach*, which is related to *teacher*, *taught* and *teaching method*, are typically recognized more quickly, presumably because shared semantics and morphological structure facilitate activation [2]. Although this area has been extensively studied in languages such as English, research on other languages, particularly morphologically complex ones, remains relatively scarce. Compared to English, Estonian has a shallower orthography and a richer system of compounding and derivation. Most notably, Estonian, like other Finno-Ugric languages, is characterized by an extensive inflectional case-marking system. This results in large morphological paradigms, which significantly influence word recognition processes [3].

Method: To examine neighborhood influences in Estonian spoken word recognition, analyses were conducted using data from the Estonian Auditory Lexical Decision Database (EALD). EALD is a large-scale dataset collected online using the open-source experimental software OpenSesame [4]. The database includes response times and accuracy data for 8800 words and 8800 pseudowords obtained in an auditory lexical decision task. The stimuli comprise monomorphemic, inflected, derived, and compound words. In addition to behavioral measures, the dataset contains a wide range of lexical-statistical variables for each item. Data were collected from 528 native speakers of Estonian (age 18–72 years; 421 female, 94 male, 10 non-binary participants, 3 chose not to answer).

Results: Our results indicated that listeners process words with larger morphological families slightly faster and more accurately than words with fewer family members (left panels of Fig. 1). We also observed a nonlinear effect of realized inflectional paradigm size (e.g., number of words sharing a lemma). Response times decreased and accuracy increased as the number of paradigm members grew, indicating an initial facilitative effect (middle panels of Fig. 1). However, for words with very large paradigms, the effect either levels off or reverses: suggesting that there was no benefit for processing from very dense inflectional paradigms. In contrast, words with many phonological neighbors were processed more slowly and with lower accuracy, suggesting increased lexical competition during recognition (right panels of Fig. 1).

Finally, age-related effects revealed that older participants were, on average, more accurate than younger participants, consistent with previous findings [5]. Unexpectedly, however, they also responded faster. This pattern contrasts with the typical age-related slowing observed in other similar lexical decision studies. One possible explanation is that most of our participants were university-educated and thus likely to have relatively high levels of literacy and extensive vocabularies, which may have overridden age-related slowing effects.

Discussion: Our study contributes to broadening spoken word recognition research beyond large Indo-European languages. It provides new insights into how morphologically complex word forms are processed in real time, particularly regarding how different types of neighborhood information influence recognition.

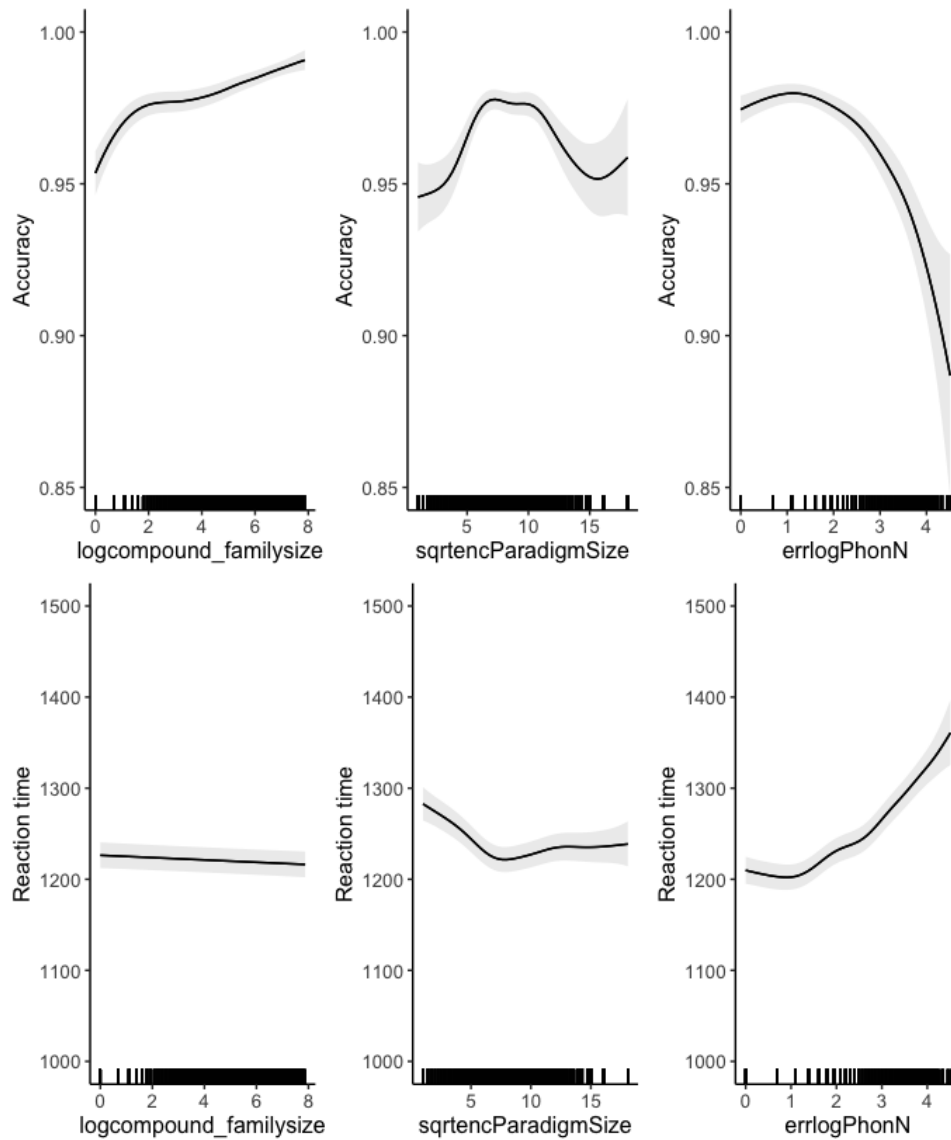


Figure 1: Neighborhood effects on accuracy and reaction time in EALD.

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