Phonological Interference During Silent Reading

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What role do phonological representations play in silent reading? The influence of phonological information on isolated visual word recognition appears to be limited (McCutchen et al., 1991; Qiao & Forster, 2007). However, a number of studies (e.g., McCutchen et al., 1991; Perfetti and McCutchen, 1982; Acheson & MacDonald, 2011) have shown that phonological information plays an important role in sentence-level reading. For instance, Perfetti and McCutchen (1982) showed that phonological similarity within a sentence causes interference effects. Furthermore, Acheson and MacDonald (2011) showed that these effects were enhanced when phonologically similar words were presented in more complex sentences (i.e., sentences with object-extracted relative clauses) rather than in simpler sentences (i.e. sentences with subject-extracted relative clauses). Although these studies indicate that phonological information influences silent reading at the sentence-level, it remains unclear precisely which stages of the comprehension process are affected. The present study (N= 32) addresses this question using eye tracking, a methodology that provides fine-grained indications of the time course of processing difficulty during online reading.

The sentences of interest involved reduced and unreduced relative clauses, with and without phonologically-similar words (see the example sentence set below). It was predicted that if phonological form overlap influences the first stages of comprehension (i.e., those related to word recognition and encoding), phonological processing difficulty (i) should be revealed only in early reading time (RT) measures and (ii) should occur independently of syntactic processing difficulty. If, on the other hand, phonological processing difficulty is related to retention and retrieval in working memory, the effects of phonological overlap (i) should be obtained only in later RT measures and (ii) should interact with syntactic processing difficulty.

The results of the study, in fact, support a hybrid model of the influence of phonological information on silent sentence-level reading. Specifically, early RT measures revealed phonological processing difficulty independent of syntactic processing difficulty, while syntactically more difficult reduced relative clause sentences yielded larger phonological interference in later RT measures. This pattern of results therefore indicates that phonological similarity interferes both at early stages of sentence comprehension and at later stages of memory retention. Although these results show clear form-related interference effects across stages of comprehension, it is important to note that the phonologically similar words used in this study were also orthographically similar. Thus, the question remains as to whether this “phonological” interference effect was due to phonological form relatedness or orthographical form similarity. A follow-up experiment is currently being conducted to address this question. The design and predictions of this follow-up experiment will also be detailed in the presentation.
References

Example Sentences (with demarcated regions of interest)
Reduced / form related:
The infection | left | by the | injection | badly hurt | the young child.|

Unreduced / form related:
The infection | that was | left | by the | injection | badly hurt | the young child.|

Reduced / control:
The infection | left | by the | medicines | badly hurt | the young child.|

Unreduced / control:
The infection | that was | left | by the | medicines | badly hurt | the young child. |