

The Nature of the Phonological Code Accessed Early in Visual Word Recognition during Sentence Reading

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Introduction

There is a great deal of evidence which suggests that readers determine the phonological representation of a word early during visual word recognition (Pollatsek, Lesch, Morris, & Rayner, 1992), and that a word's phonological code is maintained in working memory during sentence reading (Folk & Morris, 1995). However it is unclear whether the phonological code used for a word's identification is also the code used in working memory storage. Recently Inhoff, Connine, Eiter, Radach, & Heller (in press) proposed that the phonological code maintained in working memory includes the representation of speech-like properties. If the early-activated phonological code is similar to the code maintained in working memory, and therefore possesses qualities comparable to the phonological code of the spoken word, then providing readers with a spoken word, which is essentially the phonological code of the visual word, should benefit readers by providing a head start for visual word identification.

Experiment 1

In Experiment 1, participants read sentences that contained an eye-movement contingent auditory presentation, which was placed 10 character spaces before or in the space following the visual target. A spoken word that was identical, phonologically similar, or dissimilar to the visual target was presented when the readers' eyes crossed the invisible boundary. When the spoken word was presented before the visual target, target gaze durations were shorter after an identical spoken word than after either a phonologically similar or dissimilar spoken word. There was no difference between the similar and dissimilar spoken word condition. These results suggest that readers are unable to use the phonological code of a spoken word to facilitate visual word recognition. Sound-specific effects were obtained, however, during the reading of post-target words. Now, a phonologically similar spoken word yielded longer gaze durations than either an identical or a dissimilar spoken word, as occurred in our prior work (Inhoff et. al, in press). Overall, this pattern of results suggests that the phonological code used for visual word recognition is modality specific, but once visual word recognition occurs the representation maintained in working memory becomes modality independent.

Experiment 2

Experiment 2 attempted to ensure that readers were presented with the same amount of spoken word information prior to encountering the visual target word. Readers were presented with visual stimuli at one of two time intervals, simultaneously with the spoken word and delayed 300 ms after auditory onset. All visual targets were initially masked with a homogenous string of letters (e.g., ccccc) before fixation. The results reveal an identity advantage during target reading, but this advantage was no greater in the delayed presentation than in the simultaneous presentation, which further suggests that readers are unable to use the phonological code of a spoken word to facilitate visual word recognition because the code used for visual word recognition is different than the code of a spoken word.

Discussion

The results of this set of experiments indicate that the phonological code used during visual word recognition differs from the phonological code maintained in working memory. The results suggest that the phonological code used for visual word recognition is modality specific and therefore differs for visual and spoken words. However, it appears that once visual word recognition occurs and the phonological code is retained in working memory, the representation becomes modality independent.

References

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