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What is the Role of Tone in Phonological-Similarity Effect?

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Introduction

Phonological-similarity effect, PSE, (Baddeley, 1966; Conrad & Hull, 1964) is an important finding in working memory research. This finding points out that the capacity of information retention in our working memory store more or less depends on the phonological nature of the to-be-memorized information. The more similar (phonologically) of the to-be-memorized item, the more difficult to retain in the working memory store. However, most people should have the subjective experience that to immediately recall a set of colloquial slogans in television advertisement is much more easier than to immediately recall a set of common sentences due to the similarity of prosody. There is also evidence showing that rhyming of verbal information usually enhances our memorization ability (Fallon, Groves, & Tehan, 1999). Therefore, how to explain these contradicting observations is very important in order to get a fuller understanding to the operation of the working memory model (Baddeley, 1992).

From a memory study done by Saito (1998), he reported that intonation of a sentence might make a contribution to participants' recall performance (see also Pennington & Ellis, 2000). Following to this point and together with our aforementioned subjective experience, we can see that prosodic information may be useful to our recall performance to the verbal information to an extent, simply like to recall a colloquial slogan in advertisement for a brief period of time. Reviewing the relevant literature so far, there are a lot of empirical works conducted on this issue in the domain of language research: comprehension and production (Sevold & Dell, 1994; Slowiaczek, McQueen, Soltano, & Lynch, 2000; Soto-Faraco, Sebastián-Gallés & Cutler, 2001). However, little consideration has been given to how these different phonological characteristics of a word affect the recall performance in working memory so far despite of their interdependency.

The present study aims at examining the influence of different phonological characteristics of the to-be-memorized item on participants' recall performance, which is a theoretically interesting but still unexplored question, by three experiments.

Experiments

All the three experiments used a typical word span task with Chinese words as the testing materials to examine the phonological characteristics of a word on the recall performance. The main variable in the present experiment is the different degree of phonological similarity, whether those Chinese words presented in the testing lists shared any phonological characteristics (onset, rime and tone) among themselves or not (see Yip, 2005, for details). In experiment one, the materials were visually presented while the materials were presented auditorally in experiment two. And the experiment three used a silent reading paradigm.

Results and Discussion

Convergent results from the three experiments support two major conclusions in the present study. First, present results indicate that one major source of phonological-similarity decrement comes from the overlapping of the segmental information of the to-be-memorized materials. This phonological overlapping among the to-be-memorized words poses difficulties for participants to perceive and to rehearse because of the acoustic confusion among the words, which is consistent with the previous memory research findings. Second, prosodic information of the to-be-memorized materials seems to be retained longer in the working memory. This overlapping of tonal information among words even produces a phonological-similarity facilitatory effect. Finally, based on the present results, the traditional concept of the term "similar" in the phonological-similarity effect should be re-conceptualized. Because similarity in prosodic information, unlike the similarity in segmental information, will not create any interference effect in working memory, but a facilitatory effect will occur in working memory instead, which means the interference PSE is less effective to tone-rhymed materials.

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