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The Influence of Conceptual Relations on Lexical Retrieval

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Introduction

The purpose of the present investigation is to argue for another source of lexical priming that is independent of associations and similarity, namely, conceptual relations.

In a priming study, Estes (2003) found that target combinations (e.g., MOUNTAIN SNAKE) were comprehended faster when the prime used the same relation (e.g., JUNGLE BIRD) than when it used a different relation (e.g., STEREO HEADPHONE). This study shows that conceptual relations play an important role in semantic decisions. We claim that conceptual relations will also facilitate lexical retrieval of target words. Retrieval of a lexical item will activate its associated relations. This activation of relations will then spread to other lexical concepts that complement the prior lexical concept in the activated relation. Moreover, if these conceptual relations are activated automatically, then they should facilitate retrieval even in a lexical task for which the retrieval of conceptual relations is not (logically) necessary.

Prior evidence supports this prediction. Gagné and Shoben (1997, Experiment 2) found that lexical decisions were faster for sensical word pairs (e.g., MOUNTAIN BIRD) than for nonsensical word pairs (e.g., PICTURE SOUP). However, these results may be confounded since their word pairs were not matched for word length, frequency of occurrence, or frequency of co-occurrence (as this was not their empirical interest).

Experiment 1

We presented 60 participants with 30 sensical (e.g., APPLE CAKE), 30 nonsensical (e.g., SALAD BOOT) word pairs, and 60 nonword fillers in a double lexical decision task. The sensical word pairs had a conceptual relation between the concepts, whereas the nonsensical word pairs did not. Both word pair types were matched for length and frequency of occurrence. If conceptual relations facilitate lexical retrieval, then responses to sensical word pairs should be faster than responses to nonsensical word pairs. As predicted, lexical decisions were faster for sensical word pairs ($M = 992$, $S.E. = 30.39$) than for nonsensical word pairs ($M = 1122$, $S.E. = 36.98$), $t(58) = 7.80$, $p < .001$.

However, words in the sensical pairs may co-occur more frequently than words in the nonsensical pairs (i.e., APPLE and CAKE may appear more frequently together in language than SALAD and BOOT), resulting in *associative* priming. Also, words in the sensical pairs may be more semantically similar than words in the nonsensical pairs, resulting in *semantic* priming. Either possible confound could explain the results of Experiment 1, and therefore we may have failed to demonstrate *relational* priming. These potential confounds were addressed in Experiment 2.

Experiment 2

We used the same sensical word pairs from the previous experiment (e.g., APPLE CAKE). But to create the nonsensical word pairs, we simply reversed the words from the sensical pairs (e.g., CAKE APPLE) so that the the sensical and nonsensical word pairs were perfectly matched for length, frequency of occurrence, frequency of co-occurrence, and similarity. Therefore, if the facilitation of sensical word pairs observed in Experiment 1 is attributable to the presence of a sensical relation between concepts, then facilitation of the sensical word pairs should replicate here. Response times were again significantly faster for sensical word pairs ($M = 1061$, $S.E. = 52.08$) than for nonsensical word pairs ($M = 1123$, $S.E. = 55.68$), $t(36) = 3.15$, $p < .01$.

Although the effect size was smaller in this second experiment (62 msec vs. 130 msec in Experiment 1), the effect in Experiment 2 is arguably more powerful: the *exact same words* were retrieved faster in one condition than the other. Furthermore, this effect cannot be attributed to a difference in word length, frequency of occurrence, frequency of co-occurrence, or semantic similarity, but rather appears to be attributable to the presence of a sensical relation between the words.

General Discussion

In the present experiments, conceptual relations exerted a facilitative effect above and beyond any associative or semantic priming that might have also occurred. It may well be the case that APPLE and CAKE, for instance, are relatively similar and do co-occur relatively frequently. That would explain why APPLE CAKE was responded to faster than SALAD BOOT. But it can't explain why APPLE CAKE was facilitated relative to CAKE APPLE.

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