

if they are related by prior association or if they share semantic features. To retrieve a concept from memory, a node must be activated; this activation will spread to directly related concepts. Therefore, when presented with the prime-target pair LION-STRIPES, priming will occur because LION is closely connected to TIGER and TIGER is closely connected to STRIPES. Thus, activation should spread from the prime (LION) through the mediating concept (TIGER) to the target (STRIPES).

McKoon and Ratcliff 1992, using the compound cue theory of retrieval, suggest an alternative explanation for the mediated priming effect. They argue that mediated priming is not "mediated," but instead, any priming is due to weak, but direct, relationships in memory. For example, McKoon and Ratcliff argue that (all) priming is guided by two factors, semantic relatedness and lexical cooccurrence which should positively correlate with mediated priming. Closer semantic relatedness and increasing lexical cooccurrence should predict larger priming effects.

McKoon and Ratcliff's claims raise theoretically important issues. Does true "mediated" priming exist? In an effort to address this question, we first replicated the mediating priming effect using both lexical decision and naming. In addition, we examined the explanation of mediated priming as suggested by McKoon and Ratcliff relying on the Hyperspace Analogue to Language (HAL) model of memory (Burgess & Lund, in press; Lund & Burgess; 1996) to generate a semantic relatedness measure and lexical co-occurrence frequencies.

Experiments 1 and 2 are replications of the basic priming effect. The critical manipulations are Experiments 3 and 4 which use the item priming data from Experiments 1 and 2 to address the claims of McKoon and Ratcliff concerning the weak, but direct relatedness of mediated primes and targets. Experiment 3 directly tests the semantic relatedness issue, while Experiment 4 addresses the issue of lexical co-occurrence frequency.

Experiment 1

Method. Thirty University of California, Riverside, undergraduates participated. All participants were right-handed, native speakers of English.

The stimuli were taken from Balota and Lorch 1986. There were three lists, each list contained 16 critical mediated pairs, 16 unrelated pairs, and 32 nonword pairs.

A trial consisted of a fixation point (500ms) followed by a prime word (350ms) followed immediately by a target. Participants performed a lexical decision task.

Results. All effects reported were reliable at $p < .05$. There was an overall mediated priming effect. Reaction times for mediated prime-target pairs (544ms) were faster than reaction times for unrelated prime-target pairs (566ms).

T-9. Mediated Priming in High-Dimensional Semantic Space: No Effect of Direct Semantic Relationships or Co-occurrence

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Mediated priming (MP) presumably occurs via a mediating item (e.g., LION primes STRIPES via TIGER; Balota & Lorch, 1986). McKoon and Ratcliff 1988 argue that MP is caused by weak, but direct, prime-target relationships. Semantic relatedness and lexical co-occurrence underlie this effect. We replicate the MP effect (lexical decision and naming). Using the HAL memory model, we find that mediated to target semantic distances are greater than unrelated pairs, and find no relationship between strength of priming and lexical co-occurrence. McKoon and Ratcliff's claims find no support from these results. We conclude that MP occurs as a function of contexts shared (or mediated) by the mediating prime and the mediator itself.

Mediated priming is a subtle, yet reliable effect (Balota & Lorch, 1986, McKoon & Ratcliff, 1992). The mediated priming effect has traditionally been explained within a spreading activation framework of memory. Spreading activation works within a semantic memory network of interconnected nodes; each node represents a concept. These concept nodes are connected

TABLE 8
Semantic Distances for Word Pairings (in RCUs)

| Med-Target | Un-Target | Rel-Target | Med-Target |
|------------|-----------|------------|------------|
| 672 | 432 | 372 | 322 |

Experiment 2

Method. Forty-five University of California, Riverside undergraduates participated with the same restrictions as Experiment 1. Experiment 1 materials were used with the removal of non-word trials and the addition of 16 directly related trials. Procedure was the same as in Experiment 1 except that participants named the target word.

Results. All effects reported were reliable at $p < .05$. Consistent with earlier results, there was a mediated priming effect and a direct priming effect. Reaction times to directly related pairs (548ms) were faster than for unrelated pairs (568ms). Reaction times for mediated items (558ms) were faster than for unrelated pairs (568ms).

Experiment 3

Method. Semantic distances (RCUs: Riverside Context Units; see Lund & Burgess, 1996) for all word pairs used in the experiments (mediated-target, unrelated-target, related-target) were calculated using the HAL memory model. Distances were also calculated for a condition not present in the experiments—the related-mediated condition (LION-TIGER).

Results. Table 8 contains mean semantic distances for all word pairings. As expected, both directly related conditions are closer than the unrelated condition. Contrary to McKoon and Ratcliff's prediction, mediated-target pairs (627 RCUs) are actually further apart in the high-dimensional semantic space than are the unrelated-target pairs (432 RCUs).

Experiment 4

Method: PROCEDURE. Lexical co-occurrence frequencies (frequency two items occurred in the corpus) for mediated-target pairs were extracted.

Results. Correlations were calculated between priming effect obtained and lexical co-occurrence frequency, for the lexical decision and the naming experiments. Again, contrary to McKoon and Ratcliff's predictions, there was no correlation between magnitude of priming and co-occurrence frequency for lexical decision ($r = .013$) or naming latency ($r = -.004$).

Conclusions. These results suggest that mediated priming does exist and cannot be explained by directly, but weakly related, prime-target pairs. McKoon and Ratcliff's claims that semantic relatedness and lexical co-occurrence guide the strength of this priming effect were unsupported.

Unrelated prime-target pairs had closer distances than did mediated-target pairs, suggesting that semantic relatedness does not predict priming. Furthermore, there is no correlation between magnitude of priming and lexical co-occurrence frequency.

Our results are consistent with a localist spreading activation account of mediated priming. However, distributed representations, that are context vectors (such as HALs), can also explain mediated priming. It is important to note, however, that instead of nodes representing a concept, distributed representations have vector elements that encode the contexts in which words appear. Thus, in a model like HAL, LION will prime STRIPES because LION has shared contexts with TIGER and TIGER has shared contexts with STRIPES (see basic relatedness effects in Table 8).

References

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