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Lexical decision tasks, semantic priming, and reading

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LEXICAL DECISION TASKS, SEMANTIC PRIMING, AND READING

Semantic priming refers to the observation that a response to a target (e.g., dog) is faster when it is preceded by a semantically related prime (e.g., cat) compared to an unrelated prime (e.g., car). Semantic priming may occur because the prime partially activates related words or concepts, facilitating their later processing or recognition. Although this process is often automatic, priming can also be guided by the use of specific strategies to achieve a particular task goal. For example, one could prospectively generate a number of potential targets based on the prime, or retrospectively check whether the target is related to the previously displayed prime.

Words are read faster when they are preceded by a semantically related vs. unrelated word. Photo: TimHesterPhotography/iStock/Thinkstock.

Heyman et al. (online first, *JEP:LMC*) used a dual-task paradigm to assess the extent to which these two different priming strategies (prospective, retrospective) require working memory resources. Participants were shown a simple (four dots in a line) or complex (four dots randomly placed) dot pattern that they had to hold in memory while completing a lexical decision task. On each lexical decision trial, a prime-target pair was presented, and participants had to indicate whether the target was a word or non-word as quickly and accurately as possible. On 60% of the trials, the prime and target were semantically related in one of three ways: forward

associate (e.g., panda-bear), backward associate (e.g., ball-catch), and symmetric associate (e.g., answer-question). Responses were faster to targets preceded by backward and symmetric associate primes compared to unrelated primes regardless of dot pattern complexity. In contrast, a priming effect was only observed for forward associate pairs when the dot pattern held in memory was simple, not complex. These results led the authors to conclude that forward associate priming based on prospective processes depends on working memory, whereas backward associate priming based on retrospective processes is relatively effortless.

Like Heyman et al., in most lexical decision experiments, participants respond by button press to single words presented in isolation. However, in the real world, words are encountered in the context of reading, and successful word recognition is signaled by moving the eyes to the next word. An important question is whether the same semantic priming processes identified in button press experiments with isolated words apply to more ecologically valid reading contexts. Hoedemaker and Gordon (online first, *JEP:HPP*) tracked participants' eye movements while they read three words in sequence using a gaze-contingent viewing procedure where each word was only visible when it was fixated for the first time. Gaze duration for middle words was faster when the preceding word was semantically related vs. unrelated, indicating a semantic priming benefit in reading times. However, the priming effect in gaze duration was larger when participants were asked to make responses to non-words as soon as they were detected during reading (immediate lexical decision) vs. when participants indicated whether or not they detected non-words after reading all three words (delayed lexical decision). Moreover, the priming effect in gaze duration was larger for trials with the slowest reading times, suggesting a strategic use of primes when word recognition was difficult. In contrast, priming effects in button press responses typically do not vary based on response time, implying a more general and automatic facilitation process. These results indicate that the influence of semantic variables on word recognition processes are sensitive to task goals (immediate or delayed lexical decision task) and response mode (button press vs. eye movements).

Other interesting reading: Staugaard & Berntsen (2014, *JEP:G*) examine how cue discriminability at retrieval and emotional arousal at encoding influence involuntary, intrusive memories of negative emotional events. Leal & Yassa (2014, *BehavNeuro*) suggest that older adults remember emotional experiences with higher fidelity than neutral events.

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