Available online at www.sciencedirect.com
SCIENCE DIRECT®
Journal of Memory and Language 52 (2005) 526–534
Journal of Memory and Language
www.elsevier.com/locate/jml

Illusions of knowing: Metamemory and memory under conditions of retroactive interference ☆

Deborah K. Eakin *

Georgia Institute of Technology, School of Psychology, J.S. Coon Building, 654 Cherry Street, Atlanta, GA 30332-0170, USA

Received 23 December 2004; revision received 5 January 2005
Available online 8 March 2005

Abstract

The present experiments represent a phenomenon in which people experienced an *illusion of knowing* such that they were overconfident in their ability to remember information they subsequently were unable to recall. Semantic associates of cues served as targets and were studied during the original and interpolated study phases of a retroactive interference paradigm in either an intralist (cue-target together) or extralist (targets alone) cueing procedure. The paradigm was modified to include a prediction-of-knowing (POK) metamemory phase during which people predicted their performance on a subsequent recall test. Memory performance was worse when the cue was repaired with a second semantic associate (interference condition) than in the control condition. However, POKs were more positive in the interference condition. Even when people were told not to base their predictions on any information from the second list and were specifically told which information to eliminate from consideration (Exp. 2), they were unable to do so. The findings are discussed in terms of potential sources of metamemory predictions.

Keywords: Metamemory; Memory; Retroactive interference; Metacognition; POKs; Predictions

How do predictions of knowing (POKs), that is, predictions made just prior to retrieval, vary with interference, a factor that has been demonstrated to negatively impact recall (e.g., see Crowder, 1976 for a review; McGeoch, 1942; Osgood, 1946, 1949)? The evidence concerning the effects of interference on metacognition, while scant, is also mixed. On the one hand, some experimental investigations find that people's predictions follow the same pattern as recall. Other experiments, however, show a dissociation between people's metacognition and their memory. A study by Schreiber and Nelson (1998) suggests that POKs follow the same pattern as recall in response to interference from preexisting semantic associates of the cue, or *cue set size*. According to Schreiber and Nelson, cues with a large set size produce greater interference than those with a small set size because associates of the cue other than the target compete for sampling at retrieval (e.g., PIER 2, Nelson, McKinney, Gee, & Janczura, 1998). Cues with a large number of associates result in more competition and thus, greater potential interference than those with a small number. Schreiber and Nelson tested the idea by having participants study a list of target words. Next, in an extralist cueing procedure, they were provided with cues that were semantically related to one of the target

☆ The author acknowledges Thomas A. Schreiber for comments and suggestions. In addition, the author thanks Ruth Maki for her helpful comments during the early stages of the experimental design.

* Fax: +1 404 894 8905.
E-mail address: deborah.eakin@psych.gatech.edu.

0749-596X/$ - see front matter © 2005 Elsevier Inc. All rights reserved.
doi:10.1016/j.jml.2005.01.009

words on the study list, and provided a POK about future recall for the related target. For instance, if they had studied FROG on the list, they were presented with the cue word TOAD, and asked to rate whether they would be able to recall its related target. After providing POKs, each cue was presented again and participants attempted to recall the target. Half of the cues presented had a small number of semantic associates and half had a large number. People gave lower predictions that they would recall targets that were cued with words with a large number of semantic associates, and they were right. Probability of recall was worse given large- than given small-set-size cues, reflecting the negative impact of interference from competing semantic associates on memory. As such, metamemory followed the same pattern as memory in response to interference. However, other experiments have demonstrated that metamemory and memory are dissociated under conditions of interference.

In apparent contrast to the findings of Schreiber and Nelson (1998) are studies demonstrating that peoples' metacognition is dissociated from their recall in an interference situation. A series of experiments by Metcalfe, Schwartz, and Joaquim (1993) showed a dissociation between metamemory and memory. Using classical proactive interference theory manipulations, participants studied a list of cue-target (A–B) word pairs after first studying a list of word pairs consisting of either the same cue-target pair (A–B), the same cue paired with a similar target (A–B′), the same cue paired with a different target (A–D), or a completely new cue-target pair (C–D), which served as a control condition. After studying both lists, participants were provided with the cue (A) and asked to retrieve the target from the second list (B). For targets they were unable to recall, participants made feeling-of-knowing (FOK) predictions about whether they would be able to recognize the target on a subsequent recognition test. According to interference theory, probability of recall should be lowest in the A–D A–B condition in which the cue is repaired with a different target, and this finding was obtained by Metcalfe et al. in all four of the experiments they reported. In addition, probability of recall was better in the A–B′ A–B condition than in the control condition and was best in the condition in which the target was repeated (A–B A–B). Both findings are consistent with Osgood's Surface Transfer (1949), which states that memory performance increases as similarity between targets on the original and interpolated lists increases, and is best in a condition in which the two targets are identical. In contrast, FOKs were never highest in the A–B A–B condition in any of the four experiments and never followed a pattern of results that was consistent with that of either recall or recognition. As such, people's metamemory was dissociated from their memory under conditions of proactive interference.

Chandler (1994) obtained a dissociation between people's confidence in their recognition memory performance and their actual performance under conditions of interference. Chandler used classical proactive and retroactive interference manipulations, but with pictures rather than words. Participants studied a series of nature pictures. Either before (proactive interference) or after (retroactive interference) studying the target pictures, participants studied a second set of pictures that consisted of either unrelated pictures or pictures that were very similar to the target pictures (e.g., both were both were pictures of a lake scene). Then participants were presented a recognition test on which they had to distinguish between the target picture and a novel picture. Finally, participants rated their confidence in the accuracy of their selection. The results of a meta-analysis of 14 studies reported by Chandler indicated that even though the effect on memory of studying a similar picture often was null, participants always provided higher confidence judgments when they had studied a similar rather than an unrelated target picture. Even in the cases in which studying a similar picture resulted in retroactive interference, participants were more confidence in their memory performance when they studied a similar picture. As such, the Chandler experiments provide another example of a dissocation between metamemory and memory, this time under conditions of retroactive interference.

Maki (1999) also examined the impact of retroactive interference on metamemory and memory, but obtained different findings than Chandler (1994). Using a classical retroactive interference paradigm, Maki had participants learn a list of number-triad cues paired with nouns (e.g., 261—FARMER). The participants then learned a second list of pairs consisting of the same cue repaired with a semantic associate of the first-list target (e.g., 261—FIELD) in the same-associates (SA) condition, an unrelated target in the same-different (SD) condition (e.g., 261—LAMP) and completely new pairs in the different–different (DD) condition (e.g., 752—SON), which served as control. Next, each cue was presented and participants made judgments of learning (JOLs) and then attempted recall of the target. Finally, they provided FOKs for items they were unable to recall. In a comparison between both the SA and SD conditions and the DD control condition, JOLs and FOKs followed the same pattern as recall. Retroactive interference effects were obtained such that probability of recall was better in the DD than in the SD condition, and predictions also were higher in the DD than the SD condition. Probability of recall was better in the SA condition than in the DD condition, a finding that is comparable to that obtained by Metcalfe et al. showing that memory performance was better in the condition in which the first- and second-list targets were similar, and is consistent with transfer theory (e.g., Osgood, 1949). With regard to