The Effect of Modality and Warning on False Recognition

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Have you ever experienced the Mandela effect? The Mandela effect occurs when multiple people share false memories. For example, many people remember the peanut butter brand as “Jiffy”, but actually, it is “Jif.” More examples of the Mandela effect include falsely remembering Curious George to have a tail, the Monopoly Man to have a monocle, and the beloved cartoons being titled *Looney Toons* when it is actually *Looney Tunes*. How is it possible that such large portions of the population share false memories? False memories have been of interest to psychologists for a long time. More explicitly, false memories are remembered events that differ from how the event actually occurred or are fabricated memories that never happened at all. These false memories can exist vividly in a person’s mind and are often recalled confidently. Memories of past experiences can greatly influence decision-making and judgment formation. This may lead to false testimonies given with high confidence in legal situations, resulting in severe and potentially unjustified life consequences for numerous individuals. Therefore, determining what can influence, and ideally reduce, the creation of false memories is worth researching. This study explores the interaction between modality and warning on rates of correct and false recognition of studied words.

In 1959, James Deese pioneered the creation of materials that are commonly utilized to study false memories. He developed a series of word lists – each consisting of 12 words closely relating to a critical, nonpresented word – which tend to elicit the false recall of the critical lure words with varying degrees of success. In 1995, psychologists Kathleen McDermott and Henry Roediger developed six lists of associate words for the six target words from Deese’s materials that resulted in the highest intrusion rates. Roediger and McDermott replicated Deese’s findings and extended his paradigm to recognition tests; they found that recognition tests, given in the absence of preceding recall, led to a decrease in accurate recognition of studied words and produced remarkably high rates of false recognition for critical lure terms. The false recognition rate for critical items approached the hit rate, and these critical items were frequently identified with high confidence (Roediger & McDermott, 1995). These results suggest that recognition testing alone may lead to higher susceptibility to creating false memories. This methodology for examining false memories became known as the Deese-Roediger-McDermott (DRM) paradigm. However, it is unclear whether preliminary knowledge of natural susceptibility to creating false memories in the DRM paradigm can reduce rates of false recognition.

Recognition tests alone lead to higher levels of falsely remembering critical lure terms in the DRM paradigm. Could awareness of the existence of critical lure terms, and explicit warnings to avoid them, reduce how often participants falsely recognize these terms? Gallo, Roberts, and Seamon explored precisely that. They recruited 48 undergraduates at Wesleyan University for their study. Each was placed in one of the three forewarning conditions: uninformed, being urged to minimize all false alarms, and forewarning about falsely recognizing critical lures. The hit rate for the uninformed group was higher than those for the cautious and forewarned groups. Compared with uninformed and cautious subjects, forewarned subjects reduced their false alarm rate for critical lures (Gallo, Roberts, et al., 1997). These results demonstrate that although forewarning did not eliminate false recognition, it slightly decreased it. Forewarning seemed to diminish the false recognition effect but did not prevent susceptibility to the memory illusion. In 2001, Jeffery Neuschatz led a study to assess if warnings of varying strengths, given immediately prior to recognition testing, could reduce the false memory effect. 131 total introductory psychology students across New York were assigned to either receive no warning, a moderate warning, or a strong warning right before recognition testing. They found no effect of warning strength on the correct recognition of studied items or false recognition of critical lures (Neuschatz et al., 2001). These results suggest that warnings may be ineffective in preventing illusory memories when given *after* the word lists are presented. Jerwen Jou’s research found evidence that subject-initiated corrective adjustments facilitated via a two-alternative force choice test are more effective at reducing the false recognition of critical lures compared to explicit warnings given by the researchers (Jou et al., 2018). Thus, prior research has produced mixed results about the effectiveness of warnings in reducing the false recognition of critical lures. Exploring warning effects naturally led psychologists to wonder if other aspects, like presentation modality, could influence the creation of false memories.

Prior studies indicate that manipulating features of the DRM paradigm, like providing warnings, may help reduce false recognition. Scientists have theorized that the presentation modality of the word lists, visual or auditory, may also impact the rate of correct and false recognition. In 1998, Rebekah Smith and Reed Hunt designed experiments to determine if and how modality plays a role. 20 volunteers were recruited and randomly assigned to visual or auditory presentation conditions. Their results showed that false identification of critical lures was reliably higher following auditory presentation than visual (Smith & Hunt, 1998). Their findings indicate that the production of false memories in recognition depends on the manner of original list encoding. To further investigate this topic, Gallo studied the effect of manipulating modality within-subject by randomizing the presentation method for each list, for each participant. This study found extremely robust levels of false recognition across both modalities. Additionally, false alarms for critical items were equal to hit rates for list items in all conditions. They also reported no modality effect on recognizing list items and only a small modality effect on falsely recognized critical lures, with visual presentation leading to slightly less frequent false identification. (Gallo, McDermott, et al., 2001). These studies imply that visual presentation may reduce false memories compared to auditory presentation, but these modality effects are most prevalent when manipulated between-subject rather than within-subject. Although psychologists have manipulated many elements within the DRM paradigm to see their effect on creating false memories, certain combinations of effects have yet to be considered.

The creation of false memories in the DRM paradigm has been abundantly replicated and studied. Previous research has focused on the effects of modality and warning on correct and false recognition when manipulated independently. However, the interaction between modality and warning has been left unexplored thus far. This study aims to investigate the simultaneous manipulation of modality and warning in the DRM paradigm and identify whether an interaction between modality and warning exists. The following hypotheses will be tested in this study:

1. There is no difference between visual and auditory list presentation on correctly recognizing studied list items. [No modality effect on correct recognition.]
2. Warnings given prior to word list presentation will result in a slight decrease in correct recognition. [Small warning effect on correct recognition.]
3. Warnings will have little to no effect on correct recognition when lists are presented auditorily, but will have a slightly stronger effect on correct recognition when lists are presented visually. [Interaction between modality and warning on correct recognition.]
4. Visual presentation will slightly reduce false recognition of critical lure terms compared to auditory presentation. [Small modality effect on false recognition.]
5. Warnings given before word list presentation will slightly decrease the false recognition of critical lure terms. [Small warning effect on false recognition.]
6. Warnings will slightly decrease the rate of falsely recognized critical lure terms for auditory presentation, but warnings will drastically decrease the rate of falsely recognized critical lure terms for visual presentation. [Interaction between modality and warning on false recognition.]

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