



# Verbal Fluency Effects on False Memories in Adults

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## ABSTRACT

We examined the impact of verbal fluency on the creation of false memories using the Deese/Roediger-McDermott (DRM) paradigm. Participants were presented with four DRM lists at encoding and later tested on their memory for those words. Participants then completed the Controlled Oral Word Association Test (COWAT) to measure levels of verbal fluency. Experiments 1 and 2 found no significant differences in critical lure recognition between the high and low fluency groups. However, Experiment 1 did find higher recognition of critical lures compared to list items, indicating greater activation of critical lures than list items for the high fluency group. Several potential explanations are discussed.

## INTRODUCTION

The most common way of investigating false memories is by using the Deese/Roediger-McDermott (DRM) paradigm. The DRM paradigm involves presenting a series of words (e.g., *bed, rest, wake, tired, snooze*, etc.) to participants that are all associates of a particular non-presented word (e.g., *sleep*) and then evaluating their memory for the listed words. Studies have shown that individuals remember the words that were presented on the lists as well as the non-presented, critical lure. In fact, critical lures are often remembered at the same rate as words that were actually presented in the list (Roediger & McDermott, 1995). Memory for these critical lures provide an illustration of false memories.

The Activation Monitoring Theory (AMT) has been proposed to explain this effect (Roediger et al., 2001). When a list word is presented, other associated words are thought to also become activated. This activation results in participants falsely believing that certain words (i.e., the critical lures) were presented since the critical lure is activated when each list item is presented.

Findings have also shown that children are less likely to recall and recognize the critical lures compared to adults (Anastasi & Rhodes, 2008). Using the AMT, researchers have argued that children produce fewer false memories than adults because of their limited associative word network. In other words, their limited vocabulary leads to fewer associations between words and concepts when a word is presented to participants. These reduced associations lead to less activation of the critical lure and therefore lower levels of false recognition. Based upon this information, the current study evaluated if a similar pattern emerges in adults with differing levels of verbal fluency, which will also determine if this differential level of activation predicts the occurrence of false memories.

Thus, we expected that individuals who scored high on verbal fluency would be more susceptible to false memories due to their larger associative word networks. Those participants with lower verbal fluency, with their presumably smaller associative word network, were expected to produce fewer false memories, as critical lures would be less likely to be activated.

## EXPERIMENT 1

### Participants

- Undergraduate psychology students who participated had an average age of 23 years.
- Participants were placed into verbal fluency groups based on their fluency scores from the COWAT. Thirty participants were classified as having high verbal fluency (average COWAT score of 125.97), and 30 were classified as having low verbal fluency (average COWAT score of 72.93).

### Design

- The current study utilized a 2 (Verbal Fluency: high, low) x 2 (Item Type: list item, critical lure) mixed-factor design with Verbal Fluency treated as a between-subjects manipulation and Item Type was manipulated within-subjects.
- The dependent variable was the proportion of words recognized.

### Materials and Procedures

- Participants were first presented with four DRM lists. Eight DRM lists from Stadler et al. (1999) were used for the encoding study list. Presentation A consisted of the *cold, anger, chair, and thief* lists, and Presentation B consisted of the *rough, sleep, smoke, and mountain* lists. The lists were counterbalanced so that each served equally often as a presented or non-presented list. Each list consisted of 15 words, and each word was presented for 2 s with a blank slide shown for 0.5 s between each word.
- Following a filler task, participants were presented with the recognition test, where they were asked to indicate if they remembered each word from the encoding presentation. This test consisted of 32 words (12 presented items, 12 non-presented items, four presented critical lures, and four non-presented critical lures) for 5 s each.
- After the recognition test, participants completed the COWAT. Participants were given 2 minutes per prompt to write down as many words as they could for the letters *S, F, and A*, and for the *animals, fruits, and flowers* categories.

## Results

*Proportion of Words Recognized for Low and High Verbal Fluency Groups*

Verbal Fluency	Categories		Letters	
	List Items	Critical Lures	List Items	Critical Lures
Low	0.51	0.58	0.42	0.51
High	0.48	0.61	0.55	0.66

- Results showed no difference in critical lure recognition for the low and high fluency groups based on either category or letter fluency scores. There was also no difference in critical lure recognition when categorizing participants into fluency groups using a combined fluency score that was based on both the letter and category COWAT scores.
- However, participants high in verbal fluency for both the category and letter fluency groups did recognize critical lures more than they recognized list items, indicating significant activation of critical lures for the high fluency group.

## EXPERIMENT 2

- The methodology and design for Experiment 2 was the same as Experiment 1, except that words reported by participants for the COWAT were said aloud within 1 min and recorded for later transcription, which was consistent with the original COWAT.
- For Experiment 2, participants had an average age of 22 years. Forty-four participants were classified as having high verbal fluency (average COWAT score of 97.29) and 44 were classified as having low verbal fluency (average COWAT score of 61.03).

## Results

*Proportion of Words Recognized for Low and High Verbal Fluency Groups*

Verbal Fluency	Categories		Letters	
	List Items	Critical Lures	List Items	Critical Lures
Low	0.55	0.47	0.52	0.48
High	0.55	0.53	0.58	0.55

- No difference was seen between the critical lure recognition for fluency groups when including letter and category scores combined or when assessing letter fluency and category fluency separately.

## DISCUSSION

- Experiment 1 found no significant difference in recognition of critical lures between the high and low verbal fluency groups but did find that participants high in verbal fluency for both category and letter recognition recognized critical lures more often than list items. As participants in the low verbal fluency group did not show this same difference, this indicated that individuals with high verbal fluency showed greater activation of critical lures compared to list items.
- Experiment 2 also found no significant difference in critical lure recognition between the high and low verbal fluency groups. Additionally, we did not replicate the finding of critical lure recognition being higher than list item recognition for the high verbal fluency group.
- The findings of our study suggest that verbal fluency, as measured by the COWAT, may not predict the level of false memories when using the DRM paradigm in adults. This may indicate that verbal fluency differences may not provide an adequate explanation for false memory, or it may indicate that the differences in adult verbal fluency are not robust enough to find differences in false memory creation using the DRM paradigm.
- Another possibility is that letter and category fluency, as measured by the COWAT, is not the same type of fluency that leads to false memory activation in the DRM paradigm. Interestingly, this would be inconsistent with the gist explanation from fuzzy-trace theory.