

Difference in reaction times between true memories and false memories in a recognition task



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Abstract

Roediger and McDermott (1995) showed that false memories for words can be generated by showing a list of words to research participants, then asking them to recognize some of those words on a new list that also contains words semantically related to the original words but not present on the first list. Participants often think the semantically related words appeared on the first list. I will use a similar recognition task with twenty participants and measure their reaction times to words from the original list and to words frequently believed to have been on that list. I will induce false memories using lists of words that Roediger and McDermott have shown robustly produce the effect. I will use lists of words known to produce false memories with varying degrees of probability. I expect to find slower "false memory" reaction times compared to "real memory" reaction times, and that the degree of difference varies as a function of a list's ability to induce false word memories. Such a result would support the idea that different mechanisms are at work when people have false versus real memories.

Key words: false memory, reaction time, false memory effect, memory storage mechanisms.

Introduction

In theory there is a suggestion that false memories are created due to the action of 3 factors:

- There are social demands on individuals to remember. For example, researchers may exert some pressure on participants in a study to produce memories whether or not they can..
- Memory construction by imagining events can be explicitly encouraged when people are having trouble remembering.
- Individuals can be encouraged not to think about whether their constructions are real.
- Creation of false memories is most likely to occur when these external factors are present
- False memories are constructed by combining actual memories with the content of suggestions received from others. During the process, individuals may forget the source of the information. This is a classic example of source confusion, in which the content and the source become dissociated. Loftus, E (1997)
- If false memories differ from real memories, they may have a different physiological basis for them. RT may be an indicator of the physiological difference.

Hypothesis

- RT differs during recognition of actually presented stimuli versus false recognition of stimuli not actually presented, even if they are semantically related to presented stimuli.
- There is a difference in RT between false memories that are semantically connected to stimuli that are really shown and those which are not semantically connected stimuli in a memory list.

Previous studies

- Roediger & McDermott (1995) did an experiment modeled on a study done by Deese (1959) that revealed remarkable levels of false recall and false recognition in a list learning paradigm.
- What they did in experiment 1, subjects studied lists of 12 words (e.g., bed, rest, awake); each list was composed of associates of a non-presented word (e.g., sleep). In Experiment 2, a false recall rate of 55% was obtained with an expanded set of lists, and on a later recognition test, subjects produced false alarms to these items at a rate comparable to the hit rate.
- The results reveal a powerful illusion of memory: People "remember events that never happened." (Roediger, H. L., III, & McDermott, 1995)

The figure and tables shown below are results from Roediger and McDermott (1995).

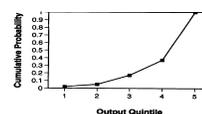


Figure 2. Result of the critical intrusion as a function of output position in recall. Quantile refers to the first 20% of responses, the second 20%, and so on.

Table 1
Recognition Results for Experiment 1: The Proportion of Items Classified As Sure Old (a Rating of 4), Probably Old (3), Probably New (2), or Sure New (1) and the Mean Ratings of Items As a Function of Study Status

Study status	Old				New				Mean rating
	4	3	2	1	4	3	2	1	
Studied	.75	.11	.09	.05	.05	.05	.05	.05	3.6
Nonstudied	.00	.02	.18	.80	1.2				
Unrelated lure	.04	.17	.35	.44	1.8				
Weakly related lure	.58	.26	.08	.08	3.3				
Critical lure									

Table 2
Recognition Results for Studied Items and Critical Lures in Experiment 2

Item type and condition	Proportion of Old responses		
	Overall	R	K
Studied			
Study + recall	.79	.57	.22
Study + arithmetic	.65	.41	.24
Nonstudied	.11	.02	.09
Critical lure	.81	.58	.23
Study + recall	.72	.38	.34
Study + arithmetic	.72	.38	.34
Nonstudied	.16	.03	.13

Note. R = remember judgment; K = know judgment.

Pictures are taken from Roediger and McDermott article 1995.

Method

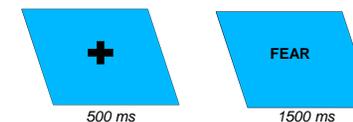
- I will use a word recognition task
- The same stimuli that were used by Roediger and McDermott will be presented to participants.
- 14 words will be shown without two key words, and in the next block participants will answer whether the presented words have been shown before.
- The stimuli in the second block are the two key words that haven't been presented in the previous block; the two that are contextually closely connected with them (not shown before) and two that aren't but were presented before as well as two words that aren't contextually connected and hadn't been shown before.

In the table below you can see examples of the stimuli

Anger	Black	Bread	Chair
mad	white	butter	table
fear	dark	food	sit
hate	cat	eat	legs
rage	charred	sandwich	seat
temper	night	rye	couch
fury	funeral	jam	desk
ire	color	milk	recliner
wrath	grief	flour	sofa
happy	blue	jelly	wood
fight	death	dough	cushion
hatred	ink	crust	swivel
mean	bottom	slice	stool
calm	coal	wine	sitting
emotion	brown	loaf	rocking
enrage	gray	toast	bench

Procedure

The experiment setup would look like on the picture below. On a screen would first be shown a fixation cross and after that a stimuli word would be shown on the screen



- Words would be shown on the screen and participants would answer by pressing the appropriate key for yes and for no.



- Reaction time for answers would be recorded
- RT for stimuli that were previously presented and for the stimuli that weren't would be compared
- Data would be computed in SPSS
- We would use ANOVA to determine if there is a difference in RT between the key words, presented words contextually connected to the key words, non connected but shown and non shown/non connected.

Expected results

- I expect a difference in RT between true and false memories.

Significance of the study

- A result that would show a difference in RT between recognizing shown and unshown words would indicate different mechanisms in our cognitive system that underly false versus real memories.
- This result would suggest new questions. For example, does this false memory effect occur because of our ability to associate words semantically? Is association the basis of this phenomenon? How large is the influence of priming on the creation of false memories.
- In regard to practical value, this kind of a result could be used for commercial and clinical purposes. For example, it may suggest instruments that enable fine discrimination between our own memories and false memories created by therapeutic procedures.

References

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