Implicit Memory versus False Memory

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Background

An unfortunate fact of life is that a person in a position of power does not always have the best interests of those under him or her in mind. A particularly unfortunate example is a therapist who would rather believe that a young woman was raised in a satanic cult and convinces his patient that this really is what happened, despite a complete lack of evidence (Schacter, 1996). This example is only one of many; there are many cases of patients recovering memories with the help of therapists only to later discover that these "memories" were not at all true. Yet these patients completely believed those memories until the mountain of evidence against them simply grew too big. It is because of these cases that researchers became interested in how the mind comes distort real memories in order to accommodate false ones.

Even though Freud and others have studied repressed memories, the study of false memories as a cognitive process has only recently come to the attention of researchers. Schacter (1996; Loftus, 1993 tells a similar tale) reviews one account of the history: In 1990 George Franklin was convicted of the 1969 homicide of his daughter's friend Susan Nason. The conviction was based almost entirely upon repressed memories which his daughter claimed to have recovered. Regardless of whether or not the allegations were true, many questions arose as to whether these memories were in fact real. Even if the memories were not real, Franklin's daughter truly believed them to be. This case sparked many—by 1992 the number of lawsuits based upon the recovery

of repressed memories had grown to such a great number that parents joined with professionals to form the False Memory Syndrome Foundation. Within four years of its founding, the Foundation had been contacted by 17,000 people about repressed memory cases (Schacter, 1996).

In discussing the recovery of repressed memories, several cognitive questions arise: Is it even possible to repress a memory of a tragic event? If so, is it possible to recover those memories at a much later date? How do you tell the difference between a truly recovered memory and a memory which was merely suggested by the process of attempted recovery? It is this last question which I will investigate.

False Memory

Roediger and McDermott (1995) describe a method of creating false memories known as the Deese-Roediger-McDermott method. One simply presents a list of semantically-associated words—for example, a list of words relating to "needle"—and then asks the participant whether they remember seeing words in the list they were presented. Participants are rather likely to report having seen the word "needle" even though they did not actually see that word. This is technically a form of false memory, but it is not quite implanting an entire false episode simply by describing it. I believe that to further investigate the "recovered" memory situation, we need to look at memories which were introduced in ways similar to what happens in the court room.

Wells and Bradfield (1998) presented participants with a grainy video of a man in a Target Store which was used as evidence in an actual murder case. Participants were only informed that the man in the video murdered someone after viewing the video. Participants had to choose the suspect from a set of lineup photos. The photo of the real suspect never appeared in the lineup. After participants made an identification they were randomly assigned to receive confirming feedback ("Good. You identified the actual suspect"), disconfirming feedback ("Actually, the suspect was number __"), or no feedback. The fact that participants were not told that the suspect may not actually be in the lineup (which occurs in real eyewitness lineup identifications) combined with the fact that the actual suspect was not in the lineup led to a 100% false identification rate.

After the feedback was given and a short time had passed, the participants were asked a series of questions about their confidence at the time of identification, how good of a view they had of the suspect's face, how long it took them to identify the suspect, and other similar questions. Participants had more confidence in their identification when confirming feedback was given, while disconfirming feedback did not lower confidence very much at all. Further experiments corroborated this and demonstrated that the participants were not even accurate in reporting their own ability to identify the suspect —for example, some participants believed they had instantly identified the suspect with full confidence. The experimental method used by Wells and Bradfield (1998) as described above has come to be known as the False Feedback paradigm.

Implicit Memory

It is possible that people with implanted false memories may still retain implicit, or unconscious, memory of the real events which happened (Schacter, 1996). This possibility dates all the way back to Freud and Breuer, who initially believed that the fears, images, and anxieties that their patients exhibited in response to certain stimuli were the result of an implicit memory for an event which really happened—which the patients had blocked out or covered up in their explicit memory. Freud later abandoned this view in favor of the possibility that these implicit memories were the result of dreams and the unconscious, but today Terr and other therapists still believe that implicit memories may be retained (Schacter, 1996).

While not directly implicit memory, one implicit learning paradigm which involves visual memory is Contextual Cueing. Chun and Jiang (1998) presented participants with a visual search task, such as the one in Figure 1 where participants must find the rotated "T" among rotated "L"s. The participants would then press one key if the "T" was facing right, and another if it was facing left.

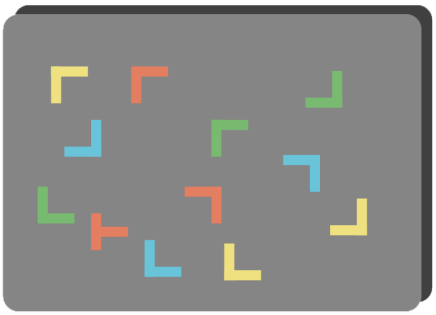

Figure 1. Typical Contextual Cueing display

Half of the spatial configurations were essentially random and were never repeated again, but the other half of the displays were repeatedly presented, spaced apart by many trials. The participants were not aware of the repetition (even in post-

experiment interviews). Reaction time was measured for each trial, and as spatial configurations were repeated, reaction time decreased.

In Chun and Jiang's (1998) initial paper, they explored many things to be certain that this was implicit learning and not some other effect. For example, they changed all of the distractors from "L"s to "S"s halfway through the experiment and still managed to get the effect. They tried varying the target locations while maintaining the distractor locations, in case participants were merely learning the "map" which allowed for a faster search to find the target, rather than remembering target location within a particular map. Chun and Jiang did not see the reaction time decrease, meaning there was no contextual cueing effect. They also tried maintaining all spatial positions but swapping a distractor and the target. They still failed to see the reaction time decrease. This is further evidence that contextual cueing is based on some deeper representation than merely learning the map.

Chun (2000) more recently published a paper in which he reviews all of the Contextual Cueing work which he and Jiang have done. Chun's focus seems primarily on visual processing, so he admits there are avenues of Contextual Cueing which have yet to be explored. One of the questions he asks is, "Are there other measures to test whether memory for context is implicit or explicit?"

Proposed Experiment

With Contextual Cueing and False Feedback in mind, I propose an experiment to attempt to figure out whether implanted false memories affect implicit memory.

Participants

This experiment should seek participants similar to those used in the Contextual Cueing experiments. Participants should have fairly normal color vision, and normal or corrected vision.

Design

Stimuli can be as defined by Chun and Jiang's (1998) experiment 1. The target is a "T" rotated 90 degrees to the left or to the right. Participants will press keys corresponding to the direction the "T" is pointing. Distractors are 11 "L" shapes rotated 0, 90, 180, or 270 degrees. Colors are randomly assigned with an equal number of targets in each color. An example is Figure 2.

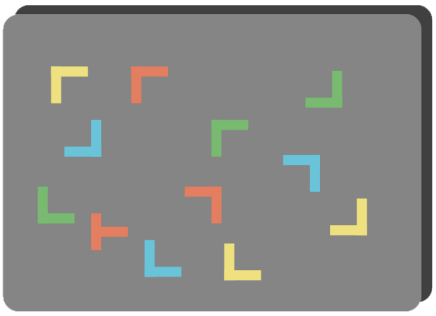

Figure 2. Typical Contextual Cueing display

Spatial configurations are divided into either Old or New. The Old spatial configurations are preserved throughout the experiment, while the New configurations are never repeated—they are randomly generated. Half of the Old configurations will be randomly selected to be used during the middle phase of the experiment. During that phase, participants will be asked to identify which location the target typically appears in. The computer will provide either confirming feedback ("Yes, the target

appears in location 1") or disconfirming feedback ("No, actually, the target usually appears in location 3") preselected at random. The actual target location has been replaced by a distractor, to ensure a 100% false alarm rate (again, as in the False Feedback paradigm as performed by Wells and Bradfield (1998)). The three numbered locations are actually locations of distractors. Figure 3 demonstrates a typical numbered-display version of Figure 2.

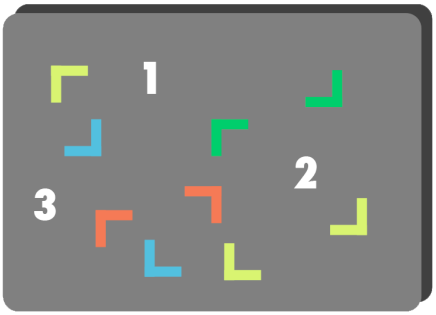

Figure 3. Numbered display for False Feedback use.

Procedure

The experiment begins like a typical Contextual Cueing experiment, with participants identifying the direction of the target "T"s by pressing a key for left or a key for right. Once the experiment is halfway complete, the participants will take a short break and then the computer will present the numbered spatial configuration displays (as in Figure 3), asking the participant to "Guess where a target might appear if you were presented with this display". As specified in the Design section, False Feedback (confirming or disconfirming) will be provided. Since the real target has been replaced with a distractor, the identification and feedback will always be incorrect.

The typical Contextual Cueing task will continue, with Old spatial configurations as they originally appeared in the first half of the experiment. The resulting measure is Reaction Time in identifying the target direction.

Expected Results

False Feedback researchers who believe that false memories affect implicit memory (not all False Feedback researchers do) would predict that the spatial configurations which have been confused by false feedback would elicit slower reaction times—likely slower than even the new spatial configurations. This viewpoint is supported by the fact that amnesiacs are known to not show the Contextual Cueing effect (Chun & Phelps, 1999).

If false memory does not affect the implicit memory involved in Contextual Cueing, however, reaction times should proceed exactly as in a regular Contextual Cueing experiment.

Further experiments could attempt to replace the computerized display section with verbal human communication, as in regular False Feedback experiments, but this will be more difficult because the spatial locations will have to be described verbally.

A statistically powerful outcome of this experiment would help point the direction for future research in the split between implicit memory and false memory. If this implicit learning task seems to remain unchanged by the false feedback the participants received, further research could determine exactly which kinds of implicit memory remain intact—one day researchers may even be able to figure out a set of experiments which could be performed to determine whether the implicit memory matches the false memory. If, however, the implicit learning in the Contextual Cueing effect is affected by the false feedback, the future does not seem as bright for false memory researchers.

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