An Experimental Investigating the Effects of Leading Questions on False Memory Creation Regarding a Series of Images

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This experiment tested the effect of leading questions on the creation of false memories of images. Subjects were presented with a series of images, followed by questions containing keywords. The keywords used in the experimental group had stronger connotations than those used in the control group. It was hypothesized that the use of words with a stronger connotation would cause subjects to create more false memories of objects that were not actually in the pictures. The independent variable was the connotation of the keyword used in the question, and the dependent variable was the number of objects falsely remembered by subjects. This experiment was an independent sample design. The results of the experiment supported the research hypothesis; a t test was used showing that the results were significant at p < .05. The results show that the use of words with stronger connotations can cause people to create more false memories.

Human beings are able to create and form strong beliefs in false memories. They may claim to remember events that never happened or to have experienced situations they have not. The use of leading questions, or misinformation, may increase the chance that a person will create a false memory. This possibility has led to much debate over psychotherapeutic techniques, which often use leading questions to prompt the patient to remember childhood traumas.

Freud’s often-debated theory of repression has recently gained even more attention from psychologists, lawmakers, and the general public due to the use of recovered memory as evidence in cases of child abuse. Recovered memories play a role in legal cases, as suspects are sometimes indicted based solely on the recovered memory of a victim. The ability of these “repressed” memories to be accurately recalled at a later time has recently come under scrutiny; as some believe that so-called “recovered” memories are actually false memories created by the patient. The validity of repressed memory recovery must be ascertained in order to determine whether or not these memories should be admissible as evidence in cases of child abuse, other childhood trauma or as eyewitness testimony. A conclusive determination of the legitimacy of these memories may also have an effect on psychiatric treatment; as many therapists currently use memory recovery techniques in treatment sessions and encourage patients to attempt to recall past episodes of distress or suffering. An assessment of the validity of memory recovery after memories have been repressed could indicate whether memories recalled during treatment are factual or simply created by the patient as a response to pressure from the therapist.

Psychological experiments have shown that humans have a tendency to create false memories when presented with information that leads to a certain conclusion. For example, in Chan and McDermott’s (2006) experiment, when presented a phrase like “the shelf weakened under the weight of the books,” many people remembered the word broke in place of the word weakened. While it may seem logical to assume that a shelf would break under weight, this was
not the information provided to the participants of this experiment. This shows the tendency of
the human brain to make conclusions based on little or no actual evidence and to make
assumptions when provided with a memory cue that seems logical. A more famous experiment
on false memory run by Roediger and McDermott (1995) involved presenting subjects with a list
of words that centered around, but never explicitly mentioned, a certain topic. For example, the
topic word could be sleep, and the words in the list could be words including bed, awake, and
tired. In this experiment, a large percentage of people reported having heard the topic word in the
list, although it was not actually included. This experiment illustrates the inclination of people to
fill in gaps in information with other information that seems relevant. These experiments and
others (Gerrie, Belcher & Garry, 2006; Lyle & Johnson, 2006) provide strong evidence that
humans have the ability to create false memories and convince themselves of the veracity of
these memories. While it has not been shown through experimentation that humans can create
false memories without prompting; it has been shown that people tend to fill in gaps in
information, make connections that are not actually present in the evidence, and believe in past
events that never actually happened when told by others that the event occurred.

Loftus and Palmer (1974) conducted an experiment on the effects of word choice in
questioning on memory. In this study, subjects were shown a video of a car accident. Subjects
were asked one of two questions, “How fast were the cars going when they contacted each
other?” or “How fast were the cars going when they smashed into each other?” Subjects in the
smashed condition estimated the cars’ speed about 10 mph faster than those in the contacted
condition. Additionally, the subjects in the contacted condition were more likely to claim to
remember broken glass; although none was shown in the video. Loftus and Palmer’s study shows
that word choice in questioning can have an effect on subject recall.

In another experiment performed by Crombag, Wagenaar, and van Koppen (1996),
subjects were questioned about an airplane crash that had been highly publicized. Subjects were
asked the leading question, “Did you see the television film of the moment the plane hit the
apartment building?” More than half of participants reported having seen the film of the crash;
although no such film existed. The use of a leading question in this instance caused subjects to
“remember” a fictitious event.

A study run by Nourkova, Bernstein, and Loftus (2004) asked participants about their
recall of either attacks on Moscow apartment buildings or the attacks on the World Trade Center.
Six months later, the subjects were interviewed about the same events; they were also asked if
they remembered the wounded animal they had supposedly mentioned in the first study. Many
subjects claimed to recall the animal; though no one had mentioned it in the first interview.

The following experiment is modeled after Loftus and Palmer’s (1974) in that the
wording of the question is the only variable being altered. The goal is to alter the memories of
those in the experimental group through the use of words with stronger connotations. However,
this experiment will show a series of pictures rather than a video and use different questions. It is
predicted that the use of words with strong connotations will cause the subjects to create false
memories of pictures they have not been shown. The Research hypothesis (H1) is that the use of
leading questions containing words with strong connotations will increase the number of images
falsely recalled by subjects. Conversely the Null hypothesis (H0), assumes there will be no
significant difference in the number of false memory claims between those subjects given
leading questions and those who are not.
Effects of Leading Questions

Method

Participants
There were 15 participants in each group. All subjects were students at Mendham High School ranging between the ages of 14 and 18. Gender distribution was fairly equal. Subjects were selected by an opportunity sample with random allocation. This was necessary due to the inflexibility of class schedules. The sample was randomly selected in order to prevent experimenter bias.

Materials
Materials used included a Power Point slideshow including 20 pictures, a sheet with questions for experimental group (see Appendix A) and a sheet with questions for control group (see Appendix B). An Informed Consent form and a Debriefing form were also used.

Design and Procedure
This study was conducted as an experiment in order to allow the connotation of the key word in each question to be controlled. It used an independent samples design; this prevented subjects from seeing the pictures more than once, as this may have enhanced their memory of the pictures. The independent variable was the connotation of the key word being used in each question prompt. The dependent variable was the number of false facts the subjects claimed to recall about the pictures. Informed consent forms were signed by participants before the experiment began, and the subjects’ data remained anonymous. Participants were informed of their right to withdraw from the experiment and were debriefed after the study. The same pictures were used in the same order for each group and consistent timing was used in each slideshow. Subjects were asked to refrain from speaking throughout the experiment.

First, subjects were asked to sign informed consent forms. They were then read the instructions for the experiment. Subjects were shown a Power Point presentation containing a series of 20 pictures. These pictures were set on a slideshow with automatic timing so that each picture was shown for 10 seconds. Subjects were then given a sheet of 25, yes-or-no questions about details of the pictures. Different sheets were created for the control and experimental groups; as a key word in each question was changed between the groups. The key words used in the experimental group were chosen for their connotation in order to lead subjects to claim to remember false details from the pictures; while the key words used in the control group did not have strong connotations. Eight questions in each group asked about actual details from the pictures in order to prevent the subjects from figuring out the intent of the experiment. Subjects were debriefed following the completion of the study.
Results

Figure 1. The effects of Leading Questions on Number of Falsely Recalled Images

Figure 1 shows the number of falsely recalled images provided by each member of the experimental and control group. The graph in Figure 1 clearly shows a consistently higher rate of falsely recalled images in the experimental group than in the control.

In Table 1 it can be seen that the mean for the experimental group was 2.60, while the control group was 1.50. The mode was 2.00 for both groups. The median of the experimental group was 2.00 and that of the control was 1.00. The standard deviation was 1.25 for the experimental group and 1.17 for the control group.

Table 1

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<tr>
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<th>Experimental</th>
<th>Control</th>
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<tr>
<td>Mean</td>
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<td>1.5</td>
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<tr>
<td>Mode</td>
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<tr>
<td>Median</td>
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<td>Standard Deviation</td>
<td>1.25</td>
<td>1.17</td>
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A t-test for independent samples was to test the significance of the results. The value of $t$ was $2.44$ ($df = 29$). This test also showed the results to be statistically significant at $p < .05$ allowing the null hypothesis to be rejected.

**Discussion**

The results of this experiment support the experimental hypothesis in showing that false memories about visual data can be more easily created with the use of leading questions than with general questions. The measures of central tendency showed that subjects given leading questions claimed to remember more false details from the images than those given general questions, and the $t$-test showed these results were significant. The null hypothesis was successfully rejected.

These results support those of Loftus and Palmer (1974), which showed that questions containing a word with a stronger connotation led subjects to create stronger false memories. This experiment also supported the results of Crombag, Wagenaar and van Koppen (1996) and Nourkova, Bernstein and Loftus (2004), which showed that leading questions could cause subjects to create false memories.

The experiment had several strengths that allowed it to succeed. Subjects were kept uninformed of the purpose of the experiment so they would not attempt to memorize the images. However, this experiment did have several limitations. As the strength of the connotation of each keyword was subjective, some of the words did not have the intended effect on subjects’ memory creation. The fact that the subjects had just seen the images minutes before answering the questions ensured the images were still fresh in subjects’ minds, possibly preventing them from distorting memories of the images.

This experiment could have been improved by choosing more emotionally-charged images and questions, as these would have been more open to manipulation through leading questions and would have been more relevant to real-life examples, such as recovered memories of child abuse. However, such an experiment would have been inappropriate to run on high school students as it could potentially be upsetting. The experiment could also be improved by waiting a few days in between showing subjects the images and asking them the questions, as this would allow time for the subjects’ memories of the pictures to fade.

Some further research was implied by this experiment. Many subjects in the control group failed to remember objects that actually were in the pictures; it would be interesting to test whether very general questions cause people to, in effect, delete memories of detail. It would also be interesting to see if this same experiment would be as effective when giving subjects a different medium to recall, such as videos or stories.

The results of experiments such as this one could have a great impact on recovered memory therapy. Although recovered memory therapy has been largely discarded by most psychologists and psychiatrists, some persist in claiming the accuracy and usefulness of recovered memory therapy. Recovered memory therapy can indeed prove useful in some instances; for example, it could be used to find the cause of and cure for a person suffering from Post-Traumatic Stress Disorder. However, the risks of creating false memories even more traumatic than the original memories must be considered before this method is used. As false memories can easily be created through the use of a question containing a word with a strong connotation; therapists must be extremely cautious to avoid prompting false memory in patients. Experiments on false memory creation through the use of leading questions may eliminate the
use of leading questions in therapy or may eliminate the reliability of recovered memory therapy altogether.

While some recovered memories may be accurate, the case for false memory creation illustrates the necessity for extreme caution in therapy. The creation of false memories of abuse could cause rifts in families, leaving both the accuser and the accused emotionally damaged, and possibly even land innocent people in jail. Therapists must be extremely careful in using such suggestive or subjective techniques as leading questions, dream interpretation, or hypnotherapy in order to prevent creation of false memories that could lead to further psychological problems. Although recovered memory therapy could prove useful in some instances, the risks far outweigh the benefits.

References

Appendix A

Experimental Questionnaire given to subjects

Answer each question to the best of your ability. If you are unsure of an answer, take your best guess.
1. Do you remember seeing the blood in the picture of the murder scene?
2. Do you remember seeing the plate in the picture of the kitchen?
3. Do you remember seeing the moon in the picture of the skyline?
4. Do you remember seeing the gun in the picture of the soldier?
5. Do you remember seeing the cart in the picture of the grocery store?
6. Do you remember seeing the fish in the picture of the aquarium?
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7. Do you remember seeing the palm tree in the picture of the beach?
8. Do you remember seeing the gifts in the picture of Christmas?
9. Do you remember seeing the pool in the picture of the cruise ship?
10. Do you remember seeing the broken glass in the picture of the car crash?
11. Do you remember seeing the dolphin in the picture of the ocean?
12. Do you remember seeing the toucan in the picture of the rainforest?
13. Do you remember seeing the bow in the picture of the bouquet?
14. Do you remember seeing the bone in the picture of the dog?
15. Do you remember seeing the camels in the picture of the desert?

Appendix B

Experimental Control Group Questionnaire

Answer each question to the best of your ability. If you are unsure of an answer, take your best guess.

1. Do you remember seeing the blood in the picture of the crime scene?
2. Do you remember seeing the plate in the picture of the room?
3. Do you remember seeing the moon in the picture of the city?
4. Do you remember seeing the gun in the picture of the officer?
5. Do you remember seeing the cart in the picture of the store?
6. Do you remember seeing the fish in the picture of the tank?
7. Do you remember seeing the palm tree in the picture of the vacation?
8. Do you remember seeing the gifts in the picture of a holiday?
9. Do you remember seeing the pool in the picture of the ship?
10. Do you remember seeing the broken glass in the picture of the car accident?
11. Do you remember seeing the dolphin in the picture of the water?
12. Do you remember seeing the toucan in the picture of the forest?
13. Do you remember seeing the bow in the picture of the flowers?
14. Do you remember seeing the bone in the picture of the pet?
15. Do you remember seeing the camels in the picture of the camp?