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Implanting False Memories

Lynn Mundwiller²

Previous research suggests that we experience false memories, these are events that we believe happen, when they actually do not. There are many factors that can create false memories; however I will be looking specifically at how priming can affect memory. Priming is an effect where in order to retrieve a memory, a link to that memory must be activated with the use of subtle cues (Herbert, 2011). Two different lists were used to try to create the same false memory for participants. These two lists I created are a semantic list and a rhyming list, both associated with the critical lure word, "snake." Participants recruited through the Lindenwood Participant Pool were randomly assigned to which list would be presented first, and then the other list was presented next. After viewing each list, participants had to write down as many of the words they could remember that they had just seen. My hypothesis is that if participants are assigned the semantic list associated with snake first, then they would be more likely to recall snake when writing down all the words that rhyme with snake.

Keywords: false memories, priming, short term memory

Previous research has been conducted to support the hypothesis that our brain can create false memories. False memories are memory illusions, these are events that we believed happen, even though they did not (Clark, Nash, Finchman & Mazzoni, 2012). There are many potential causes that can create false memories, however, I will be looking specifically at how priming can affect memory. Priming is an effect where in order to retrieve a memory, a link to that memory must be activated with the use of subtle cues (Herbert, 2011). In a previous study, researchers

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gave a list of words to participants that all related to sleep; however sleep was not one of the words on the list (Roediger & McDermott, 1995). Many participants falsely recalled the word sleep being on the list because many people were actively thinking about sleeping when hearing words associated with sleep such as bed, rest, awake, etc. I will be conducting a similar experiment, however I will have two separate lists, a semantic list and a rhyme list, that will both have a critical lure word, “snake.”

Participants will have to use their working memory, or short-term memory, to help them memorize the lists. It is safe to assume that participants will be using techniques such as chunking or rehearsal to try to memorize the lists, because these are techniques that are normally used when working in short term memory. Chunking is putting the information into sections, or chunks, to help them memorize things while rehearsal is constantly repeating the information over and over again to try to memorize something (Cowan, Rowder, Blume & Saults, 2012). Another approach some participants may use to help them remember the material is the Method of Loci. This method consists of using a story and picturing images in a familiar setting throughout the story in order to help remember something (Lea, 1975). Ideally, lists are good for this method because it is fairly easy to picture a few items from a list.

My hypothesis is that the word, “snake” will be falsely recalled through the use of priming most frequently when participants are recalling words from the Rhyme List after they

have already been exposed to the Semantic List in the first trial. Although it was possible for my participants to falsely recall “snake” after either list given at either trial, I believed that the effect of priming would be greatest when participants were given the Semantic List first, followed by the Rhyme List. I expected to see “snake” more frequently on the Rhyme List when the Rhyme List was given second, because the Semantic List would prime them to think about a snake. Giving the participant the Semantic List first, since it is a list of words that described and related to snake, it would then influence what they recall on the Rhyme List. Due to the effects of priming, they previously had thought about snake characteristics, and would currently be listing multiple words that rhyme with snake. Since participants would actively be thinking of snake characteristics, it would be expected to assume that they would recall snake on the Rhyme List because at one point they were thinking about a snake when given the Semantic List first, and are also focused on many words that rhyme with snake.

Method

Participants

There was a total of 13 participants in this study. Participants for this study were recruited from the Lindenwood Participant Pool (LPP), where participants signed up for this study through Sona Systems. The LPP consists of undergraduates in classes of anthropology, psychology, sociology, athletic training along with exercise science. Those in the LPP are at least ages 18 and

older, or unless they have a parent consent form filed with the LPP office. Participants received extra credit from their class for their participation.

Materials and Procedure

Once approved through the IRB, a room was booked through the LPP and a room in Young 105 was assigned to conduct this experiment. Participants signed up for this study by using Sona Systems to book a time to participate. Upon arrival, participants signed the participant sign in sheet, and then participants were then given the informed consent (see Appendix A) which they read and then willingly signed. Instructions (see Appendix B) were then read to participants explaining to them that they would be watching two different sets of timed slides in PowerPoint. Each slide were presented for 3s, and they were told to memorize as many words as possible and then write down all of the words they remembered after viewing each set of slides.

The slides were filed with two different lists, List Semantic (see Appendix C) consisted of 10 words associated with snake, such as: slither, constrictor, bite, reptile, etc. List Rhyme (see Appendix D) consisted of 10 words that rhymed with snake, such as: bake, take, shake, wake, etc. List Semantic and List Rhyme were counterbalanced between participants, meaning whichever list was presented first alternated between participants. After viewing either list, participants were then given a sheet of paper (see Appendix E) to write down all the words they recalled.

Participants then viewed the other PowerPoint, and then were asked to write down all the words they recalled for that set of slides. After viewing both sets of slides, participants were then asked a set of questions (see Appendix F). The first questions asked if there were any words that stuck out to them that they remembered. The next question asked if they used any techniques to help them memorize the lists. Participants were then given a feedback letter to inform them the purpose of this study (see Appendix G) along with their participant receipt in order to receive their extra credit for participating. Participants would turn their receipts into the LPP office and then receive extra credit from their professor.

Results

Thirteen participants were in this study. All participants did not falsely recall snake through the use of priming, except for one. However, this participant falsely recalled snake after receiving the Rhyme List first, and the Semantic List second, which was the opposite of my hypothesis. A paired sample *t*-test was performed in SPSS comparing the means of the amount of correctly recalled words on both the Semantic List and the Rhyme List (see Appendix H). The results revealed a statistically significant difference, $t(12)=4.085$, $p=0.002$. More words were recalled from the Rhyme List (M)=70.54 (SD)=1.33. A paired samples *t*-test was also calculated for the Semantic List, (M)=5.85 (SD)=1.41. In order for a word to count, it must have been spelled correctly. Steak was the most frequently recalled word, which 3 out of the 13 participants

recalled. Also, memory rehearsal was the most used technique to help remember the list of words, which 7 out of 13 participants described as “repeating the words over in my head.”

Discussion

My hypothesis was that snake would be most falsely recalled through the use of priming if participants are presented with Semantic List first and Rhyme List second. Previous research has looked at the effects of priming, however previous research did not look at how effective priming is in storing in short term memory, it is possible that priming isn't an effective way in order to implant a false memory. Participants were able to remember more words from the Rhyme List than the Semantic List, maybe because it was easier for participants to list off similar words that rhyme with each other. There is some confusion as to why my hypothesis was not supported by the performance of a single participant. It could be because it was such a small sample, and possibly if more participants had been signed up, and if I had made more room bookings, more people could have demonstrated my hypothesis of falsely recalling snake. It could have also been that 3s was possibly too long of a time for participants to see each slide. Maybe if the time were faster, it would have made remembering each word a little harder, which could potentially affect the priming process. I think it was also obvious to some participants that I was centered around the theme of snakes, while viewing the semantic list one participant even

asked me why all the words were related to snake. It is possible to them that the snake theme was obvious, and they knew that snake was in fact not, one of the words to recall.

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Appendix A
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Informed Consent for Participation in Research Activities

“Implanting False Memories”

Principal Investigator Lynn Mundwiller
E-mail: LMM073@lionmail.lindenwood.edu

Participant _____ Contact info (email) _____

1. You are invited to participate in a research study conducted by Lynn Mundwiller under the guidance of Dr. Michiko Nohara-LeClair. The purpose of this research is help support previous research on how memories can be influenced based on what it has been previously been exposed to it, which is called priming.
2. a) Your participation will involve viewing a PowerPoint presentation with several words on it. Try to remember as many of the following words as you can. When you are finished, you will be given a piece of paper and will write down all of the words you remember from the PowerPoint. Once you are done with this, you will then view another power point presentation, where you will again be instructed to remember as many of the words as possible. Again, you will write down all the words you remember after viewing the presentation. When finished with this, I will then ask you a couple of questions about this experiment.

b) The amount of time involved in your participation will be approximately 15 minutes, and you will be rewarded extra credit from your class.

Approximately 30 students will be involved in this research.

3. There may be certain risks or discomforts associated with this research. They include discomfort from words on the power point presentation.
4. There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge about priming and false memories and may help society.
5. Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate or to withdraw. Alternatives for earning course credit are available from your course instructor.
6. We will do everything we can to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study and the information collected will remain in the possession of the investigator in a safe location.
7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Lynn Mundwiller at LMM073@lionmail.lindenwood.edu or the Supervising Faculty Dr. Michiko Nohara-LeClair at 636-949-4371, You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Jann Weitzel, Vice President for Academic Affairs at 636-949-4846.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

 Participant's Signature

 Date

 Participant's Printed Name

 Signature of Principal Investigator

 Date

 Investigator Printed Name

Appendix B

Instructions:

Shortly you will be viewing a PowerPoint presentation with several words on it. Try to remember as many of the following words as you can. When you are finished, you will be given a piece of paper and will write down all of the words you remember from the PowerPoint. Once you are done with this, you will then view another PowerPoint presentation, where you will again be instructed to remember as many of the words as possible. Again, you will write down all the words you remember after viewing the presentation. When finished with this, I will then ask you a couple of questions over this experiment. If you have any questions during any time, please ask the researcher.

Appendix C

Semantic List

Scales

Constrictor

Bite

Reptiles

Eggs

Slither

Fangs

Poison

Vertebrate

Predator

Appendix D

Rhyme List

Break

Ache

Wake

Flake

Steak

Take

Make

Rake

Shake

Cake

Appendix F

Participant #: _____

Questions:

1. Were there any words that stuck out to you more? Do you have any idea why?
2. Were there any tricks you used to help memorize either lists?

Appendix G

Feedback Letter

Dear Participant,

I am really thankful for your help in conducting my research. Your time today has been really appreciated!

The point of this experiment was to create a false memory with the influence of priming. Priming is an effect where in order to retrieve a memory, a link to that memory must be activated with the use of subtle cues. What I hoped to accomplish in this experiment was for you to falsely remember “snake” on one of the lists. Snake was not one of the words on either PowerPoint, but if priming was done correctly, I would have expected you to recall snake from being on the list. If you received the list of words related to snake first, and then received the list of words rhyming with snake, when recalling the words that rhyme with snake, I expected you to write snake on your list of words. However if you saw the list of rhyming words first, and then received the words that are related to snake second, I expected you to not recall snake.

Results of this study will be available at the end of the spring semester, and will also be available in Dr. Michiko Nohara-LeClair’s research website in our class journal. If you have any questions concerning this study, or you are interested in hearing the results, feel free to contact me or you can contact my professor Dr. Michiko Nohara-LeClair. This information is provided below.

If for whatever reason my study has made you uncomfortable and you think you may need to seek professional counseling, you may do so by contacting Lindenwood’s Student Counseling and Resource Center at (636) 627-2928.

Once Again, thank you for participating!

Sincerely,

Lynn Mundwiller

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Dr. Michiko Nohara-LeClair

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