Running Head: ALTERATION OF FACIAL MEMORY

An Alteration of Memory

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Literature Review

An Alteration in Facial Memory

Suppose you are shopping at a general store. Suddenly, you realise that a man is robbing the clerk at gunpoint. Within a few minutes, the robber has the clerk remove all of the cash from the register and the safe. As he is walking towards the door, he walks by a display of potato chips; he stops, grabs a small bag of barbecue chips, and exits the store. Following this, another witness approaches you and the exchange begins of two interpretations of the incident. Your stories are almost identical, however, the other witness recalls seeing the robber take a bag of ketchup potato chips. Then, within minutes the police arrive and begin taking statements. Your recollection of the events are quite vivid, in fact, when the police ask you if the robber grabbed anything else, you recall a bag of ketchup potato chips. Next, imagine weeks go by before you are asked to look through mug shots. How accurate is your memory of the event or even the assailant going to be?

Rewritten Memories

When witnesses are asked to provide a statement, it is important to keep in mind that there are many factors, which can affect a person's memory? As discussed by Loftus and Hoffman (1989) it is possible for an eyewitness to have one perception of an event that conflicts with the perceptions of another witness. With the eye witnesses merely discussing the act among them, their memories of the event may be altered. It is important to keep in mind that there can be months and even years before one is asked to recall the

events at a trial.

It is postulated by Loftus , Donders, Hoffman, and Schooler (1989), that new incoming information rewrites our old memory and may even destroy it. Therefore, in essence, any exposure one may have to others' testimonies, newspapers, and television could potentially have an effect on our memories of certain events. Loftus et al. (1989) showed that the memories of their test subjects could be altered. They showed 79 slides to their participants, which depicted a maintenance worker going into an office to repair a broken chair. As the maintenance worker made his way through the office, he came across several items, a magazine, a coffee jar, a soft drink, a tool, $20 dollars, and a calculator. He then steals the money and the calculator. Following a 10-minute distracter task, the participants read a narrative about the slides, which depicted a different magazine, coffee brand, and soft drink then originally shown in the slides. Next, they were tested on what they saw in the slides. The target questions included choices between the correct brands and the mislead brands. As well, a confidence level to the response given was included. The results tended to show that a significant amount of the participants recalled seeing the brands depicted in the narrative description as being the same as in the slide show. As well, they tended to respond with a great deal of confidence.

Bonto and Payne (1991) replicated this experiment; however, they manipulated the context in which they presented the pictures, the narration, and the test. In essence, half of their participants saw the slides, read the narration (50% were misleading) and completed the test in the same room. The others had the slides presented in one room, the narration

(50% were misleading) in a second room, and the test in a third room. One of the goals of Bonto and Payne was to determine whether the context within which subjects were exposed to events would affect the magnitude of the post event information effect. Their results showed that altering the environmental context did not have an effect on participants' performance. There was however, a significant difference between mislead and control groups, reconfirming Loftus et al., (1989) findings in which misleading post-event information can negatively influence subjects' performance on tests of their memory for the original event. It is possible that Bonto and Payne did not find a significant effect with the context, because the difference in context was not strong enough. Perhaps if they had rooms, which were significantly distinct from each other, they may have found significant effects.

Repeated Exposure

Mitchell and Zaragoza (1996) showed also showed how an eyewitness's memory could be altered. They presented a video of a burglary to participants. After the video, the participants were randomly assigned to one of three conditions. In condition one, they received a series of questions presented to them in a video. Condition two, had questions in presented in audio form. Condition three, had questions presented in a narrative form. The questions regarded what took place in the initial video of the burglary. An example question was "as the thief put the gun in his coat and exited the back door, did he step out onto a porch?". This question was misleading because the thief didn't have a gun. The

remaining questions, which repeatedly depicted the thief as carrying a gun eventually, led the participant to believe that there was a gun used in the robbery. This experiment used repeated exposure, as well as a manipulation of contextual presentation of misleading information. Therefore, participants who encountered the repeated suggestions in different contexts were more likely to misattribute the suggestions to the video, as opposed to subjects who received all of them in the same context. Again, this reinforces Loftus' theory that our original memories can be rewritten by providing deceitful information following an initial experience.

Source Errors

Another aspect, which should be taken into account when viewing the manipulation of memories, is source monitoring errors. As proposed by Lindsay (1990) source monitoring errors occur when a memory from one source is mis-attributed to another source. An example of this involves four individuals and a story, Kathy, Liz, Peter and Mark. Kathy originally tells Mark and Peter a story. Although, when Mark is recounting this event to Peter, he mistakenly attributes the story telling to Liz. Our source monitoring process can be manipulated by the degree to which we recollect an event. Therefore, in essence, we are susceptible to alterations in memory via misguided memory of the source.

As well, Lane and Zaragoza (1994) described source misattribution errors as errors measured by the extent to which exposure of post-event suggestion leads subjects to believe they remembered seeing the suggested items at the original event. Therefore, Lane

et al. (1994) is essentially claiming that a source misattribution error is another way of recalling information incorrectly. It is not claiming that the original information is rewritten, as would Loftus and her colleagues, it is stating that the post-event suggestions produce a mis-attribution error in which the participants believe the post event suggestions to have taken place in the original experience.

Availability Heuristic

Gabrielcik and Fazio (1984) looked at priming and frequency estimation. Their experiment was a test of the availability heuristic. Essentially, what they did was present their participants with words containing the letter T in a subliminal form at 1/500 of a second. Following presentation of these words, they were asked in the form of a questionnaire what letters were more prevalent in the list of words they saw. The participants tended to respond correctly with "T" as being the more common letter among all the words presented. This experiment showed that faced with the task of making a judgement under conditions of uncertainty, individuals often rely upon heuristics to guide their assessments.

Conclusion

It is well established by Loftus et al. (1989) that events that occur following a learning episode can affect people's ability to recollect the original episode. Typically, the method used is to expose the subjects to an event and then later introduce new incongruent information. In essence, the original memory is rewritten. Through exposure to new

information, the association of newly introduced material can become associated with the original. Essentially, it is possible to make a mental short cut or a heuristic rather then recalling the initial memory. Essentially, the commonalties with most memory manipulation experiments are that participants are mislead or deceived by providing incongruent material in a different context following the initial experience. What has not typically been explored are the effects of repeated exposure of a subject characteristic on eyewitness testimony with respects to the availability heuristic.

Bibliography

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The physical contexts in which the original information and misleading information are presented is varied, accuracy tests showed no effect.

Jenkins, F., Davies, G. (1985) . Contamination of facial memory through exposure to misleading pictures. Journal of Applied Psychology, 70, 164-176.

Participants viewed a short film depicting an unpleasant incident. Contradictory composites were shown after which altered the subject's previous memory. Author suggests that subjects tend to report added alterations in memory, perhaps due to the introduction of incongruent features.

Gabrielcik, A. Fazio, R. (1984). Priming and frequency estimation: A strict test of the availability heuristic. Personality and Social Psychology Bulletin, 10, 85-89.

Words containing the letter "T" were subliminally presented to participants. The participants were then asked through a questionnaire if the letter common to all words presented was the letter "T" or "S". A significant number of participants answered correctly supporting the premise of the availability heuristic.

Freyd, J.J., Gleaves, D.H. (1996). "Remembering" words not present in the list: Relevance

to the current recovered/false memory controversy. Journal of Experimental Psychology: Learning, Memory, and Cognition, 22, 811-813.

Experimenters found that when participants studied a list of words with a common but not presented associate, participants frequently falsely reported remembering words that were never presented.

Lane, S. M., Zaragosa, M. S. (1994). Source misattributions and the suggestibility of eyewitness memory. Journal of Experimental Psychology: Learning, Memory, and Cognition, 20, 934-945.

Experimenters measured source misattribution effect with subjects. Subjects were measured on the extent to which they believed the "new memories after misleading suggestions were presented.

Lindsay, D. S., (1990) . Misleading suggestions can impair eyewitnesses' ability to remember event details. Journal of Experimental Psychology: Learning, Memory, and Cognition, 16, 1077-1083.

Tendency to report suggested details was set in opposition to ability to remember their source by telling subjects not to report anything from the narrative. Conditions were set so that in the high but not in the low discriminability condition it was easy to remember the suggestions and their source. Suggested details were reported on misled items more often on the low-discriminability then on the high

discriminability.

Loftus, E. F., Hoffman, H.G., (1989). Misinformation and memory: the memory creation of new memories. Journal of Experimental Psychology: General, 118, 100-104.

Misleading information presented after an event can lead people to erroneous reports of that misinformation.

Loftus, E.F., Donders, K., Hoffman, H., G., Schooler, J. W., Creating new memories that are quickly accessed and confidently held. Memory and Cognition, 17, 607-616.

Misled subjects are timed for their response of their rewritten memories, and it is found that there is no difference in reaction time between "real" and "unreal" memories.

Mitchell, K. J., Zaragoza, M.S, (1996). Repeated exposure to suggestion and false memory: the role of contextual variability. Journal of Memory and Language, 35, 246-260.

The possibility that increasing contextual variability between the repeated exposures would exacerbate this effect by impairing subjects'' ability to discriminate accurately the precise source of the suggested item.

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Abstract

This experiment examined the effects of repeated exposure of a subject characteristic on eyewitness testimony; research on the availability heuristic suggests such repeated exposure should bias memory. Under-graduate psychology students witnessed an incident in which an unknown actor portraying a student temporarily disrupted a class in progress. Following the class, participants viewed a short slide show displaying "mug shots". One group viewed a slide show in which 70% of the mug shots depicted men with facial hair; a second group saw shots in which 10% had facial hair. Immediately following the slide show, participants completed a questionnaire covering the physical appearance of the actor, including the critical question of whether he had facial hair. Participants were re-tested a week later. Facial memories of the experimental group were not significantly altered by the exposure to an increase in common characteristics of the pictures.

An Alteration in Facial Memory

Imagine you witness a crime such as a burglary, a mugging, or a murder. At the time, you may have been inattentive to the crime or simply indifferent to those involved, as you may not have realised what was happening until it was over. The point is you were there and there is some memory of the event. Then suppose the police begin interviewing possible witnesses to the crime. Regardless of how weak or strong your memories, the police may still want you to testify to the event you witnessed. Next, imagine weeks go by before you are asked to look through mug shots. How accurate is your memory of the event or even the assailant going to be?

When witnesses are asked to provide a statement, it is important to keep in mind that there are many factors, which can affect a person's memory? As discussed by Loftus and Hoffman (1989) it is possible for an eyewitness to have one perception of an event that conflicts with the perceptions of another witness. With the eye witnesses merely discussing the act among them, their memories of the event may be altered. As well, any other events that may have happened in between the witnessing of the event and the testimony at a trial could affect one's memory. There can be sometimes months and even years before one is asked to recall the events at a trial.

It is postulated by Loftus , Donders, Hoffman, and Schooler (1989), and found in Lindsay, (1990), that new incoming information rewrites our old memory and may even destroy it. Therefore, in essence any exposure one may have to others' testimonies,

newspapers, and television could potentially have an effect on our memories of certain events. Loftus et al. (1989) showed that the memories of their test subjects could be altered. They initially showed pictures of a maintenance worker stealing money and a calculator, and then removed the picture. Next, they read a short narrative describing the incident, which stated that the maintenance worker was stealing other items instead of money and a calculator. When the subjects were asked to list the objects that were in the maintenance worker's possession, many answered with the details given to them in the narration. Bonto and Payne (1991) replicated this experiment; however, they manipulated the context in which they presented the pictures, the narration, and the test. Bonto and Payne had very similar results whereby the narration following the presentation of the pictures altered the original memory of the pictures. These are but a few of the many similar experiments like this conducted by Loftus and others that support her theory that memory can be altered.

As well, Mitchell and Zaragoza (1996) showed how an eyewitness's memory could be altered. They presented a video of a burglary to participants. After the video, the participants were asked a series of questions regarding what took place. They were asked "as the thief put the gun in his coat and exited the back door, did he step out onto a porch?". This question was misleading because the thief didn't have a gun. The form in which the questions were presented altered the memories of the eyewitnesses. The remaining questions, which also depicted the thief as carrying a gun eventually, led the participant to believe that there was a gun used in the robbery. Again, this reinforces

Loftus' theory that our memories can be rewritten.

Another aspect, which should be taken into account when viewing the manipulation of memories, is source monitoring errors. As proposed by Lindsay (1990) source monitoring errors occur when a memory from one source is mis-attributed to another source. An example of this involves four individuals and a story, Kathy, Liz, Peter and Mark. Kathy originally tells Mark and Peter a story. Although, when Mark is recounting this event to Peter, he mistakenly attributes the story-telling to Liz. Our source monitoring process can be manipulated by the degree to which we recollect an event. Therefore, in essence, we are susceptible to alterations in memory via misguided memory of the source.

As well, Lane and Zaragoza (1994) described source misattribution errors as errors measured by the extent to which exposure of post-event suggestion leads subjects to believe they remembered seeing the suggested items at the original event. Keeping source misattribution in mind, it may be possible that with exposure to multiple pictures with similar characteristics, one might question his/her source and therefore attribute characteristics from the pictures to those of their original memory.

Gabrielcik and Fazio (1984) looked at priming and frequency estimation. Their experiment was a test of the availability heuristic. Essentially, what they did was present their participants with words containing the letter T in a subliminal form. Following presentation of these words, they were asked in the form of a questionnaire what letters were more prevalent in the list of words they saw. The participants tended to respond correctly with "T" as being the more common letter among all the words presented. This

experiment showed that faced with the task of making a judgement under conditions of uncertainty, individuals often rely upon heuristics to guide their assessments.

Interest in alterations in memory aren't limited to eyewitness memory. The possibility of memories being created or rewritten has become a matter of great interest, of late. The recovered and false memory debate takes this area of study into great consideration and as such affects many individuals involved in that debate.

This experiment examined the degree of memory contamination of individuals exposed to mug shots of criminals with common features. It is well established that events that occur following a learning episode can affect people's ability to recollect the original episode. Typically, the method used is to expose the subjects to an event and then later introduce new incongruent information. In essence, the original memory is rewritten. Through exposure to new information, the association of newly introduced material can become associated with the original. Essentially, it is possible to make a mental short cut or a heuristic rather then rewriting a memory. In the present study, incongruent material is not provided therefore the participants are not deceived or misled. The participants were exposed to material unrelated to the initial event which may, or may not, have influenced their original memories. Those influences were measured. To what extent does repeated exposure to mug shots with common characteristic influence the memories of eyewitnesses?

Method

Participants

The subjects were 18 male and 22 female undergraduate psychology students from Algoma University College. Students who participated in the experiment were granted partial credit.

Design

In two undergraduate psychology classes students were asked to volunteer for a brief memory experiment. Early in the class, a confederate entered the classrooms, where all participants could clearly see him. He interrupted the instructor by asking if anyone in the class was the owner of a blue Volkswagen, license plate PAG-782 as this vehicle was blocking his car. Failing a response he left and the class then continued.

Following class, participants were randomly place in one of two groups. Each viewed a slide show displaying 40 "mug shots". One group's "mugshot" slide show consisted of 70% of the targets having facial hair. A second group saw shots in which 10% had facial hair. The slide show displayed the shots for 5 seconds with a 1-second interval. The subjects were instructed to view the photographs, as they would have a recognition task following the slide show.

All participants were asked to complete a questionnaire covering the physical appearance of the confederate, including the critical question of whether or not, he had facial hair. A Likert scale of 1-7 was used, in order to rate the participants level of confidence. Following the completion of the questionnaire, each group was debriefed on

the purpose of the experiment and the necessity of being deceived. A week later, the participants were re-tested using the same questionnaire.

Results

The data was examined using a General Linear Model, as the groups were not equal in numbers. The main effect of picture type and time with respect to the clean shaven response was not found significant, F (1,63)= 0.04, p=0.85. With respect to the moustache response, no significant difference was found, F (1, 47)= 0.15, p=0.701. The beard response was not significant either, F (1,48)= 0.55, p= 0.463. Nor was the goatee response, F (1, 51)=0.03, p=0.868, The side burns response did not reach significance either, F (1,48)=0.15, p=0.698. The significance level was $p < 0.05$ for all statistical analyses. No significant effect or interaction was found between the dependant variables of clean-, moustache, beard, goatee, or side burns with regards to control or experiment condition or the time of testing.

Discussion

As previously stated, there were no significant effects found in this experiment. There are several possibilities as to why no effects were found.

First, the participants were repeatedly exposed to the "mug shots" however; they were merely instructed to view the slide show, as they would be tested when it was over. Then the participants were asked to recall the physical features of the confederate. The

participants' memory of the confederate was most likely a separate memory, as was the memory of the slide show. Therefore, if the participants were asked to look for the confederate in the slide show, it is possible that the memory of the confederate that would be readily available could have been influenced by the repeated exposure to the "mug shots" with common characteristics. As a result, it is probable that two separate memories were formed, one being the confederate and the other being the slide show which were so unrelated that they didn't have an opportunity to influence each other.

It is also possible that the experiment did not yield a significant effect because there were only 40 "mug shots" used in the slide show. Perhaps due to the limited number of pictures, a ceiling effect was created in which memories were formed for all the "mug shots" without effectively creating a readily available heuristic. Simply increasing the number of pictures may solve this.

This experiment suggests that police should exercise caution when interrogating a witness. Exposure to mug shots with similar features may have an effect of altering the facial memory of an eyewitness. In addition, care should be taken when attempting to formulate a composite sketch of the perpetrator, misleading questions could perhaps alter the witnesses' memories.

In regards to the current controversy regarding recovered memories of abuse, it is impossible to conclude from this experiment and others like it, that memories of those claiming to be abused can now be shown false. As stated by Freyd and Gleaves (1996) it is possible that experiments like this will, in fact, be used in courtrooms, and thus

perpetuate the silence of those who have fallen victim to sexual abuse. So, we can say that small events or details may or may not be created and tested in laboratories, however, can one take the next step and say that such explicit memories of child abuse can be created as well?

In conclusion Loftus (1989, p 103) stated "Give us a dozen healthy memories, well formed, and our own specified world to handle them in. And we'll guarantee to take any one at random and train it to become any type of memory that we might select..."

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	Strongly Agree						Strongly Disagree
	1	2	3	4	5	6	7
The individual had/was (a/an)							
Moustache	1	2	3	4	5	6	7
Beard	1	2	3	4	5	6	7
Goatee	1	2	3	4	5	6	7
Clean shaven	1	2	3	4	5	6	7
Sideburns	1	2	3	4	5	6	7

Figure 1. Sample questions from the questionnaire

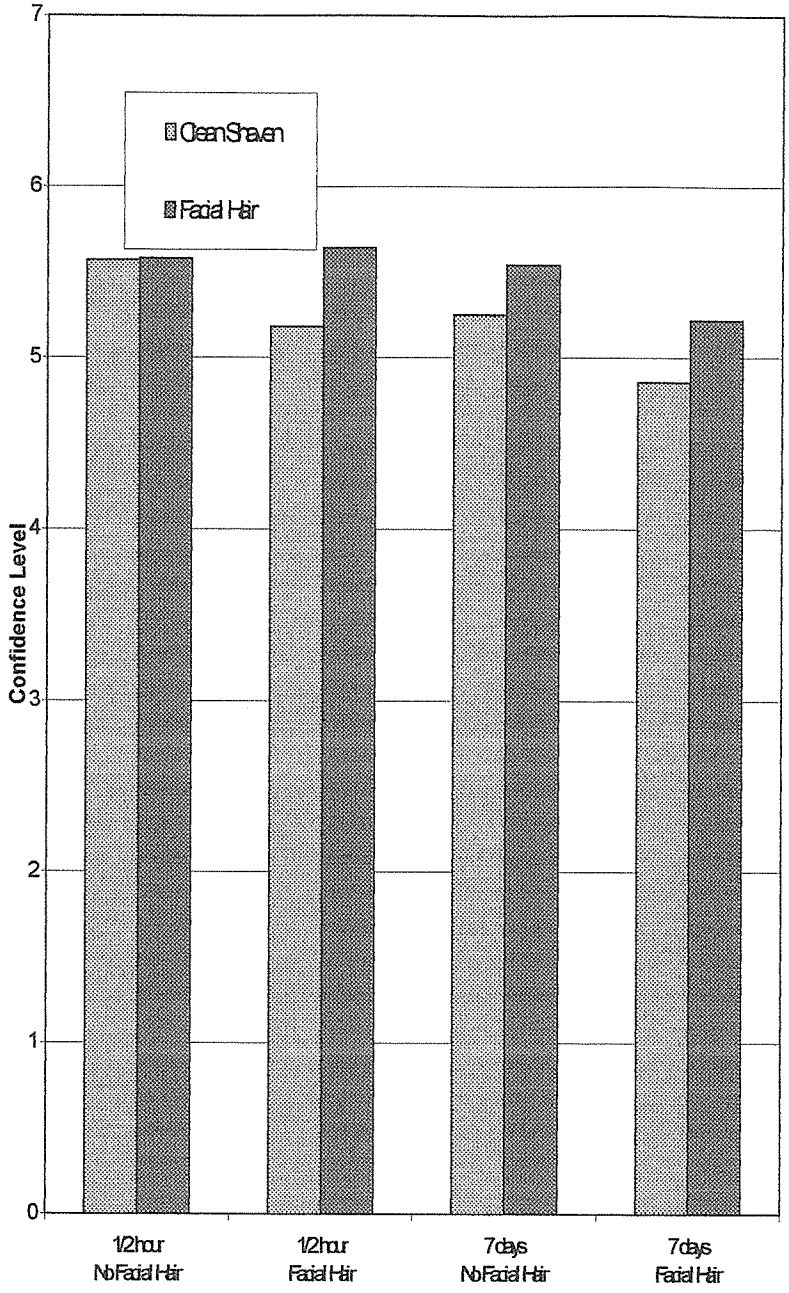

Figure 2. Mean responses, for each time frame and condition.