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The Effect of Context on Retrieval Blocking and Source Misattribution in an Eyewitness Memory Paradigm

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THE EFFECT OF CONTEXT ON RETRIEVAL BLOCKING AND SOURCE
MISATTRIBUTION IN AN EYEWITNESS MEMORY PARADIGM

By

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A Thesis
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Master of Science
in Psychology
in the Department of Psychology

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MISATTRIBUTION IN AN EYEWITNESS MEMORY PARADIGM

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Exposure to misleading post-event information can result in impaired memory for the original event. Two theoretical mechanisms (i.e., retrieval blocking and source misattribution) have been proposed as explanations for the occurrence of the misinformation effect. The impact of context on the occurrence of these errors has been examined to determine if changing the context between events reduces the misinformation effect. Previous findings indicate that context plays a different role in each of these mechanisms; however, experimental differences in the paradgms used to examine retrieval blocking and source misattribution have made comparisons between these mechanisms difficult. The present study examined the role of context in eyewitness memory using the same materials, manipulations, and procedures to determine if context does, in fact, have a different impact on these mechanisms. Results indicate that changing the context between events reduces the occurrence of source misattribution but does not ameliorate the impact of retrieval blocking.

DEDICATION

This work is dedicated to my mother and father whose love and support gave me the courage to pursue and achieve my dreams. I can never express how grateful I am to be blessed with such wonderful parents, without whom I would not be the man I am today.

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CHAPTER I

INTRODUCTION

Memory researchers have found that eyewitness memory for an event can be impaired by contradictory post-event information, a finding known as the *misinformation effect* (Allen & Lindsay, 1998; Eakin, Schreiber, & Sergent-Marshall, 2003; Lindsay, 1990; Lindsay, Allen, Chan, & Dahl, 2004; Loftus, Miller, & Burns, 1978; Schreiber & Sergent, 1998). The misinformation effect is typically examined using the eyewitness memory paradigm. During the first phase of the paradigm, an event is depicted in a series of slides (e.g., Eakin et al., 2003; Loftus et al., 1978), described in a narrative (e.g., Lindsay & Johnson, 1989), or shown in a video segment (e.g., Lindsay et al., 2004). For example, in the slideshow the participant may see a “no smoking” sign mounted on a museum wall. During the second phase, participants typically read a post-event narrative describing the witnessed event. The post-event narrative follows the events depicted in the slide show; however, some critical details are mentioned in a generic way (control condition; e.g., sign) and some are mentioned in a misleading way (misled condition; e.g., “no cameras”). The memory test requires participants to answer questions about details from the witnessed event (e.g., “What type of sign was mounted on the museum wall?”). The typical result is the misinformation effect; memory is better for the control than the misled items.

Many theoretical explanations have been posited for the misinformation effect. However, the focus of the current experiment will be on retrieval blocking (McGeoch, 1942; Eakin et al., 2003) and source misattribution (Lindsay, 1990; Lindsay et al., 2004). In addition, the role of the match in context between the witnessed and post events in ameliorating the misinformation effect due to both will be examined. A review of prior findings on the impact of contextual match in eyewitness memory research will be presented. First, however, the two theoretical explanations for the misinformation effect will be discussed.

Retrieval Blocking

The eyewitness memory paradigm is modeled after the retroactive interference paradigm. In the typical retroactive interference paradigm, participants study an original list of cue-target word pairs (e.g., SIGN-SMOKING). Participants then study an interpolated list of cue-target pairs. Control items on the interpolated list consist of new cue-target pairs (e.g., FROG-TOAD) and experimental items consist of new targets paired with cues that were studied on the original list (e.g., SIGN-CAMERA). At test, participants are provided with the cue from the original list and asked to recall the associated target. Memory for targets associated with cues that appeared only on the original list (control condition) is better than for targets that were re-paired with original-list cues (interference condition), a finding known as the retroactive interference effect. Theoretically, retroactive interference occurs because of response competition (McGeoch, 1942). When a cue is linked to multiple targets at recall, the targets compete for retrieval. In both the retroactive interference and eyewitness memory paradigms,

response competition can occur at test because in the interference—or misled—condition, the cue has been paired with multiple targets. For example, in the case of the eyewitness memory paradigm, when the test cue asks —“What type of sign was mounted on the museum wall?” in the misled condition, —“no smoking” and —“no cameras” can compete for retrieval. The end result of this competition could be that (a) the original target is retrieved, (b) the interpolated target is retrieved, or (c) the competition is so strong between possible targets that nothing is retrieved. When the incorrect information is retrieved first, retrieval blocking—the most severe form of response competition—can occur, making retrieval of the original target difficult.

The theoretical mechanism of retrieval blocking is described by the Search of Associative Memory (SAM) computational model (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981). According to SAM, the association between a cue and target has a particular strength that determines the likelihood that the target will be retrieved, given the cue. This association strength can be increased by what SAM describes as *cue-incrementing*. Cue-incrementing states that when a particular target is retrieved, given a cue, the association between the two is strengthened. The more the target is retrieved in response to the cue, the stronger the association becomes between the pair. Association strength, according to SAM, is correlated with likelihood of retrieval of a particular target. Therefore, the more a target is retrieved, the more likely it will be retrieved next time the cue is presented. Therefore, if the result of response competition is retrieval of the misled target, the association between the cue and that target is strengthened, increasing the probability that the misled target will be retrieved again, given the same cue. The end results is that probability of retrieving the witnessed

target is decreased; in effect, repeated retrieval of the misled target blocks access to the witnessed target. This cycle of retrieval and strengthening of the misled target, and resultant blocking of access to the witnessed target, is called retrieval blocking (McGeoch, 1942).

Retrieval blocking can be examined in the eyewitness memory paradigm by administering the *modified opposition test* (MOT; Eakin et al., 2003) as the final recall test of memory for witnessed-event information. The MOT uses pretest instructions that warn participants that information in the post-event narrative was misleading and inaccurate. Participants are also warned not to answer the test questions with any information that they remember from the post-event narrative. In addition to the pretest warnings, the MOT uses a special kind of cued-recall test that includes a hint following each question. The hint specifies the incorrect answer from the post-event narrative (e.g., “What type of sign was mounted on the museum wall? Hint: NOT ‘no cameras’”). The MOT was specifically designed to ensure retrieval of the misled target at test with the goal of strengthening the association between the cue and the misled target. For participants in the misled condition who read about ‘no cameras,’ the presence of the hint increases the association strength between the cue and the misled target that was created while reading the misled narrative. This increased association strength also increases the likelihood that the misled target, rather than the witnessed target, will be retrieved again—given the cue—resulting in retrieval blocking at test (Eakin et al., 2003; Schreiber & Sergent, 1998). Participants in the control condition have no prior association between the cue and the misled target to be strengthened by the presence of the hint on the MOT. Therefore, there is no prior association between the cue and misinformation to be

strengthened by the presence of the hint on the MOT, and retrieval is not impacted by retrieval blocking in the control condition to the same degree as in the misled condition.

The SAM (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981) model of memory not only proposes that associations are strengthened between the cue and target, but also that the context surrounding the association is also strengthened. Context refers to the conditions surrounding the encoding and retrieval of information (e.g., the environment, the materials, the internal state of the individual, etc.). The role of context on memory, specifically within the retroactive interference and eyewitness memory paradigms, will be discussed in more detail after a review of source misattribution, another theoretical mechanisms proposed to explain retroactive interference and misinformation effects.

Source Misattribution

Lindsay and colleagues (Allen & Lindsay, 1998; Lindsay, 1990; Lindsay et al., 2004) proposed that the misinformation effect in eyewitness memory could also be due to source misattribution. Source misattribution is a strong version of source confusion, which occurs when information from both the witnessed and post event is retrieved at test, but the source of each is confused. For example, participants might remember both the “no smoking” and “no cameras” signs, but not remember which one was in the slide show event. Source misattribution occurs when an individual attributes the information to the wrong source. For instance, participants could mistakenly remember seeing the “no cameras” sign in the slide show event when they had read about it in the post-event narrative. Lindsay (1990) examined the role of source misattribution in contributing to

the misinformation effect using the *logic of opposition test* (LOT). In fact, the MOT was a modification of the LOT that added the hint to elicit retrieval blocking. Instructions for the LOT warn participants that misleading information was present in the post-event narrative and that they should only provide answers that they remember seeing during the witnessed event. Lindsay's assumption was that participants would only provide misleading information from the post-event narrative as a response to questions if they had misattributed its source to the slide show. Lindsay found that more people in the mislead condition erroneously reported misleading information as a response than in the control condition, despite the warning on the LOT. He attributed this finding to source misattribution, an explanation that is grounded in the source-monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993).

The source monitoring framework states that memory for the source of information is based on characteristics associated with the memory for that information at encoding (e.g., perceptual information; contextual information; semantic details) in combination with judgment processes regarding these characteristics at retrieval (Johnson et al., 1993). The source monitoring framework defines these characteristics in the same way that SAM (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981) defines context. Context includes details like the color, sound, spatial and temporal location, and emotional reactions associated with a specific memory that can be used to discriminate between potential sources of the memory. According to source monitoring framework, source memory accuracy depends, in part, on the discriminability of the conditions associated with the information being retrieved. For instance, if the conditions associated with the witnessed and post events in the eyewitness memory paradigm are similar,

source misattribution could occur on a typical cued recall test, resulting in a misinformation effect. Therefore, the source monitoring framework predicts that if the conditions between the witnessed and post events are highly discriminable, fewer source misattributions will be made, and the misinformation effect will be eliminated.

Lindsay (1990) tested the role of discriminability on source misattribution using the eyewitness memory paradigm in which participants were assigned to either a low- or high-discriminability condition. Participants viewed a slideshow depicting a theft in an office while listening to an accompanying narrative describing the event in a female voice. Participants in the low-discriminability condition read the post-event narrative as it was narrated in the same female voice; participants in the high-discriminability condition read the post-event narrative as it was narrated by a male voice. In addition to the voice manipulation, Lindsay also seated participants in the low-discriminability condition in the same dark room in which they viewed the slideshow during the post-event narrative, whereas participants in the high-discriminability condition stood in a lit room during the post-event narrative. The manipulations in the high-discriminability condition were intended to increase the contextual differences between the slideshow and the post-event narrative. Although participants in both conditions showed source misattribution—both groups reported seeing misleading items in the slideshow—those in the low-discriminability condition reported misleading items more frequently than those in the high-discriminability condition. Lindsay's findings suggest that providing discriminable contexts between the witnessed and post events alleviates misinformation effects due to source misattribution. The role of context in alleviating interference effects due to retroactive interference will be presented next.

The Role of Context in Retrieval Interference

The role of context has been examined using the typical retroactive interference paradigm (Bilodeau & Schlosberg, 1951; Greenspoon & Ranyard, 1957; Strand, 1970). Bilodeau and Schlosberg (1951) altered the context between the original and interpolated phases of the paradigm by having participants either learn the original and interpolated lists in different rooms (i.e., classroom or storeroom), using different devices (i.e., card-flipper or memory drum), and in different postural positions (i.e., sitting or standing) or learn the original and interpolated lists in the same context. When the context was the same for the original and interpolated lists, retroactive interference effects were obtained; however, no retroactive interference effects were obtained when the context was different. Greenspoon and Ranyard (1957) expanded on the experiment by Bilodeau and Schlosberg. In addition to learning the original and interpolated lists in either different or similar conditions, Greenspoon and Ranyard also varied who was in the room for the two learning phases and the appearance of the materials (i.e., in one context an asterisk preceded the first syllable whereas in the other context a blank card preceded that syllable). They replicated the findings of Bilodeau and Schlosberg; retroactive interference effects were reduced when participants learned the original and interpolated lists under different contexts as compared to when they were the same.

Strand (1970) was not convinced that a change in context between the original and interpolated lists was the reason for reduced retroactive interference when list-learning conditions were different. Strand noted that when the contexts were different, participants had to get up, leave the room, walk to another room, and get seated again prior to learning the interpolated list. She hypothesized that the disruption between the

original and interpolated list-learning phases, rather than the differing contexts, led to the reduction in retroactive interference. To test this hypothesis, Strand used the same contextual manipulation as the studies previously mentioned (i.e., changing the room, apparatus, etc. between list presentations), but also added a disruption condition. For the disruption condition, participants learned both lists with no contextual differences between list presentations; however, a short “errand” had participants leave the room and return between list presentations and again before the test. In addition to finding the typical reduction in retroactive interference when the context of list presentations was different, Strand also found a reduction in retroactive interference in the disruption condition. Strand’s findings suggest that the reduction in retroactive interference was not attributable to the differing contexts between lists but rather to the disruption that occurred during the changing of contextual environments.

The typical eyewitness memory paradigm inherently contains dissimilar contexts between the witnessed and post event. The witnessed event is typically a slide show and the post event is typically a written narrative. Regardless, a misinformation effect is usually obtained despite the lack of contextual match. Eakin and Wood (2010) amplified the contextual difference between events by presenting the misleading information in a narrative in which the place and people were different from the slide show. After viewing a slide show of an older man and boy shopping in a nature goods store, participants read misleading information in a narrative that either followed the slide show (same context) or was completely different than what was witnessed (different context). For instance, in the slide show, the older man pays for a book using a Visa credit card. In the misled condition, people reading a similar-context narrative read that he paid with a MasterCard.

In the dissimilar context narrative, people read that a mother and her friend took their daughters for ice cream and paid with a MasterCard. Memory was tested using the MOT, and a significant misinformation effect was obtained regardless of contextual differences between the witnessed and post event (see also Allen & Lindsay, 1998). Apparently, contextual dissimilarity does not ameliorate retrieval blocking in the same manner as source discriminability does.

Lindsay, Allen, Chan, and Dahl (2004) examined whether varying contextual similarity could eliminate misinformation effects due to source misattribution. Lindsay et al. used a witnessed event in which a thief explored a museum, but for which no critical items were presented; actual video information was tested later to establish a baseline measure of recall. Misled participants read a narrative that suggested items that had not been witnessed during the video event (e.g., a “no smoking” sign); participants in the control condition read a narrative with no suggested items. The narrative either followed the context of the witnessed event, described a similar event (e.g., a thief in a museum), or described a contextually dissimilar narrative (a school trip to a palace). Memory was tested using the LOT; participants were instructed to disregard any information they remembered from the narrative and to report only items they remembered seeing in the video—the assumption was that any misled information that was reported was due to source misattribution. The rate of reported misinformation, or intrusion rate, was significantly higher when the context was similar than when it was dissimilar. Contrary to the findings for retrieval blocking, contextual differences between witnessed and post events reduced source misattribution.

Purpose of the Study

A review of the literature examining contextual similarity between a witnessed event and post-event information in the eyewitness memory paradigm suggests that, although both retrieval blocking and source misattribution can explain misinformation effects, differing the contexts in which the original and misleading information are presented does not appear to have the same impact on the two mechanisms. Although contextual dissimilarity does not seem to ameliorate retrieval blocking (Eakin & Wood, 2010); it does, however, seem to reduce source misattribution errors (Lindsay, 1990; Lindsay et al., 2004). One explanation for this dissociation is that the paradigms used by Eakin and Wood and Lindsay et al. involved different materials and manipulations. For instance, the paradigm used by Eakin and Wood depicted the witnessed event in a series of slides whereas Lindsay et al. used a video segment. In addition, Eakin and Wood had participants view the event twice while Lindsay et al. showed the video segment once. Another difference between these paradigms is that Eakin and Wood did not use accompanying narration for the witnessed or post event whereas Lindsay et al. used accompanying narration for both.

The differences in materials and the presentation of events might explain why contextual dissimilarity plays a different role in each of the paradigms. In the Eakin and Wood (2010) study, it could be that the differences between the witnessed and post event in terms of misinformation were too subtle; thereby, negating any effect that providing dissimilar contexts might have had on retrieval blocking. It is also possible that providing an audio narration—as in Lindsay et al. (2004) increased the salience of information in the witnessed and post events. In other words, the accompanying narration may have

increased the amount of information accurately encoded as compared to the passive viewing of the witnessed event and reading of the post-event narrative; thereby, increasing the amount of information available to aid in discriminating between sources. It is also possible that the results for source misattribution were confounded by the final test instructions used in the Lindsay et al. study. Due to the inclusion of the statement “Guess if you have to” in the instructions before the final test, the LOT becomes less effective in accurately measuring source misattribution. By instructing participants to “guess,” Lindsay et al. increased the chances of participants reporting the only item they can recall (misinformation) out of frustration and not due to source misattribution. Therefore, the goal of the study is to examine the impact of context dissimilarity between the witnessed and post event on both retrieval blocking and source misattribution simultaneously. Testing these two mechanisms simultaneously provides an opportunity to examine the role of context on retrieval blocking and source misattribution using the same paradigm and eliminating the problems found in previous studies.

The paradigm examined retrieval blocking and source misattribution using the same materials and manipulations. If the contextual information associated with the witnessed event is blocked along with the information from the witnessed event, as described in SAM (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981), then participants will not be able to use the contextual differences between events to ameliorate retrieval blocking. In other words, if context is part of the strengthened association between the test cue and misinformation, then it will also be strengthened and block access to the context associated with the witnessed event. However if this is not the case, then people could use the contextual information to un-block access to the target in

the witnessed event. If discriminability between events aids in the judgment process of source attribution as described in the source monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993), then participants should be able to use contextual differences between events to appropriately attribute the source of original and misleading information. In other words, when there is not enough distinguishable information available to serve the judgment process of discriminating between sources, providing discriminable contexts should improve source monitoring and reduce the occurrence of source misattributions. The paradigm used in this study tested the hypothesis that providing dissimilar contexts between witnessed and post events would not ameliorate the misinformation effect due to retrieval blocking but would reduce, or even eliminate, the misinformation effect due to source misattribution. More specifically, when examining retrieval blocking, a misinformation effect was expected regardless of the context in which the post event was presented. However, when examining source misattribution, a misinformation effect was expected when the context of the witnessed and post events was the same, but no misinformation effect was expected when the context of the witnessed and post events was different.

CHAPTER II

METHODS

Design and Participants

The study was a 2 (Misinformation: control, misled) x 2 (Contextual Similarity: same, different) mixed-factorial design. Misinformation was manipulated within subjects and Contextual Similarity was manipulated between subjects. The dependent variables were probability of recall as measured by the MOT and intrusion errors as measured by the LOT. Participants were recruited from the Psychology Research Program at Mississippi State University and course credit was given in exchange for participation. A total of 256 participants were randomly assigned to either the retrieval blocking or source misattribution experiments by alternating between these two mechanisms when distributing the booklets. Participants were tested in small groups of 5 to 10 per session. Ninety-three participants were eliminated from the analysis. Thirteen of these subjects were dropped because of a failure to follow the instructions given by the experimenter and contained in the booklet, 38 were dropped because they were unable to recall at least one of three easy items, 22 were dropped because they were unable to recall at least one of four control items in the retrieval blocking booklet, and 23 were dropped because they indicated that they had previously participated in a similar experiment. Therefore, analyses are based on the remaining 160 participants. Age data were not collected.

Materials

A consent form was used to verify participant consent. The witnessed event was an 8-minute video segment from *The Return of the Pink Panther* (Lindsay et al., 2004) depicting an event in which a thief breaks into a museum and steals a large diamond. The video segment was projected onto a screen in a classroom in Magruder Hall using a projector and Windows Media Player.

For all conditions, three items presented in the video served as “easy” test questions to determine whether the participant had any recall for the witnessed event. The three easy items were as follows: a mechanism used by the thief to get from one building to another (crossbow), the color of the rug on which a diamond pedestal stands (red), and the anchor point for the thief’s zip-line escape (pole). Eight generic details were deemed critical items (i.e., sign, painting, statue, war item, sculpture, mural, jewelry, and wall decoration). Critical items were divided into two sets in order to provide control and interference sets for the within-subjects misinformation manipulation. Sets were determined by alternating set placement according to the order in which items were presented in the narratives (Set 1: sign, statue, sculpture, jewelry; Set 2: painting, war item, mural, wall decoration). Critical item sets were counterbalanced so that each set served as control items in approximately half of the conditions. For instance, Counterbalance 1 refers to conditions using Set 1 items as control items and provided misleading information about Set 2 items in the post-event narrative. Counterbalance 2 reversed the sets. In addition to being divided into two sets, critical items had two versions of specific details (Version A: a “no smoking” sign, a painting of a prince, a statue of a goddess, a sword, a dolphin sculpture, a mural of two knights, a pair of

earrings, a clock; Version B: a ~~no~~ cameras” sign, a painting of a queen, a statue of an armored man, a shield, a cupids sculpture, a mural of David and Goliath, a bracelet, a mirror). Critical item versions were also counterbalanced so that each version served as misinformation in half of the post-event narratives. The presentation of critical items and misleading information differed depending on which mechanism was being examined in the booklet each participant received (i.e., MOT, LOT) and will be discussed separately.

Retrieval blocking. Eight different booklets were created for participants who received booklets designed to examine retrieval blocking: one booklet for each combination of contextual similarity (same, different), critical item version (Version A, Version B), and item set. Two different witnessed event narratives were constructed and differed only with regard to which of the two versions of critical items they included. Two lists were constructed to specify which version of critical items was used in each narrative (List 1: Version A items in witnessed event narrative, Version B items in post-event narrative; List 2: Version B items in witnessed event narrative, Version A items in post-event narrative). For instance, a booklet using List 1 specifically mentioned that the thief passed by a ~~no~~ smoking” sign and a painting of a prince in the witnessed event narrative; a booklet using List 2 specifically mentioned that the thief passed by a ~~no~~ cameras” sign and a painting of a queen in the witnessed event narrative. Following the witnessed event narrative, each booklet contained an initial filler task consisting of general-knowledge questions. For example, participants were asked questions such as ~~What is the largest living organism on Earth?”~~

Table 1

Presentation of Critical Items in MOT Narratives.

Critical Items	Witnessed Event	Post Event	
List 1		CB1	CB2
Sign	No smoking	Sign	No cameras
Painting	Prince	Queen	Painting
Statue	Goddess	Statue	Armored man
War item	Sword	Shield	War item
Sculpture	Dolphins	Sculpture	Cupids
Mural	Knights	David and Goliath	Mural
Jewelry	Earrings	Jewelry	Bracelet
Wall decoration	Clock	Mirror	Wall decoration
List 2		CB1	CB2
Sign	No cameras	Sign	No smoking
Painting	Queen	Prince	Painting
Statue	Armored man	Statue	Goddess
War item	Shield	Sword	War item
Sculpture	Cupids	Sculpture	Dolphins
Mural	David and Goliath	Knights	Mural
Jewelry	Bracelet	Jewelry	Earrings
Wall decoration	Mirror	Clock	Wall decoration

Each booklet also contained a post-event narrative after the filler task. Each post-event narrative mentioned four of the eight specific items from the witnessed event narrative in a generic way to serve as control and mentioned the other four items in a misleading way. For instance, a booklet using List 1 and Counterbalance 1 (Set 1 as control items) mentioned a sign (instead of a “no smoking” sign) and a painting of a

queen (instead of a painting of a prince). Table 1 shows how critical items were presented in MOT booklets in terms of lists and counterbalance sets within each list. Each event narrative presented the control and misleading information in a context which either described the witnessed event (same context) or described a school field trip to a palace (different context). For instance, in the different context condition, the post-event narrative may have mentioned that the school children and their teacher passed by a sign mounted on the iron gates of the palace. Following the post-event narrative, the booklets contained a final filler task consisting of general-knowledge questions.

The final section of the booklets contained the final test (MOT) and test instructions. Test instructions informed participants that the second narrative (the post-event narrative) contained misleading information and not to respond to any test questions with information that was remembered from the second narrative. In addition to the warning, the test instructions also encouraged participants to respond only with information they could remember specifically coming from the video segment and first narrative (witnessed event narrative). Each test consisted of 11 cued-recall questions (three easy, four control, and four misled) and a twelfth question asking if the participant had previously participated in a similar experiment. Two versions of the MOT were created—one for each list—and differed only in which version was used to provide the hints. For example, the MOT used for List 1 provided hints consisting of Version B items (e.g., ~~What~~ “What was the subject of the painting? Hint: not queen”).

The test was also divided into two sections. The first section consisted of the three easy item questions and instructed participants to base their responses on what they remember from the video. The second section consisted of the remaining eight critical

item questions and instructed participants to base their responses on what they remembered from the witnessed event narrative. The misinformation effect due to retrieval blocking was measured in terms of the probability of recall for control items versus the probability of recall for misled items.

Source misattribution. Eight different booklets were created for participants who were assigned to the LOT conditions. Unlike the MOT booklets, LOT booklets did not contain a witnessed event narrative because the misinformation effect due to source misattribution was measured in terms of the intrusion rate of details from the post-event narrative into participant's memory for the witnessed event (video), as measured by Lindsay et al. (2004). In order to get this kind of measurement, participants were not presented with specific details about the witnessed event beyond the three easy items present in the video until the presentation of misleading information in the post-event narrative. Therefore, the LOT booklets began with the initial filler task of general-knowledge questions. However, in order to maintain experimental integrity between the retrieval blocking and source misattribution paradigms in terms of the time between the video segment and the post-event narrative, the initial filler task consisted of twice as many questions so that participants with MOT and LOT booklets reached the post-event narrative at the same time.

Following the initial filler task, LOT booklets contained a post-event narrative. Similar to the MOT booklet post-event narratives, LOT post-event narratives mentioned four of the eight critical items in a misleading way; mentioning these items is misleading because none of the items were shown in the video. Therefore, the four control items

were not mentioned at all in the LOT narrative. The same counterbalance sets and lists constructed for the MOT booklets were also used in the presentation of critical items for the LOT booklets. However, without a witnessed event, each list referred only to which version of critical items was used as misinformation in the post-event narrative (List 1: Version B items in post-event narrative; List 2: Version A items in post-event narrative). Table 2 shows how critical items were presented in LOT booklets in terms of lists and counterbalance sets within each list. The post-event narratives in the LOT booklets also had different contextual versions (same, different) for the contextual similarity manipulation.

After the post-event narrative, booklets contained another filler task of general knowledge questions before the final test. The LOT was identical to the MOT with the exception of the hints. In addition, the questions were not separated in terms of video versus narrative because all questions referred to the video. The misinformation effect due to source misattribution was measured in terms of the rate of intrusions (i.e., the occurrence of reporting specific critical items for control items versus misled items). Following the completion of the test, participants brought their booklets to the experimenter and were given a debriefing statement as they were led out of the classroom.

Procedure

Participants were invited into the room and asked to sit at a desk on which a consent form was placed. Consent forms were placed on desks that provided participants with a clear view of the screen. After all consent forms were signed and collected,

participants were told that they would view a video of a man stealing a diamond from a museum and that their memory for details in the video would be tested. After viewing the 8-minute video, the booklets were distributed.

Table 2

Presentation of Critical Items in LOT Narratives.

Critical Items	Post Event	
List 1	Counterbalance 1	Counterbalance 2
Sign	----	No cameras
Painting	Queen	----
Statue	----	Armored man
War item	Shield	----
Sculpture	----	Cupids
Mural	David and Goliath	----
Jewelry	----	Bracelets
Wall decoration	Mirror	----
List 2	Counterbalance 1	Counterbalance 2
Sign	----	No smoking
Painting	Prince	----
Statue	----	Goddess
War item	Sword	----
Sculpture	----	Dolphins
Mural	Knights	----
Jewelry	----	Earrings
Wall decoration	Clock	----

Participants were then instructed to begin working through the booklet until they came to a page that instructed them to stop. Participants with MOT booklets read the event narrative and completed a short general knowledge questionnaire; participants with LOT booklets immediately began working on a longer general knowledge questionnaire (see Figure 1). After 13-minutes, participants who had not completed the questionnaire were asked to stop in order to continue with the experiment. Participants were then instructed to continue working through the rest of the booklet—consisting of the post-event narrative, a second general knowledge questionnaire, and the final recall test—at their own pace.

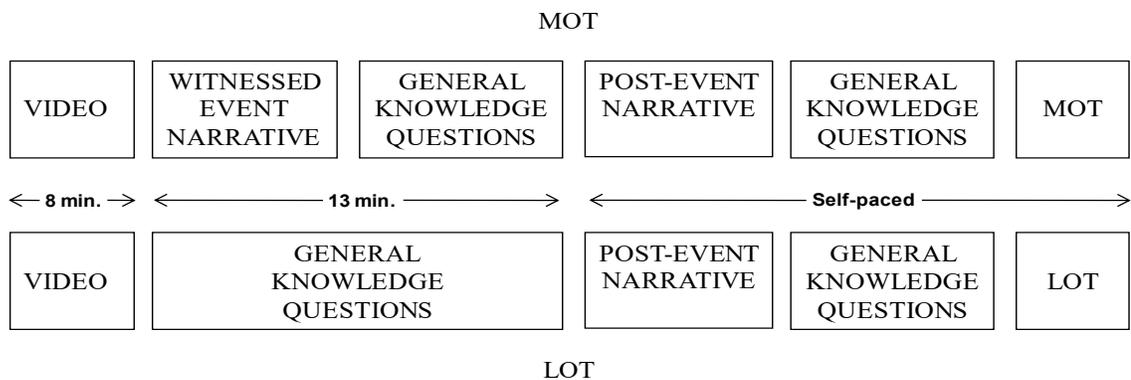


Figure 1. Procedural timeline for MOT and LOT conditions.

CHAPTER III

RESULTS

Preliminary analysis of the critical items was conducted to determine if the items used were capable of capturing a typical misinformation effect due to retrieval blocking. Probability of recall was calculated for each critical item in the same context condition (i.e., the typical eyewitness memory paradigm). Analysis revealed one critical item for which participants showed extremely poor recall when the item served as control (statue: $M = .12$, $SEM = .08$) and was removed as one of the Set 1 items in subsequent analyses. In order to maintain an equal number of control and misled observations per item set, probability of recall was examined for Set 2 items to determine for which item participants showed the poorest recall when serving as control (war item: $M = .38$, $SEM = .10$) and this item was also removed in subsequent analyses. In addition, an examination of our exclusion criterion revealed three participants with no recall for control items after the removal of the two critical items from the analysis. These participants were removed from the analyses.

Probability of recall was evaluated using theoretically driven planned comparisons between control and misled items in each of the conditions examining retrieval blocking using dependent samples, one-tailed t tests to determine if a misinformation effect was present. One-tailed tests were used because there is no

theoretical reason for probability of recall for misled items to be higher than for control items. All comparisons were evaluated at $p < .05$. Table 3 gives the mean probability of recall for control and misled items for each list and counterbalance for the typical eyewitness memory paradigm conditions (i.e., Same condition).

Table 3

Mean Probability of Recall for Retrieval Blocking.

	Control	Misled
	<i>M (SD)</i>	<i>M (SD)</i>
List 1		
Counterbalance 1	.70 (.29)	.27 (.26)
Counterbalance 2	.61 (.31)	.61 (.31)
List 2		
Counterbalance 1	.52 (.26)	.81 (.38)
Counterbalance 2	.70 (.27)	.45 (.40)

Overall, probability of recall was significantly higher for control items ($M = .64$, $SEM = .05$) than for misled items ($M = .52$, $SEM = .06$) indicating that a misinformation effect due to retrieval blocking was obtained, $t(77) = 1.92$, $p < .05$, $\eta_p^2 = .04$. However, the results across conditions were mixed in that a misinformation effect was only obtained in some of the experimental conditions. A misinformation effect was obtained for List 1-Counterbalance 1, $t(9) = 3.38$, $p < .01$, $\eta_p^2 = .40$, and List 2-Counterbalance 2, $t(10) = 2.39$, $p < .05$, $\eta_p^2 = .19$. No significant difference in probability of recall was obtained between the control and misled items for List 1-Counterbalance 2, $t(11) = 0$, $p = .5$, $\eta_p^2 = 0.0$, and a reverse misinformation effect (i.e., probability of recall was

significantly higher for misled items than for control items) was obtained for List 2-Counterbalance 1, $t(6) = -2.12, p < .05, \eta_p^2 = .12$.

Why differences were obtained between the List and Counterbalance conditions will be discussed later. However, because the purpose of this experiment was to determine how contextual similarity between a witnessed and post event might differentially impact retrieval blocking and source monitoring, only the conditions in which a misinformation effect was obtained will be included in these next analyses (i.e., List 1-Counterbalance 1 and List 2-Counterbalance 2). All other list and counterbalance conditions were removed from these analyses.

Mean probability of recall for the List 1-Counterbalance 2 and List 2-Counterbalance 1 conditions were collapsed to examine the impact of contextual similarity between a witnessed and post event on retrieval blocking and source misattribution. Table 4 gives the overall means for probability of recall in the retrieval blocking paradigm and the intrusion rate in the source misattribution paradigm. In the Same condition, probability of recall was significantly higher for control items ($M = .70, SEM = .06$) than for misled items ($M = .37, SEM = .08$), $t(20) = 4.01, p < .001, \eta_p^2 = .23$. When the misinformation was presented in a completely different context—in the Different condition—probability of recall was still significantly higher for control ($M = .70, SEM = .06$) than for misled items ($M = .40, SEM = .07$), $t(21) = 4.63, p < .001, \eta_p^2 = .21$. The presence of a misinformation effect in the Different condition suggests that, as predicted, making the context between the witnessed and post event more discriminable does not ameliorate the impact of retrieval blocking on memory.

Table 4

Overall Means for Probability of Recall and Intrusion Rate.

	Same		Different	
	Control	Misled	Control	Misled
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Probability of recall	.70 (.28)	.37 (.35)	.70 (.36)	.40 (.34)
Intrusion rate	0.0 (0.0)	.27 (.32)	.02 (.07)	.06 (.13)

To determine whether context has the same effect on source monitoring errors, intrusion rate was examined for control and misled items in the Same condition. Intrusion rates were significantly higher for misled items ($M = .27$, $SEM = .07$) than for control items ($M = 0.00$), $t(19) = 3.76$, $p < .001$, $\eta_p^2 = .27$. However, when the context differed between the video and the narrative in which the misleading information was presented, intrusion rates lessened significantly. In the Different condition, intrusion rates were similar for the misled items ($M = .06$, $SEM = .03$) and control items ($M = .02$, $SEM = .02$), $t(20) = 1.37$, $p = .09$, $\eta_p^2 = .05$. Intrusion rates for misled items were also compared across context conditions and indicated that changing the context between events resulted in significantly less intrusions in the Different condition than in the Same condition, $t(39) = 2.69$, $p < .01$, $\eta_p^2 = .16$. The absence of a misinformation effect in source monitoring in the Different condition suggests that, as predicted, making the context between the witnessed and post event more discriminable resulted in more accurate source monitoring.

Alternate Analysis

In the previous analysis, conditions were included because an interference effect was obtained at a subject level. However, because the Misinformation condition manipulation was within subjects, the level of recall for the control and misled levels of that factor is not for the same items. For instance, for participants in the Counterbalance 1 condition, the “no smoking” sign served as a control item whereas for those in the Counterbalance 2 condition, the “no smoking” sign served as a misled item. One potential criticism of the previous analysis is that clearly obtaining a misinformation effect depended on the particular grouping of items resulting in an unfair comparison when conditions are selected using this criterion. Therefore, additional analyses were conducted by reorganizing the control and misled results so that the same items were being compared in each case, as if Misinformation had been manipulated between subjects. Probability of recall for control and misled items was compared by crossing counterbalance conditions within each list; for instance, probability of recall for control items in List 1-Counterbalance 1 was tested against the probability of recall for misled items in List 1-Counterbalance 2. A comparison between the control and misled conditions was then tested using independent samples *t* tests. Table 5 gives a layout of the comparisons made and their mean probability of recall.

Probability of recall was significantly higher for control items ($M = .61$, $SEM = .09$) than for misled items ($M = .26$, $SEM = .08$) in List 1 using Counterbalance 2 as control and Counterbalance 1 as misled, $t(20) = 2.76$, $p < .01$, $\eta_p^2 = .28$. All other comparisons indicated no misinformation effect (List 1-Counterbalance 1 as control and Counterbalance 2 as misled, $t(20) = 0.68$, $p = .25$, $\eta_p^2 = .02$; List 2-Counterbalance 1 as

control and Counterbalance 2 as misled, $t(16) = 0.40, p = .35, \eta_p^2 = .01$; List 2-Counterbalance 2 as control and Counterbalance 1 as misled, $t(16) = -0.73, p = .24, \eta_p^2 = .03$) and were removed from these analyses.

Table 5

Between-subjects Comparisons Examining Retrieval Blocking.

	Control		Misled	
	<i>M (SD)</i>		<i>M (SD)</i>	
List 1				
Counterbalance 1	.70 (.29)	Counterbalance 2	.61 (.31)	
Counterbalance 2	.61 (.31)	Counterbalance 1	.26 (.27)	
List 2				
Counterbalance 1	.52 (.26)	Counterbalance 2	.45 (.40)	
Counterbalance 2	.70 (.27)	Counterbalance 1	.81 (.38)	

A significant misinformation effect was also obtained in the Different condition between subjects in List 1 conditions using Counterbalance 2 as control ($M = .54, SEM = .09$) and Counterbalance 1 as misled ($M = .21, SEM = .08$), $t(17) = 2.72, p < .01, \eta_p^2 = .30$. Again, to determine whether context had the same effect on source monitoring errors, intrusion rate for control and misled items was also examined between subjects in List 1 using Counterbalance 2 as control and Counterbalance 1 as misled. Intrusion rates in the Same condition were significantly higher for misled items ($M = .41, SEM = .12$) than for control items ($M = 0$), $t(19) = 3.36, p < .01, \eta_p^2 = .43$. However, when the context differed between the video and the narrative in which the misleading information was presented, intrusion rates lessened significantly. In the Different condition, intrusion

rates were similar for the misled items ($M = .11$, $SEM = .06$) and control items ($M = .04$, $SEM = .04$), $t(15) = 0.98$, $p = .17$, $\eta_p^2 = .34$. Intrusion rates for misled items were also compared across context conditions and indicated that changing the context between events resulted in significantly less intrusions in the Different condition than in the Same condition, $t(16) = 2.22$, $p < .05$, $\eta_p^2 = .24$. The results of the between-subjects analyses support the findings from the within-subjects analyses indicating that making the context between the witnessed and post event more discriminable does not ameliorate the impact of retrieval blocking on memory, but does result in more accurate source monitoring.

List Analysis

The materials used in this study had previously been used in a source monitoring (Lindsay et al., 2004) but not in a retrieval blocking paradigm. That the results differed depending on the counterbalance manipulation seemed apparent. Therefore, to determine whether it was particular list items or the particular combination of items that was problematic, we conducted an item analysis of the critical items used. In this analysis, each critical item acted as a subject and the mean participant recall level served as the dependent measure. Recall was grouped according to whether the critical item served as a control or a misled item. Because of the counterbalancing strategy of placing the critical items in order of appearance in the narratives and then strategically selecting every other item to serve in a set, the end result was two groups of items per list. Group 1 consisted of specific critical items from List 1-Set 1 (i.e., “no smoking” sign, statue of a goddess, dolphin sculpture, and earrings), and Group 2 consisted of specific critical items from List 2- Set 1 (i.e., “no cameras” sign, statue of an armored man, cupid sculpture, and

bracelets). Group 3 and Group 4 consisted of specific critical items from Set 2 for List 1 and List 2, respectively. A 4 (Group) x 2 (Interference: control, misled) analysis of variance was conducted on the mean probability of each item to determine if individual items behaved in significantly different ways depending on whether they served as a control or interference item. The results indicated no interaction between Group and Interference, $F(3,24) = 0.25, p = .86$, suggesting that differences in List and Counterbalance conditions were due to an interaction between the systematic grouping of items when assigning them to either the control or misled conditions rather than any particular item. In other words, the grouping of items interacted with interference condition and with subject.

The resultant grouping artifact interfered with including all of the data in our analyses; however, when the particular grouping resulted in a misinformation effect, we were able to conduct the planned analyses to test and provide support for our hypotheses. Regardless of how the analyses were approached, making the context of the post event different from the context of the witnessed event lessened the occurrence of source misattribution but did not ameliorate the impact of retrieval blocking.

CHAPTER IV

DISCUSSION

The present findings provide evidence to support the hypothesis that contextual similarity between a witnessed and post event has a different impact on retrieval blocking and source misattribution in terms of producing a misinformation effect. As predicted, when retrieval blocking was isolated, memory was better for control items than for misled items, regardless of the contextual similarity between events. In other words, a misinformation effect due to retrieval blocking was obtained even when the context of the post-event narrative was completely different from the context of the witnessed event. Providing misinformation in a post-event narrative also increased intrusion rates on a test of source monitoring; memory intrusions occurred more often for misled items than for control items. However, as predicted, presenting the misinformation in a different context from the witnessed event reduced intrusions; the intrusions were no more frequent for misled than control items when the context differed. In other words, people were able to use the context to ameliorate intrusions when the context differed, but were not able to use the context to ameliorate retrieval blocking in that condition.

Although previous studies have presented similar findings concerning the impact of contextual similarity on retrieval blocking (Eakin & Wood, 2010) and source misattribution (Lindsay, 1990; Lindsay et al., 2004), the present study not only replicates

these findings, but also, by examining the role of context on these two mechanisms simultaneously using the same experimental materials and procedures, many of the problems associated with comparing results across studies and mechanisms were eliminated. Given that the findings from the present study indicate that the differential findings about the impact of context manipulations on retrieval blocking versus source monitoring validate prior research, the remaining question from a theoretical point of view concerns why context operated differently. The results are discussed in terms of the SAM (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981) model of memory and the source monitoring framework (Johnson et al., 1993).

The findings of the present study can be understood using the explanation for retrieval blocking posited by SAM (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981). The SAM model of memory states that the context surrounding the association between a cue and target is strengthened along with the association between the cue and target. In other words, if a misled item is retrieved, as is likely to happen on the MOT, that item blocks retrieval of the witnessed information. Along with the witnessed item, the context associated with the misled item may also block access to the context associated with the witnessed item, preventing contextual differences between a witnessed and post event from reducing or eliminating retrieval blocking. As posited by SAM, the present results suggest that the context surrounding the association between a cue and target is part of the strength association between that cue and target because participants were unable to use the context of events to unblock access to the correct information. Apparently, the context surrounding the desired target is susceptible to retrieval blocking by the context surrounding the target responsible for the interference. It

appears that context cannot be used to ameliorate the misinformation effect due to retrieval blocking because access to the context associated with a to-be-remembered item is blocked along with the item itself by the misleading item and its context.

The source monitoring framework provides a theoretical explanation for the source misattribution findings from the current study (Johnson et al., 1993). The source monitoring framework states that source memory accuracy depends, in part, on the discriminability of the conditions associated with the information being retrieved. In other words, when enough contextual discriminability exists between events, the context of these events can be used during the judgment process of source misattribution to help discriminate between events. It appears that context can be used to ameliorate the misinformation effect due to source misattribution because the context associated is separate from the to-be-remembered item and can provide enough independent discriminability between events to allow the source to be appropriately attributed to the to-be-remembered item.

Apparently, context plays a different role depending on which mechanism is responsible for the potential memory error. For instance, the context associated with the to-be-remembered item cannot be used when a misleading item is retrieved because the context associated with the misleading item is also retrieved. The retrieval of the misled item context blocks the context of the to-be-remembered item from being retrieved: thereby, preventing the context of the to-be-remembered item from providing additional information that may help retrieve the to-be-remembered item. However, when attempting to attribute details to particular events, the context of associated with each event can be used to provide additional information about the source of these events

because the context is independent of the item to-be-remembered. For instance, if an event is identified as a source of misinformation and has an adequately discriminable context, then this context can provide the means to disregard (i.e., inhibit) details associated with the misleading event; thereby, providing an opportunity to attribute details to the appropriate event.

Despite the goals of the present study to examine the role of context on retrieval blocking and source misattribution while correcting for methodological and materials differences in prior research, issues remained concerning the experimental design, materials, and analyses. The retrieval blocking paradigm had to be modified to accommodate the absence of critical information in the video by presenting the “witnessed” event in a narrative. It could be the case that reading two narratives, one for the witnessed and one for the misleading information, impaired memory for some items. The difference between the two conditions may have been less distinctive because of the similar modality in presenting the witnessed and misleading information. However, the fact that a misinformation effects was (sometimes) obtained, suggests that this method was successful, at least some of the time. In addition, manipulating the misinformation factor within subjects limited the potential impact of this factor on the effect of interest.

Another limitation to the design used in the present paradigm is the use of a different dependent measure for retrieval blocking and source misattribution (i.e., probability of recall and intrusion rate, respectively). Because of this, only indirect comparisons in terms of the patterns of the impact of misinformation on retrieval blocking and source monitoring can be examined, rather than statistical comparisons. The development of a truly equivalent eyewitness memory paradigm (i.e., same procedure

and dependent measure) capable of examining retrieval blocking and source misattribution would certainly be a beneficial addition to the examination of these two mechanisms.

In addition to the limitations in the design of the present study, several issues concerning the materials, specifically the critical items, were problematic. The biggest issue was that there appeared to be an interaction between the way items were grouped into sets and the conditions in which they served. One item (statue) was not memorable regardless of the condition in which it served and was removed from the analysis, which led to another item (war) being removed from the misled set. An examination of individual items did not reveal differences; however, serving in a particular set with particular other items resulted in very different memory performance across control and misled conditions. Any attempt to explain this grouping artifact is speculative. It could be the case that specific versions and combinations of items were not memorable and therefore acted differently in the control than the misled condition. Clearly some combinations of items were better recalled when they served as misled items than as control items. Previous researchers have dealt with this problem by doing extensive counterbalancing (for instance, we could have also counterbalanced between lists) and pilot testing to identify “good” from “bad” items. For instance, it is well known in the eyewitness memory field that the candy bar slide from the Loftus et al. (1978) slides is notoriously difficult to use as a misled item. All of the critical items used were new to our paradigm and perhaps extensive piloting would have eliminated “difficult” items from the lists.

Regardless of the grouping artifact, the same findings were obtained whether we defined the misinformation effect as a within-subjects or between-subjects factor. Therefore, the analyses only included conditions in which a misinformation effect was obtained either within subjects for different control and misled critical items or between subjects for the same control and misled critical items. Regardless of how the data were parsed, when a misinformation effect was obtained due to retrieval blocking and source misattribution, providing a different context for the post event reduced source monitoring errors but had no impact on retrieval blocking. Because these findings were consistent for both the within- and between-subjects analyses, we have support for the validity of the conclusions.

Although several issues and limitations existed within the present study, valuable information was gained concerning the impact that the context of an event can have on the occurrence of two of the major causes of eyewitness memory errors. The findings have both practical and theoretical implications. For instance, an attorney may direct their clients to avoid situations where they could be exposed to details similar to those that are important to the case, regardless of how similar the circumstances surrounding the case are to the current situation. The findings of the present study also suggest that exposure to post-event information may provide an opportunity for retrieval blocking of accurate details from the event of interest. Additionally, it may help an attorney to know that when a client is having difficulty remembering where they heard or saw something, having the client focus on the conditions surrounding the events in question might alleviate source confusion and result in appropriate attribution of the information to the source. In addition to providing information for members of the justice system that work

with eyewitnesses, the present findings also provide evidence in support of both the SAM (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981) model of memory and the source monitoring framework (Johnson et al., 1993). The findings suggest that context is inherent in the retrieval process and cannot be separated from that process to help alleviate retrieval blocking. However, when the context is independent from the item to-be-remembered, the context can be used to eliminate sources of competing information.

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APPENDIX A

SAMPLE MOT BOOKLET

With Same Context Post-event Narrative

S# _____

***** PLEASE LEAVE BOOKLETS CLOSED IN FRONT OF *****
***** YOU UNTIL INSTRUCTED TO BEGIN *****

Instructions

On the next page you will find a written narrative that describes what was seen in the video. Please read this narrative carefully as you will be tested on details from this narrative later on. Once you have finished reading the narrative, continue to the next page of the booklet and follow the instructions.

A man dressed in black clothes uses a silver crossbow to shoot an arrow from one building to another building, which appears to be a museum. The arrow sticks into the old, brick wall of the museum right above a "no smoking" sign and a missing black, Labrador flyer. With a rope that ties the arrow to the building where he is standing, the man uses a silver pulley to slide himself to the roof of the museum. After landing, he throws a grappling hook up to the roof and latches onto a black, iron window frame located on the roof of the museum. Using the rope, the man scales the wall and removes the window. After that, he lowers his crossbow slowly down to the floor of the museum, and then he descends down to the floor of the museum. It appears that the man has entered a dimly lit hallway. There is a dark door located behind him. A painting of a prince is hanging above the door, and a large ceramic pot is located to the left side of the door. There is also a red fire extinguisher mounted on the wall to the right side of the door.

The man, his face painted in black, walks through the hallway, where a black telephone is mounted on the wall. The man uses a can of aerosol and sprays in front of him to check for invisible security beams. He turns left at the end of the hallway where a gold-painted, porcelain planter holds a magnificent Bonsai tree. The man passes more artifacts, a statue of a goddess, and another red fire extinguisher on the wall. He then walks down the hallway until he approaches three holes in the wall, each emitting an invisible beam that will trigger the alarm if something gets in its way. The man uses the aerosol to locate the invisible beams, and notices that the lowest beam is almost a foot above the floor. He lies down and uses his crossbow to shoot an arrow to the other end of the hallway. He then spreads oil on the floor and takes a black foam pad out from his black coat and places it on the floor. Lying on the pad, the man pulls himself underneath the alarm beams using the rope attached to the arrow at the other end of the hallway. After successfully evading the alarm, he gets up and walks into a big room. The room is very large and filled with sculptures, paintings, and artifacts, such as model castle displays and swords mounted on the wall in one corner of the room. In another corner of the room, a large pedestal that has been carved to resemble dolphins holds on it a beautiful purple mineral. The mineral is surrounded on all sides by individual glass cases containing various mining tools such as antique chisels, hammers, and picks. The back wall of the big room has a mounted elk head with a massive 14-point rack. Another telephone and fire extinguisher are mounted on either side of the elk head. The lights in the room are dim, and there is nobody around when the man arrives.

A huge, egg-shaped diamond is located in the center of the room. The diamond is sitting on a stand with a spherical glass lid used to cover the diamond. The stand of the diamond is placed on top of a red, floral rug. There are pillars located around the diamond, each with holes that emit beams much like the system in the hallway. The man again uses his aerosol to locate where the beams are. He then shoots an arrow into the middle of a mural of two knights in battle painted on the ceiling. He slowly uses the rope attached to the arrow to lift the lid that covers the diamond up by its handle. After that, he takes a pair of mechanical gripping devices out from the big pockets in his black pants and lies on the rug. He uses the aerosol again to check the positions of the beams and carefully maneuvers the mechanical arms, removes the diamond from the stand, and drops it into his hand. Then he places a white glove on the stand that was holding the diamond. The thief glances back at a display case full of elegant earrings, but decides that he has what he came for and moves back towards the hallway. After that, he slides himself back into the hallway with the aid of the foam pad. At the same time, a security guard, wearing a light brown uniform, walks into the hallway. The thief stays down on the floor while the security guard is staring into the large room. When the security guard notices that the diamond is gone, he runs into the room and triggers the alarm. An aluminum door slams down and traps the security guard in the room while the burglar runs through the hallway. Two other security guards come over to open the aluminum door that has trapped the third guard, and all three guards pursue the thief.

The thief now appears in the lobby of the museum, still trying to escape. While climbing the stairs, the thief runs into a large clock hanging on the wall almost knocking it to the floor. He continues to climb the stairs until he reaches the roof. Four security guards are now chasing him across the roof of the museum. When the thief rounds the corner, he notices a metal door beside him swing open. The thief, suspecting a guard behind the door, kicks the door shut knocking the guard unconscious. There are many powerful lights mounted on the floor of the roof in groups of three with old paint cans sitting beside them. Three security guards arrive from the same route as the thief, and they too slam the door closed knocking the dazed security guard unconscious again. Meanwhile, the burglar ties a rope attached to the crossbow to a pole on the rooftop. He then shoots an arrow into the balcony of an apartment building across the street. Again, he uses the pulley to slide himself to the other building and escapes the pursuit of the security guards who are firing their weapons at him from the roof of the museum.

Instructions

On the next page you will find some general knowledge questions which we would like you to answer. The purpose of answering these questions is to help us prepare materials for future experiments. Please read each question carefully and then print the correct answer in the blank next to the question. Try hard to think of the correct answer for each question. If you cannot think of the correct answer, then please write down your best guess. Once you have answered a question, go to the next one and do not return to any previous questions. When you have answered the last question on the page, please turn to the next page.

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- What is Japanese for a 17-syllable poem? _____
- What is the oldest physical science? _____
- How many of the 7 dwarfs have beards? _____
- What is the oxygen-carrying protein of red blood cells? _____
- What is white sugar mixed with to make brown sugar? _____
- What elementary particle's antiparticle is the positron? _____
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- In what country can the world's longest coastline be found? _____
- What country did Burma split form in 1937? _____
- What age of exploration began on October 4, 1957? _____
- How many inches square are U.S. passport photos? _____
- What bacteria is the most common cause of food poisoning? _____
- What is the second letter of the Greek Alphabet? _____
- What do insects do through their spiracles? _____
- How many feet deep is the average grave in the U.S.? _____
- What is the only sea that has shores on the continents of Europe, Asia and Africa? _____
- What is the state bird of 7 U.S. states? _____

Instructions

When you reach this page in the booklet, please put your pen/pencil down and wait quietly for a short while until everyone has completed the general knowledge questions. The next part of the experiment will begin when everyone has finished this section.

*****DO NOT TURN THE PAGE UNTIL INSTRUCTED TO DO SO *****

Instructions

On the next page you will find a written narrative which we would like you to read once at your own pace. Your memory for details described in the narrative will also be tested, so please read it thoroughly. After you are finished, continue working through the booklet at your own pace.

******* PLEASE TURN TO THE NEXT PAGE *******

A man dressed in black clothes uses a silver crossbow to shoot an arrow from one building to another building, which appears to be a museum. The arrow sticks into the old, brick wall of the museum right above a metal sign and a missing black, Labrador flyer. With a rope that ties the arrow to the building where he is standing, the man uses a silver pulley to slide himself to the roof of the museum. After landing, he throws a grappling hook up to the roof and latches onto a black, iron window frame located on the roof of the museum. Using the rope, the man scales the wall and removes the window. After that, he lowers his crossbow slowly down to the floor of the museum, and then he descends down to the floor of the museum. It appears that the man has entered a dimly lit hallway. There is a dark door located behind him. A painting of a queen is hanging above the door, and a large ceramic pot is located to the left side of the door. There is also a red fire extinguisher mounted on the wall to the right side of the door.

The man, his face painted in black, walks through the hallway, where a black telephone is mounted on the wall. The man uses a can of aerosol and sprays in front of him to check for invisible security beams. He turns left at the end of the hallway where a gold-painted, porcelain planter holds a magnificent Bonsai tree. The man passes more artifacts, a statue, and another red fire extinguisher on the wall. He then walks down the hallway until he approaches three holes in the wall, each emitting an invisible beam that will trigger the alarm if something gets in its way. The man uses the aerosol to locate the invisible beams, and notices that the lowest beam is almost a foot above the floor. He lies down and uses his crossbow to shoot an arrow to the other end of the hallway. He then spreads oil on the floor and takes a black foam pad out from his black coat and places it on the floor. Lying on the pad, the man pulls himself underneath the alarm beams using the rope attached to the arrow at the other end of the hallway. After successfully evading the alarm, he gets up and walks into a big room. The room is very large and filled with sculptures, paintings, and artifacts, such as model castle displays and shields mounted on the wall in one corner of the room. In another corner of the room, a large, sculptured pedestal holds a beautiful purple mineral. The mineral is surrounded on all sides by individual glass cases containing various mining tools such as antique chisels, hammers, and picks. The back wall of the big room has a mounted elk head with a massive 14-point rack. Another telephone and fire extinguisher are mounted on either side of the elk head. The lights in the room are dim, and there is nobody around when the man arrives.

A huge, egg-shaped diamond is located in the center of the room. The diamond is sitting on a stand with a spherical glass lid used to cover the diamond. The stand of the diamond is placed on top of a red, floral rug. There are pillars located around the diamond, each with holes that emit beams much like the system in the hallway. The man again uses his aerosol to locate where the beams are. He then shoots an arrow into the middle of a mural of David and Goliath in battle painted on the ceiling. He slowly uses the rope attached to the arrow to lift the lid that covers the diamond up by its handle. After that, he takes a pair of mechanical gripping devices out from the big pockets in his black pants and lies on the rug. He uses the aerosol again to check the positions of the beams and carefully maneuvers the mechanical arms, removes the diamond from the stand, and drops it into his hand. Then he places a white glove on the stand that was holding the diamond. The thief glances back at a display case full of jewelry, but decides that he has what he came for and moves back towards the hallway. After that, he slides himself back into the hallway with the aid of the foam pad. At the same time, a security guard, wearing a light brown uniform, walks into the hallway. The thief stays down on the floor while the security guard is staring into the large room. When the security guard notices that the diamond is gone, he runs into the room and triggers the alarm. An aluminum door slams down and traps the security guard in the room while the burglar runs through the hallway. Two other security guards come over to open the aluminum door that has trapped the third guard, and all three guards pursue the thief.

The thief now appears in the lobby of the museum, still trying to escape. While climbing the stairs, the thief runs into a large mirror hanging on the wall almost knocking it to the floor. He continues to climb the stairs until he reaches the roof. Four security guards are now chasing him across the roof of the museum. When the thief rounds the corner, he notices a metal door beside him swing open. The thief, suspecting a guard behind the door, kicks the door shut knocking the guard unconscious. There are many powerful lights mounted on the floor of the roof in groups of three with old paint cans sitting beside them. Three security guards arrive from the same route as the thief, and they too slam the door closed knocking the dazed security guard unconscious again. Meanwhile, the burglar ties a rope attached to the crossbow to a pole on the rooftop. He then shoots an arrow into the balcony of an apartment building across the street. Again, he uses the pulley to slide himself to the other building and escapes the pursuit of the security guards who are firing their weapons at him from the roof of the museum.

Instructions

On the next two pages you will find some more general knowledge questions. As before, please read each question carefully and then print the correct answer or your best guess in the blank next to the question. When you have answered the last question on the page, please turn to the next page.

******* PLEASE TURN TO THE NEXT PAGE *******

- What U.S. agency is considered by e-mail users to deliver ~~snail-mail~~? _____
- What letter begins words with the fewest entries in the Oxford English dictionary? _____
- What desert is home for Death Valley? _____
- What do herbivorous dinosaurs feed on? _____
- How many nostrils grace an elephant's trunk? _____
- What living organism can be 30 times the size of a blue whale? _____
- What letter-and number designation was given to the U.S. canine corps in 1942? _____
- What does the ~~it~~ "is" mean in bronchitis? _____
- What name for a bone disease translates as ~~porous bone~~? _____
- What was the most lethal infectious disease of 1990? _____
- What does the number of protons in the nucleus of an atom determine? _____
- How many toes does each of a guinea pig's hind feet have? _____
- What body part becomes infected if you have cholera? _____
- What is the most common cause of cirrhosis? _____
- What brand name is aspartame sold under? _____
- What color hair do one in sixteen Americans have? _____
- What branch of biology deals with the nature of aging? _____
- What body orifice are you able to talk through if you can ~~snoach~~? _____
- What does ~~arthro~~ mean in arthroscopic? _____
- What p-word is defined as an inert substance administered instead of a drug? _____
- What is the active ingredient in smelling salts? _____

- What country's tourists spend the most money per capita in foreign lands? _____
- What two letters are both symbols for 1,000? _____
- What is the smallest number of pips on a domino? _____
- What is slowed significantly if you're suffering from bradycardia? _____
- What is the most abundant species of tiger? _____
- What is the most common name for a screw with a cross drive recess? _____
- What did the French call "the English disease" and the English call "the French disease"? _____
- What is the top apple-producing state in the U.S.? _____
- What does a bromidrosiphobic shoe salesman fear? _____
- What glandular organ is on the right side of the abdominal cavity under the diaphragm? _____
- What is the official color of IBM? _____
- What does "SPF" mean on sunscreen containers? _____
- What central African State boasts a big "R" in the middle of its flag? _____
- What determines the sex of crocodile embryos? _____
- What are dogfish small versions of? _____
- What is computer-ese for 1,024 kilobytes? _____
- What U.S. outfit uses the slogan "full speed ahead"? _____
- Who killed Cleopatra in 30 B.C.E.? _____
- What African country has 13 official languages? _____
- What is the common name for a cubic decimeter? _____

Instructions

The second written narrative you read included objects that were depicted in the movie clip or described in the first narrative that you read. In the second narrative, however, these objects were depicted in a way that contradicted what was shown in the movie or in the first narrative.

On the next page are a few questions which test your memory for details depicted in the movie clip or presented in the first narrative. The details that the questions ask you about were mentioned in the second narrative but they were wrong (that is, the second narrative misled you and gave you incorrect information). **There is no question on this test for which the correct answer was mentioned in the second narrative.**

Please read each question carefully and write the correct answer in the space provided below each question. You should base your answers **only** on information you remember from the movie clip or the first narrative and **not** on any information that you remember from the second narrative. Please make sure that your answer is something you specifically remember as coming from the movie clip or first narrative. In order to help you remember the correct answer, there is a "hint" given below each question. The hint specifies an item that is not the correct answer and that you should **not** give as your response. Read this hint carefully and please make sure that you **do not** give the item mentioned in the hint as your response.

When you have finished answering all the questions, please quietly bring your booklet to the front.

*****PLEASE CONTINUE TO THE NEXT PAGE*****

INSTRUCTIONS—PLEASE READ CAREFULLY

The following questions ask you about details in the movie clip you saw at the beginning of this experiment. Remember to answer the questions based only on what you remember from the movie clip. It is very important that you do not leave any question blank.

- 1) What type of device did the thief use to propel the zip line from the apartment building to the museum?

(Hint: not rifle)

- 2) What was the color of the carpet underneath the diamond? *(Hint: not green)*

- 3) To what did the thief attach his end of the zip line before escaping from the roof of the museum?

(Hint: not a light)

The next questions are based solely on what you remember in the movie clip and first narrative describing the movie clip. Remember, there is no question on this portion of the test for which the correct answer was mentioned in the second narrative.

- 4) What warning sign was posted on the exterior wall of the museum before the thief broke in?

(Hint: not "no cameras")

- 5) In the first room that the thief entered, what was the subject of the painting hanging above the door that was directly behind the thief? *(Hint: not queen)*

- 6) What was the subject of the statue in the dimly lit hallway just before the thief prepared to slide under the security system in the video? *(Hint: not armored man)*

- 7) What item used in warfare was hanging on the wall in the big room where the diamond was stolen?

(Hint: not shield)

- 8) What was sculpted on the pedestal in the big room where the diamond was stolen? *(Hint: not cupids)*

- 9) What characters were painted on the mural on the ceiling in the big room where the diamond was stolen?

(Hint: not David and Goliath)

- 10) What kind of jewelry did the thief consider stealing before making his escape? *(Hint: not bracelets)*

- 11) What wall decoration did the thief almost knock off the wall while escaping up the stairs? *(Hint: not mirror)*

- 12) Have you ever participated in a study like this before? **Y / N**

APPENDIX B

SAMPLE LOT BOOKLET

With Different Context Post-event Narrative

S# _____

***** PLEASE LEAVE BOOKLETS CLOSED IN FRONT OF *****
***** YOU UNTIL INSTRUCTED TO BEGIN *****

Instructions

On the next page you will find some general knowledge questions which we would like you to answer. The purpose of answering these questions is to help us prepare materials for future experiments. Please read each question carefully and then print the correct answer in the blank next to the question. Try hard to think of the correct answer for each question. If you cannot think of the correct answer, then please write down your best guess. Once you have answered a question, go to the next one and do not return to any previous questions. When you have answered the last question on the page, please turn to the next page.

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- What is the most common last name of the world's English speaking people? _____
- What is the international system of units is better known as to Americans? _____
- How many years long is a quinquennium? _____
- What extends further North: Japan, North Korea or Turkey? _____
- What is Japanese for a 17-syllable poem? _____
- What is the oldest physical science? _____
- How many of the 7 dwarfs have beards? _____
- What is the oxygen-carrying protein of red blood cells? _____
- What is white sugar mixed with to make brown sugar? _____
- What elementary particle's antiparticle is the positron? _____
- What U.S. president has been depicted the most often on the silver screen? _____
- In what country can the world's longest coastline be found? _____
- What country did Burma split form in 1937? _____
- What age of exploration began on October 4, 1957? _____
- How many inches square are U.S. passport photos? _____
- What bacteria is the most common cause of food poisoning? _____
- What is the second letter of the Greek Alphabet? _____
- What do insects do through their spiracles? _____
- How many feet deep is the average grave in the U.S.? _____
- What is the only sea that has shores on the continents of Europe, Asia and Africa? _____
- What is the state bird of 7 U.S. states? _____

- What black metal gave blacksmiths their name? _____
- What word describes the physical components of a computer? _____
- What do you call the offspring of a male tiger and a female lion? _____
- What company first condensed soup in 1898? _____
- What distant planet circles the sun every 84 years? _____
- What color are a zebra's black stripes during the first six months of life? _____
- What teenage year does an American first develop phobias in, on average? _____
- What sea contains Europe's lowest points? _____
- How many kittens comprise the average litter? _____
- What machine is most often used in a lie detector test? _____
- What does a cyberphobic fear? _____
- What word describes energy obtained from underground heat? _____
- What hasn't a nulliparous woman done? _____
- What nation is bordered on the north by Syria, Turkey and Iran? _____
- What is the smallest size bottle of champagne? _____
- What is removed from water in the process of desalination? _____
- What Olympic field event consists of crouch, shift, thrust, and release? _____
- What must a meteor do to become a meteorite? _____
- How many pecks make a bushel? _____
- What test-tube process has the acronym IVF? _____

Instructions

When you reach this page in the booklet, please put your pen/pencil down and wait quietly for a short while until everyone has completed the general knowledge questions. The next part of the experiment will begin when everyone has finished this section.

*****DO NOT TURN THE PAGE UNTIL INSTRUCTED TO DO SO *****

Instructions

On the next page you will find a written narrative which we would like you to read once at your own pace. Your memory for details described in the narrative will also be tested, so please read it thoroughly. After you are finished, continue working through the booklet at your own pace.

******* PLEASE TURN TO THE NEXT PAGE *******

A class of Grade 10 students who live in Bedford, England, is going on a field trip to visit a palace in London. Balmoral Palace of London was built by a wealthy Duke in the fifteenth century. The grounds were once huge, but now the estate is just a few acres on the south bank of the Thames, about a mile from London Tower Bridge. As the school bus drives through the large gates in the wrought-iron fence that surround the estate, they can see the twin towers of the palace rising above the trees. There is also a “no smoking” sign mounted on every main post of the fence. The bus stops in a parking area near the palace entrance, and the children pile out, laughing and talking and fooling around. The teacher emerges from the bus and asks the students to gather around and pay attention to her. She tells the students to behave when they are inside the palace. She says, “Okay people, when you’re in the palace, stay with the crowd and don’t run around. I don’t want to see any inappropriate behavior. Now line up, because we’re going in.” As the students walk towards the entrance of the palace, they stare up at its high, stone walls and heavily barred windows.

The teacher tells her students about the history and background of the palace as they enter the castle. She says, “The palace was once surrounded by thousands of acres of woodland and small tenant farms. Over the years, further land was acquired, expanding the area to about 50,000 acres. One of the estate’s most important areas was the 2500 acre Ballochbuie Forest, which was bought by Queen Victoria to save it from a timber merchant. Almost all of the land, including most of the Forest, is now gone, but a small stand of trees still remains. We’ll get a chance to see it later on.”

When they enter the foyer of the palace, a staff member is sitting behind a desk. The teacher has collected a nominal fee from her students before the day of the field trip. After they pay for the entry fee, they go through a door and head into a long, dimly lit hallway. The hallway is richly carpeted and decorated with all sorts of luxurious and exotic ornaments. There are many dimly lit paintings on the walls, and various kinds of statues and sculptures mounted on pedestals. About halfway down the hall there is a large statue of a goddess, with one arm broken off at the elbow. One of the students reaches out to touch a painting which alerts a staff member of the palace, who comes over and politely asks the student not to touch any of the displays. The teacher apologizes, and they keep walking through the hallway and enter a fairly large square room. There is a set of ornately carved wooden doors directly across from where they entered. The class walks through the wooden doors and enters the throne room.

The throne room is well-illuminated. Sunlight penetrates through the numerous high windows, which are built along the far wall of the room. There are also many paintings and sculptures in the room. Most of the paintings are portraits, and a tag appears beneath each painting. Each tag provides detailed information about the painting, such as the artist’s name and when the painting was done. All the portraits were done for the royal families who used to live in the palace. The paintings are hanging on both sides of the room. The floors are made of dark wood, and a rich red carpet leads up to two huge, golden chairs in the centre of the room, where the king and queen used to sit in state. Mounted on the stone wall behind the thrones are more artifacts. Beside each throne is a beautiful pedestal sculpted to resemble dolphins, and sitting in a glass case atop each pedestal is a golden, jewel-encrusted crown. Students get together around the crown as their teacher briefs them on the history of the crown and the people who used to live in the palace.

The teacher then tells the students that they will go up to the roof of the palace. As they continue through the hallway, the teacher encourages the students to examine a display case full of earrings worn by the royal family. She says, “There is a walkway on the roof that provides a magnificent view of what’s left of the forest surrounding the palace.” They walk up the stairs and arrive on the roof. There are some hardware tools on the floor of the roof. A student asks her teacher why there are tools on the floor, and the teacher answers that the tools might have been left there by construction and renovation workers. It appears that the roof of the palace is currently undergoing some restoration. The teacher shows the students around on the roof. Most of them are disappointed by the “forest.” The Ballochbuie forest was once vast, but now it is not much bigger than the parking lot in which they can see their waiting bus. Nonetheless, the view is spectacular. The golden twilight of late afternoon reflects off the flowing river Thames, and the view is unlike anything the students have ever seen. While they are enjoying the view, the teacher tells them that the time is up and they have to head back to school.

Instructions

On the next two pages you will find some more general knowledge questions. As before, please read each question carefully and then print the correct answer or your best guess in the blank next to the question. When you have answered the last question on the page, please turn to the next page.

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- What letter begins words with the fewest entries in the Oxford English dictionary? _____
- What desert is home for Death Valley? _____
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- What is the top apple-producing state in the U.S.? _____
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- What African country has 13 official languages? _____
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- 1) What type of device did the thief use to propel the zip line from the apartment building to the museum?

- 2) What was the color of the carpet underneath the diamond?

- 3) To what did the thief attach his end of the zip line before escaping from the roof of the museum?

- 4) What warning sign was posted on the exterior wall of the museum before the thief broke in?

- 5) In the first room that the thief entered, what was the subject of the painting hanging above the door that was directly behind the thief?

- 6) What was the subject of the statue in the dimly lit hallway just before the thief prepared to slide under the security system in the video?

- 7) What item used in warfare was hanging on the wall in the big room where the diamond was stolen?

- 8) What was sculpted on the pedestal in the big room where the diamond was stolen?

- 9) What characters were painted on the mural on the ceiling in the big room where the diamond was stolen?

- 10) What kind of jewelry did the thief consider stealing before making his escape?

- 11) What wall decoration did the thief almost knock off the wall while escaping up the stairs?

- 12) Have you ever participated in a study like this before? **Y / N**

APPENDIX C
IRB APPROVAL LETTER



MISSISSIPPI STATE
UNIVERSITY™

Compliance Division
Administrative Offices
Animal Care and Use (IACUC)
Human Research Protection
Program (IRB)
1207 Hwy 182 West, Suite C
Starkville, MS 39759
(662) 325-3496 - fax

Safety Division
Biosafety (IBC)
Radiation Safety
Hazardous Waste
Chemical & Lab Safety
Fire & Life Safety
70 Morgan Avenue
Mississippi State, MS 39762
(662) 325-8776 - fax

<http://www.orc.msstate.edu>
compliance@research.msstate.edu
(662) 325-5294

October 26, 2010

Matthew Douglass
4410 Swinnea Rd.
Southaven, MS 38671

RE: IRB Study #10-297: The Effect of Context on Retrieval Blocking and Source
Misattribution in an Eyewitness Memory Paradigm
(SONA System Title: Blocking the Confusion)

Dear Mr. Douglass:

The above referenced project was reviewed and approved via administrative review on 10/26/2010 in accordance with 45 CFR 46.101(b)(1). Continuing review is not necessary for this project. However, any modification to the project must be reviewed and approved by the IRB prior to implementation. Any failure to adhere to the approved protocol could result in suspension or termination of your project. The IRB reserves the right, at anytime during the project period, to observe you and the additional researchers on this project.

Please note that the MSU IRB is in the process of seeking accreditation for our human subjects protection program. As a result of these efforts, you will likely notice many changes in the IRB's policies and procedures in the coming months. These changes will be posted online at <http://www.orc.msstate.edu/human/aahrpp.php>. The first of these changes is the implementation of an approval stamp for consent forms. The approval stamp will assist in ensuring the IRB approved version of the consent form is used in the actual conduct of research. You must use copies of the stamped consent form for obtaining consent from participants.

Please refer to your IRB number (#10-297) when contacting our office regarding this application.

Thank you for your cooperation and good luck to you in conducting this research project. If you have questions or concerns, please contact me at cwilliams@research.msstate.edu or call 662-325-5220.

Sincerely,

[For use with electronic submissions]

Christine Williams, CIP
IRB Compliance Administrator

cc: Deborah Eakin (Advisor)

Office of Regulatory Compliance & Safety • Post Office Box 6223 • Mississippi State, MS 39762