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The Relationship Between Eyewitness Identification Accuracy and Memory for Contextual Details

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Honors Thesis

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Abstract

Eyewitness identification is very compelling to judges and juries, yet research has demonstrated that it is often fallible. One important issue concerns the relationship between lineup identification accuracy and memory for other event (contextual) details. Legal professionals find the issue of interest because, if there is a relationship, confirming that a witness is correct about event details might increase confidence that he or she correctly identified a perpetrator rather than an innocent suspect. Memory researchers find the issue of interest because it relates to our understanding of how individual features of an experience become "bound" together into coherent memory for an event. In this experiment, participants saw a slideshow depicting a crime committed by a male and female perpetrator. The perpetrators interacted with some objects and other objects were simply in the periphery of the scene. Afterwards, participants completed a lineup for each perpetrator and each object. When participants picked an object from a lineup, they were also asked to indicate whether the male or female handled it, or whether it was in the background. Results revealed a modest association between memory for the perpetrators and memory for objects that were more central to the event. Participants were also more likely to correctly remember the "source" of an object when a perpetrator handled it than when it had been in the background.

The relationship between eyewitness identification accuracy and memory for contextual details

Historically, investigators, juries, and judges have taken eyewitness testimony at face value. In other words, what witnesses confidently recollect at the time of questioning and in court is generally believed to be the truth. However, there are a number of reasons to question this assumption. Research on eyewitness memory has revealed many factors that influence accuracy (for a review, see Wells, Memon, & Penrod, 2006). For example, witnesses' memory can be negatively affected by the passage of time (i.e., being questioned right after the crime is committed versus weeks or months afterward; e.g., Deffenbacher, Bornstein, & Penrod, 2008). There are also compelling real-life examples of false identification that arise from DNA exonerations (Connors, Lundregan, Miller, and McEwen, 1996). Perhaps not surprisingly, these findings have led researchers to suggest ways of improving the accuracy of eyewitness testimony (e.g., the way lineups are conducted; Wells, Small, Penrod, Malpass, Fulero, & Brimacombe, 1998). However, there are other potential ways of improving the usefulness of eyewitness evidence that involve taking advantage of all that the witness reports. In the following study, I investigate the possibility that being accurate about some details of an eyewitness event might predict whether a witness is correct about other aspects (specifically, whether their identification of a perpetrator is correct).

When a witness is questioned following an eyewitness event, he or she typically provides information about a wide variety of aspects of that event. These details could include a description of the perpetrator, objects he or she handled or took, actions that took place, or other types of information. Later on, a suspect may be apprehended, and

the witness could be called upon to identify whether any of the members of the lineup are, in fact, the perpetrator. In such a situation, it is reasonable to ask whether accuracy about some elements of a witness's report would predict accuracy on other aspects. This could occur, for instance, when an investigator can corroborate some of the details of the crime via videotape or physical evidence. If a witness has accurate knowledge of these details, the investigator may have reason to believe that the witness would be more likely to accurately pick the perpetrator from a lineup. Although this is a reasonable hypothesis, research has provided mixed evidence for this proposition (e.g., Wells & Leippe, 1981; Lane, Groft, Roussel & Calamia, 2008). I next discuss this research below, followed by a description of the current experiment and the hypotheses.

Some previous research has provided evidence that memory for peripheral or "unimportant" details is negatively associated with accuracy of eyewitness identifications (Wells & Leippe, 1981). In their study, Wells and Leippe called these features *peripheral details* because they were associated with the background scene of a crime rather than being part of the perpetrator's appearance or directly related to the criminal act. They carried out their experiment by using a confederate to act as a culprit who stole a calculator, and the participants were witnesses to the crime. After the participants picked a culprit from a photo lineup, their memories for peripheral details, such as the number of chairs in the room and whether the room was carpeted or tiled, were tested. Wells and Leippe found that the participants who had accurate memories for the peripheral details were less likely to make correct identifications, and therefore, accuracy for peripheral details was not a good indicator of accuracy for eyewitness identification. A study done by Casner et al. (2007) confirmed the results of Wells and Leippe's study, and it showed

evidence to support that accuracy of memory for "peripheral sources of hazard" (e.g., objects placed in the background scenery during the time of a crime) was not a predictor of identification accuracy. In fact, those researchers actually reported a floor effect in the data for the measure, peripheral context memory.

Other research has found that accurate memory for contextual details is associated with better memory for the perpetrator. In a study conducted by Cutler, Penrod, and Martens (1987), a video of a simulated crime was shown to participants whose memory for details such as in which hand the weapon was held and color of shirt the victim was wearing was tested. They found that ninety-two percent of the participants correctly remembered in which hand the weapon was held; this result could have been due to the fact that people were fixated with the presence of a weapon. More relevant is the finding that seventy-nine percent correctly remembered the color of the victim's shirt. These participants associated, for example, "yellow shirt" with the victim. It is possible that if the participants were able to remember this color, they may have been able to identify the specific shirt worn by the victim if they had been presented with a lineup of similar shirts. Cutler, Penrod, and Martens reported that participants were more likely to accurately identify a perpetrator from a lineup when they accurately remembered many contextual details from the crime context rather than a few. Different reasons for why these participants had high scores on both measures, memory for details and accuracy of identification, when the manipulated details were not associated, can be argued. It's possible that there was something about the details that made the participants associate them with the perpetrator's face during the encoding phase of the experiment; for example, yellow is a really bright color.

Similarly, Lane, et al. (2008) examined the relationship between memory for contextual details and eyewitness identification using a face recognition procedure. Participants studied faces and associated details (e.g., a crime word or the side of the screen on which the face was presented), and were tested using a series of target-present and target-absent simultaneous lineups (i.e., all the faces are seen at the same time). For each face they claimed to have seen, they were also asked to recognize associated contextual details (e.g., What crime did this person commit?). Across two experiments, accurate memory for contextual details was generally associated with a higher likelihood of a correct identification (i.e., picking the target person instead of an innocent person). Thus, the results of Cutler, et al. and Lane, et al. suggest that memory for contextual details can be associated with identification accuracy.

Finally, other research suggests that there is little or no relation between memories for different aspects of an eyewitness event (Fisher, Brewer & Mitchell, in press). Fisher, et al. describe a series of studies examining memory for an eyewitness event using either a live event or a videotaped crime. In each, participants saw a mock crime and were asked to freely recall or take a recognition test for different details from the event (e.g., color of the perpetrator's shirt, actions that were performed, a description of the perpetrator, etc.). They did not assess memory for the perpetrator using a lineup. Their general finding was that there is little or no correlation between different aspects of a witness's memory. Thus, this research is relevant to the current study, because the authors suggest that different elements of memory for an event are represented independently. On this view, memory for contextual details should not be predictive of lineup identification.

Although the results and conclusions of prior research are inconsistent, it is important to note that the procedures that were used and the aspects of memory that were measured were quite different. For example, in some research the "contextual" details were objects and other times they were features of objects. In addition, those studies that used lineup identification to evaluate memory for the perpetrator typically measured memory for the contextual details using a verbal response. In the following study, I attempted to address some of these issues (e.g., all of the key items are objects). I also attempted to address an issue raised by Lane et al. (2008). They argued that one potential difference between studies that obtained a significant relationship between ID accuracy and memory for detail concerns the issue of "binding." When one remembers a complex event, it is thought that various aspects of the event (e.g., people, objects, locations) differ in the degree to which they are associated with each other. For example, ICE theory of context memory (Murnane, Phelps & Malmberg, 1999) suggests that memory consists of items (details of central focus), contextual details (details that are more peripheral) and ensemble (items and details that are encoded together). According to this view, one might expect that the relationship between memories for various aspects of an event would be better if those aspects were associated during encoding. Thus, in the following experiment, we manipulated the level of association between an object from the event and the perpetrators.

Current Experiment and Hypotheses

The procedure for the experiment was as follows. Participants saw a slide sequence depicting a theft that occurred at a party. There were two perpetrators: a male and a female. There were also objects shown in the event (e.g., a screwdriver, a laptop).

Some of these objects were exclusively handled by the male, others exclusively by the female, and others were in the background. Following a brief filler task, participants received lineups for each of the perpetrators and were given the choice of picking a lineup member or the option of "not present." Participants subsequently received lineups for each of the objects. In addition to their lineup choice, participants made a source judgment every time they picked an object. Specifically, they were asked whether the identified object had been handled by the male, the female, or whether it was in the background. The key dependent measures of interest are 1) accuracy of perpetrator and object lineup identification, assessed by correlations, and 2) accuracy of source judgments for objects that are selected in the lineups.

The following study attempts to answer the question: what is the relationship between accuracy of people's memory for contextual details and their ability to accurately identify a perpetrator from a lineup? There are three basic hypotheses about this relationship. The first is called the *independent components* hypothesis (Fisher et al., in press). This hypothesis predicts that there should be little or no correlation between memory for the perpetrator in the lineup and memory for the objects (whether associated with a person or not). The second is called the *specific binding* hypothesis. On this view, there should be a moderate to strong correlation between memory for the perpetrator in the lineup and memory for the objects associated with <u>that particular perpetrator</u>. This hypothesis would also predict that memory for the source of the objects would be better for objects that the perpetrators used or held than for objects that were in the background. The third hypothesis is called the *attentional deployment* hypothesis. On this view, people tend to attend more to central elements of an event (e.g., actions and objects that

would be included when one recounts important things that happened) and focus less on more peripheral or background elements. This would predict that there should be moderate or high correlations between memory for the perpetrators (who are central elements) and memory for the "central" objects (ones that are associated with either perpetrator). This correlation should be higher than between perpetrator identification and memory for the more "peripheral" objects (ones that are in the background). Like the specific binding hypothesis, this hypothesis predicts that memory for the source of objects would be better for objects that the perpetrators used or held than for objects that were in the background.

Methods

Participants. A total of 110 undergraduates from LSU participated and earned extra credit in their psychology courses. The participants consisted of 14.6% males and 85.4% females. The mean age was 20, and the age range was 18 to 61.

Materials. Four versions of a slideshow that depict a theft were created for use in this experiment. Whether an item was associated with the male perpetrator, the female perpetrator, in the background, or was not included in the event was counterbalanced across the experiment. In all versions of the slides, two culprits, a male and a female, enter a house party at which guests are mingling outside, and use tools to break into a bedroom in order to steal items inside. The culprits are carrying bags into which they place the items that they are stealing. Table 1 presents the way all of the objects used in the slides were counterbalanced across versions. Objects 1, 4, 7, and 10 are the tools: a multi-tool, a screwdriver, a crowbar, and a chisel. Objects 2, 5, 8, and 11 are the bags: a backpack, a messenger bag (i.e. a laptop case), a canvas grocery bag, and a canvas tote

bag. Objects 3, 6, 9, and 12 are the stolen items: an i-Pod speaker, a jewelry box, a laptop, and a CD bookcase. In order to decide which pictures would be used for the lineups, similarity ratings between the targets and all of the other pictures of items and perpetrators were collected from undergraduate students. The means of these ratings were analyzed and a balancing technique of these values was used to choose the final pictures for the lineups. A computer program written in E-Prime™ was used to present the stimuli and collect data from the participants.

Procedure. The participants entered the room, chose a computer, and took a seat. After completing the consent form, they were told, "You will see a series of pictures depicting an event," and to "Please watch the event carefully." Then, the participants watched the crime slideshow. Each slide was presented for three seconds. Following this, participants worked on a sudoku for ten minutes as a filler task. Participants next made two lineup judgments. Before the first lineup, they were told that they would see six faces simultaneously on the computer screen, and that one of the criminals from the slides may or may not be among these faces. Each lineup face had a number associated with it. If a participant believed a given face was one of the perpetrators, he or she pressed the number key associated with the face. If a participant believed the perpetrator was not in the lineup, he or she pressed the "7" key. Both lineups were target-present (i.e., a perpetrator was among the faces). Following the lineups, participants' memory for the objects in the slideshow was assessed. There was an "object lineup" for each object presented in the slideshow. For example, the participants saw multiple pictures of a jewelry box and had to identify which specific jewelry box was in the slides. Participants also had the choice of not picking any of the pictures by pressing the "7" key if they

believed, for example, that there was not a jewelry box in the slideshow. In addition to portraying lineups for the objects that were in the slides, there were lineups of objects that were not in the slideshow (i.e., target-absent lineups; performance on these items are not discussed below because they are not relevant to the key questions being asked). The order in which the fourteen lineups (for perpetrators and objects) were presented was the same for all of the participants and consisted of: the female perpetrator, male perpetrator, screwdriver, backpack, laptop, grocery bag, multi-tool, CD case, chisel, jewelry box, messenger bag, crowbar, canvas tote bag, and i-Pod speaker. If a participant picked an object from the lineup, they were asked a question about the "source" of the item. Specifically, they were asked whether the object had been handled or worn by the male perpetrator, female perpetrator, or whether the object had been in the background (i.e., not handled by either perpetrator). Following the lineup sequence, participants answered some demographic questions, were debriefed, and finally, thanked for their participation. Data collected from participants who reported that they were colorblind or that they recognized or knew either perpetrator or any foils from outside of the experiment (i.e., from daily life) was excluded from the analysis.

Results

Preliminary Analyses

Because these materials had never been used in an experiment before, I first examined performance on each of the lineups before looking at the associations between memory for the perpetrators and objects. Descriptive statistics revealed that participants performed well on the female lineup. As seen in **Table 2**, participants picked the perpetrator from the lineup (i.e., a "hit") 53% of the time. Participants chose the male

perpetrator 34% of the time, suggesting that the male lineup was more difficult. At least one issue appears to be that one male lineup member (i.e., a "foil") was falsely identified at a high rate. A paired samples t-test showed a significant difference between the participants' correct male identifications and correct female identifications, $t(109) = 3.05$, $p < .01$. As will be discussed later, the poor performance on the male lineup potentially affects our ability to detect associations between lineup and object identification.

In addition, Table 2 indicates that performance on object lineups was more often accurate than inaccurate; accuracy on lineups for objects that were associated with the female was 73% and with the male was 72%. Accuracy on lineups for peripheral objects was 67%. A comparison between these groups was not statistically significant, F (2,218) = 1.9. MSE = .61, ns.

Although overall accuracy for the object lineups was relatively high, performance on the individual lineups varied. Performance was very good for the school bags (M = .709, SD = .456), laptops (M = .718, SD = .452), and grocery bags (M = .718, SD = .452), with few participants making false identifications. In contrast, performance was quite low in the messenger bag (M = .327, SD = .471) and the canvas bag (M = .264, SD = .443) lineups. Furthermore, the low performance was sometimes due to high false identifications of foils and other times because of high misses (suggesting that the representation of the target object was not very good). These issues suggest the need to modify these lineups in future research.

Correlations between Perpetrator Identification and Object Identification

The relationship between identification accuracy of perpetrators and accuracy of object identification was first examined separately by gender. None of the correlations

between identification of the female perpetrator and the identification of female objects (r = .12), male objects (r = .16), and peripheral objects (r = .09) were statistically significant. The same was true for the male perpetrator (r = .04, .01, and .09 for male, female, and peripheral objects). Overall, the evidence is not consistent with the specific binding hypothesis, which suggests greater correlations between identification accuracy and objects that were specifically handled by that perpetrator. Next, the person-specific objects were combined into central objects (i.e., touched or handled by either perpetrator). The correlation between identification accuracy for the female perpetrator and central objects was .21 ($p < .05$), and between the male perpetrator and central objects was .04. If the two perpetrators are combined to make an overall identification accuracy measure, the correlation with central objects is .17 ($p = .051$) and with peripheral objects .12.

The interpretation of these results with respect to the hypotheses is somewhat unclear. As noted above, the data is not consistent with the specific binding hypothesis. The data for the female perpetrator appears most consistent with the deployed attention hypothesis, as accuracy of the perpetrator lineup was significantly correlated with memory for the central details but not peripheral details. However, this same pattern is not found for the male perpetrator. If the failure to find a relationship for the male perpetrator is due to problems with the male lineup (e.g.. the photograph for the perpetrator is not as good a match to his likeness in the event in the slides, a foil lineup member who is a “dead ringer” for the perpetrator), then it is possible the findings are consistent with the deployed attention hypothesis (but could not be detected). The alternative is that the results are actually more consistent with the independent

components hypothesis, and the finding of a relationship between female identification accuracy and central objects is specific to that "item" rather than a general effect of attention.

Source Judgments

The probability that participants were able to remember an object's source (male, female, or background) was analyzed. There were significant differences in source memory between the three categories (M = .89, .93 and .76 for female, male, and background, $F(2, 206) = 14.29$, MSE = .058, $p < .01$). Followup t-tests using a Bonferroni correction revealed that although source accuracy did not significantly differ between objects handled by males and females, source accuracy was greater for objects handled by males and females than for objects handled by neither perpetrator (i.e., they were in the background). In other words, participants were more likely to correctly identify the source when an object was interacted with (by either the male or female perpetrator) than when it was not (periphery). This information is important because it tells us there were no differences in how well remembered objects were when handled by either the male or female (i.e., there was no greater attention paid to an object when the female handled it or vice versa). More importantly, this finding is most consistent with the deployed attention and specific binding hypotheses. However, the correlations discussed above are more supportive of the former hypothesis. On this view, the objects associated with the perpetrators would be considered central to the event, and memory for this association was better than memory for the source of items that were more peripheral.

Discussion

This is the first in a series of studies designed to examine the relationship between accuracy of people's memory for contextual details and their ability to accurately identify a perpetrator from a lineup. Although I discuss below some of the limitations of our materials in addressing this question, the results of this study do help to begin to answer this question. First, the results were not consistent with the specific binding hypothesis. Correlations for identification accuracy between the male and female perpetrator and their respective associated objects were not higher than those between perpetrator identification and objects associated with the other perpetrator. Overall, the results could be considered consistent with two of the hypotheses – *deployed attention* and *independent components*. If the effects obtained with the female perpetrator generalize, the results are most consistent with the *deployed attention* hypothesis. According to this hypothesis, people pay attention to various aspects of the event as they are trying to comprehend what is happening. Typically, individuals attend to people or objects that are most critical to this understanding. These types of details are called *central*, while details that are less important are called *peripheral*. According to this hypothesis, people or objects that are most central to the story of the event are more likely to be associated together (see *ensemble encoding*, Murnane et al., 1999), and thus memory for one is likely to be predictive of memory for the other. The results of this study revealed a small to moderate correlation between memory for central objects and memory for the perpetrators (and somewhat stronger when limited to the female perpetrator). Furthermore, consistent with this hypothesis, participants were more likely to remember the source of items that were handled by the perpetrators than they were to remember the

source of items that were in the background. The results could also be said to be consistent with the *independent components* hypothesis. This hypothesis predicts little or no correlation between memory accuracy for the different components of the event. This prediction is consistent with the findings for the male perpetrator, because the correlations between memory for the male and memory for central or peripheral objects were low and statistically non-significant. Although the correlation between central objects and the female perpetrator was significant, the correlation was still quite modest.

Distinguishing between the attentional deployment and independent components hypotheses will require future research involving modifications to the lineups to ensure that they are appropriately sensitive. As mentioned above, the male perpetrator lineup was particularly problematic. Overall, identification for the perpetrator was low, and there were a high number of false identifications of a particular lineup member who looked a lot like the perpetrator. In addition, the lineup photograph of the male perpetrator appears to be a poorer likeness of the male (as depicted in the slides) than it was for the female perpetrator. In addition, some of the object lineups led to very poor or very high identification rates. Although there is nothing wrong with variability for object types, in some cases it led to ceiling or floor effects, making it difficult to obtain a correlation. Overall, the goal of future research is to develop a more sensitive and reliable measure of participants' memory for the event.

The probability of participants choosing the correct source of an object (i.e., male, female, or periphery), given that they also chose the correct object, provided evidence for binding. Participants were likely to associate objects that the female was holding during the crime with the female and were also likely to make this type of association for the

male and the objects that he used. Participants were able to bind, for example, chisel with male. In other words, the participants were likely to remember that a chisel was used by the male perpetrator to break into the room. However, as seen in the correlation data, having good memory for these associations is not necessarily an indication that memory for the identity of the person or the object will necessarily be accurate. Put another way, if I remember the male used the chisel to break in the room, that does not necessarily mean that I will have good memory for the male or the chisel.

Eyewitness identification can be flawed, and the errors that result can be quite consequential, as innocent people have been placed behind bars and even worse, on death row. One potential way of helping increase the usefulness of eyewitness identification decisions involves looking at the accuracy of memory for other elements of the event. Although the previous research findings on this topic are mixed, the present study attempted to systematically examine the relationship between memory for contextual details and the ability to identify the perpetrators of a crime. The results of this study suggest that eyewitnesses may bind certain aspects of a crime into memory, and therefore, that not all memories of a particular context are independent of one another. Although more research is needed to clarify the results, this study is a promising beginning toward understanding some of the complex factors that affect eyewitness memory.

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Table 1. Randomized, counterbalanced arrangement of details in four versions of slideshow

Version 1:

	Male Associated Details	Female Associated Details	Peripheral Details	Not Present Details
Tools:	Object 10	Object 4	Object 7	Object 1
Bags:	Object 5	Object 2	Object 11	Object 8
Steals:	Object 9	Object 3	Object 6	Object 12

Version 2:

	Male Associated Details	Female Associated Details	Peripheral Details	Not Present Details
Tools:	Object 7	Object 1	Object 4	Object 10
Bags:	Object 8	Object 5	Object 2	Object 11
Steals:	Object 6	Object 9	Object 12	Object 3

Version 3:

	Male Associated Details	Female Associated Details	Peripheral Details	Not Present Details
Tools:	Object 4	Object 10	Object 1	Object 7
Bags:	Object 11	Object 8	Object 5	Object 2
Steals:	Object 3	Object 12	Object 9	Object 6

Version 4:

	Male Associated Details	Female Associated Details	Peripheral Details	Not Present Details
Tools:	Object 1	Object 7	Object 10	Object 4
Bags:	Object 2	Object 11	Object 8	Object 5
Steals:	Object 12	Object 6	Object 3	Object 9

Table 2. Descriptive statistics of hits, foil IDs, & misses for the male, female, & object lineups

Lineup Type	Hits M (SD)	Foil IDs M (SD)	Misses M (SD)
Female Perpetrator	52.73% (50.15%)	11.82% (32.43%)	35.45% (48.06%)
Male Perpetrator	33.64% (47.46%)	39.09% (49.02%)	27.27% (44.74%)
Female Object	73.33% (27.02%)	16.97% (22.46%)	9.7% (17.69%)
Male Object	71.52% (24.66%)	18.79% (21.90%)	9.7% (16.50%)
Peripheral Object	66.67% (27.47%)	21.82% (24.91%)	11.52% (20.41%)

Note. Hits are accurate identifications. Foil IDs are identifications of an incorrect face or object. Misses are instances of the "not present" option being selected, while every lineup was target present.