DISTINGUISHING PERPETRATOR FROM EYEWITNESS MEMORY ON THE BASIS OF ACTION, MOTIVATION, AND AROUSAL

by

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Abstract

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The criminal justice system uses both perpetrator and eyewitness memory to investigate and prosecute crimes. Unlike eyewitness memory, however, the collection and use of perpetrator memory is not subject to official guidelines or recommendations. Whereas the criminal justice system seems to acknowledge that witnesses to crime may sometimes have unreliable memories for crime, there often appears to be an assumption that perpetrator memory should be detailed and accurate. Three studies were conducted to compare perpetrator and eyewitness memory and explore the impact of motivation and arousal on any differences. Study One investigated whether basic role differences could differentiate perpetrators and witnesses and assessed whether any difference would persist over a delay. Study Two parceled out the impact of action and motivation and assess the impact of an observer. Study Three attempted to replicate the first two studies under conditions of higher complexity and realism and explore the impact of arousal.

Perpetrators did display superior free recall memory than eyewitnesses across all three studies, but were not superior to motivated witnesses (accomplices) in Study 3. Overall, results suggest that perpetrator memory is not infallible and may be no better than witnesses in certain conditions. Possible implications for the findings will be discussed.

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION……………………………………………………………………1

CHAPTER 2: CURRENT STATE OF RESEARCH ON CRIME MEMORY: AN OVERVIEW OF EYEWITNESS MEMORY RESEARCH……………………………………………………….5
- Encoding…………………………………………………………………………………….6
- Storage……………………………………………………………………………………...13
- Retrieval…………………………………………………………………………………….15

CHAPTER 3: PROPOSED DIFFERENCES BETWEEN PERPETRATORS AND EYEWITNESSES……………………………………………………………………………..17
- Action……………………………………………………………………………………….17
- Motivation…………………………………………………………………………………..26
- Stress/Arousal………………………………………………………………………………32

CHAPTER 4: CONCLUSION……………………………………………………………….40

CHAPTER 5: OVERVIEW…………………………………………………………………...41

CHAPTER 6: STUDY ONE METHOD……………………………………………………....45
- Participants and Design……………………………………………………………………..45
- Procedure…………………………………………………………………………………...45
- Measures……………………………………………………………………………………48
  - Crime perceptions questionnaire…………………………………………………48
  - State Anxiety Scale………………………………………………………………48
  - Demographic questionnaire……………………………………………………...49
  - Free recall test……………………………………………………………………49
  - Remember/Know/Guess test……………………………………………………..49
  - Recognition test…………………………………………………………………..50
- Free Recall Coding…………………………………………………………………………50
- Hypotheses………………………………………………………………………………….52

CHAPTER 7: STUDY ONE RESULTS……………………………………………………...54
- Crime Perceptions…………………………………………………………………………..54
- Free Recall…………………………………………………………………………………..57
- Remember/Know/Guess Test………………………………………………………………61
- Recognition Test……………………………………………………………………………64

CHAPTER 8: STUDY ONE DISCUSSION………………………………………………….67

CHAPTER 9: STUDY TWO METHOD……………………………………………………...73
- Participants and Design……………………………………………………………………..73
- Procedure…………………………………………………………………………………...73
- Measures……………………………………………………………………………………75
  - Crime perceptions questionnaire…………………………………………………75

        Remember/Know test……………………………………………………………76
    Free Recall Coding………………………………………………………………76
    Hypotheses………………………………………………………………………..77

CHAPTER 10: STUDY TWO RESULTS…………………………………………………78
    Crime Perceptions……………………………………………………………..78
    Free Recall……………………………………………………………………..82
    Remember/Know/Guess Test……………………………………………………85
    Recognition Test………………………………………………………………88

CHAPTER 11: STUDY TWO DISCUSSION……………………………………………..90

CHAPTER 12: STUDY THREE METHOD…………………………………………………94
    Participants and Design……………………………………………………..94
    Procedure………………………………………………………………………...94
    Measures………………………………………………………………………….98
        Crime perceptions questionnaire……………………………………………98
        Free recall questionnaire…………………………………………………98
        Remember/Know/Guess test………………………………………………..99
        Recognition test………………………………………………………………99
    Free Recall Coding………………………………………………………………99
    Hypotheses……………………………………………………………………...100

CHAPTER 13: STUDY THREE RESULTS……………………………………………...102
    Crime Perceptions……………………………………………………………102
    Free Recall…………………………………………………………………...107
    Remember/Know/Guess Test…………………………………………………..110
    Recognition Test……………………………………………………………..117

CHAPTER 14: STUDY THREE DISCUSSION……………………………………………119

CHAPTER 15: GENERAL DISCUSSION………………………………………………125
    Practical Implications……………………………………………..………128
    Directions for Future Research……………………………………………131
    Conclusion…………………………………………………………………...134

TABLES……………………………………………………………………………..135

FIGURES…………………………………………………………………………….138

APPENDICES………………………………………………………………………….141

REFERENCES…………………………………………………………………………190

TABLES

Table 1: Study 1: Mean item frequency and details contained within participants’ free recall statements………………………………………………………………………………..………

Table 2: Study 2: Mean item frequency and details contained within participants’ free recall statements……………………………...…………………………………………………………

Table 3: Study 3: Mean item frequency and details contained within participants’ free recall statements. ………………………………………………………………………...………….

FIGURES

Figure 1: Mean differences in total free recall percentage between perpetrators and witnesses in Study 1……………………………………………………………………………………………

Figure 2: Mean differences in total free recall percentage between actors and observers in Study 2………………………………………………………………………………………………

Figure 3: Mean differences in total free recall percentage between perpetrators, accomplices, and witnesses in Study 3…………………………………………………………………………..

APPENDICES

APPENDIX A: Study One Informed Consent……………………………………………………..

APPENDIX B: Study One Task Instructions……………………………………………………

APPENDIX C: Study One/Two Task List………………………………………………………

APPENDIX D: Study One Event Perception Questionnaire……………………………….......

APPENDIX E: State Anxiety Scale – Short Form………………………………………………

APPENDIX F: Permission to Use Videotaped Data Form………………………………………

APPENDIX G: Study One/Two Free Recall Questionnaire……………………………………..

APPENDIX H: Study One Remember/Know/Guess Test……………………………………….

APPENDIX I: Study One/Two Recognition Test……………………………………………........

APPENDIX J: Study Two Informed Consent…………………………………………………...

APPENDIX K: Study Two Instructions…………………………………………………………

APPENDIX L: Study Two Event Perception Questionnaire……………………………….......

APPENDIX M: Study Two Remember/Know Test…………………………………………….

APPENDIX N: Study Three Informed Consent…………………………………………………

APPENDIX O: Study Three Task Instructions…………………………………………….......

APPENDIX P: Study Three Event Perception Questionnaire…………………………………..

APPENDIX Q: Study Three Free Recall Questionnaire………………………………………..

APPENDIX R: Study Three Remember/Know/Guess Test…………………………………….

APPENDIX S: Study Three Recognition Test………………………………………………….

CHAPTER 1: INTRODUCTION

Confessions are considered something of a gold standard in evidence, offering proof of guilt beyond a shadow of a doubt. There are two aspects of confession that are persuasive: (1) the admission of guilt, in which a suspect incriminates himself or herself in a crime; and (2) the post-admission narrative, in which the suspect recounts his or her memories of the crime, thus demonstrating guilty knowledge. In light of the compelling nature of crime-relevant statements, it makes sense that interviewing suspects is one of the most important evidence gathering tools of police investigations (Holmberg & Christianson, 2002). Indeed, one of the main goals of interrogation is to produce a confession, effectively solving the case (Inbau, Reid, Buckley, & Jayne, 2013).

Although there is no way to estimate a prevalence rate, it is clear that the number of wrongful convictions based on false confessions is sizable and continues to grow. More than 307 cases of post-conviction DNA exonerations have occurred in the United States since 1989 (Innocence Project, 2013). At present, roughly one-quarter of these cases involved some form of false confession as a contributing factor. This high number raises troubling questions about the processes of police interrogation and the effectiveness of our criminal justice system as a safety net for innocent people who are wrongly accused. When an innocent person confesses, the police who obtained the confession, the prosecutor who decides to file charges based on that confession, the judge who admits the confession as voluntary, and the jury that accepts the confession as indicative of guilt are all misled into trusting the false confession.

There are several reasons why people trust confessions as a matter of common sense, even if they are false. One is that confessions tend to be highly detailed: 97 percent of false confessions examined in a recent review actually contained highly accurate details that were not available in the public domain (Garrett, 2010). Vivid details can be highly persuasive, affecting attitudes in realms as diverse as consumer purchase choices (Keller & Block, 1997), medical decisions (Block & Keller, 1997), and truth judgments (Bell & Loftus, 1985; Strömwall & Granhag, 2005). Although there are important boundary conditions, it appears that vividness increases message processing via heightened attention, which can enhance memorability and persuasiveness (Guadagno, Rhoads, & Sagarin, 2011; Nisbett & Ross, 1980; Smith & Shaffer, 2000). Vividness also affects the inferences that individuals make, as people generally believe those that report vivid details have more knowledge than those that present pallid information (Bell & Loftus, 1985). The impact of statement details within the criminal justice system is clear throughout the investigative and prosecutorial processes. Police officers often consider the presence or lack of details when making judgments about whether interviewees are truthful or deceptive (Hartwig, Granhag, Strömwall, & Kronkvist, 2006; Hartwig, Granhag, Strömwall, & Vrij, 2005). Many experts in deception detection also recommend a focus on details, advocating such deception detection techniques as Statement Validity Analysis (SVA; Vrij, 2008) and Criterion-Based Content Analysis (CBCA), a core component of SVA (Vrij & Mann, 2006). CBCA focuses on 19 criteria to determine whether the statement given is likely a genuine recollection or a fabrication (Vrij, 2005). The first 13 criteria focus on information that would be expected to discriminate between true and false statements as they are assumed too difficult to fabricate--such as the quantity, unusualness, and richness of the statement details (Vrij, 2005; Vrij & Mann, 2006). Four criteria focus on factors that are expected to discriminate between true and false statements because of proposed motivational differences between liars and truth-tellers, such as admitting a lack of memory, making spontaneous corrections (e.g., “He was wearing a red, no, purple, shirt”), and hedging testimony (e.g., “I think”, “I am not sure”, "Maybe", etc.). Whereas liars want to appear stereotypically innocent, truth tellers seek to recount information as they truly know it; therefore, these types of details would actually be expected in truthful accounts but not fabricated statements. Ultimately, according to CBCA, the more details that are present, the more likely it is that the statement given is an authentic memory. Accounts that are sparse in detail, on the other hand, are viewed with suspicion.

Should an individual be judged untruthful, the police are likely to consider him or her a suspect worthy of interrogation. In the interrogation stage, police look for non-public details about the crime that "only a perpetrator could have known" to pressure suspects into confessing and to subsequently substantiate their admission of guilt (Inbau et al., 2013). Later in the process, the same details convince trial judges and juries that the confession is diagnostic of guilt. People believe that individuals who provide vivid details in their accounts have more complete memories than those who provide pallid testimony (Bell & Loftus, 1985). Vivid details in courtroom testimony, even if trivial, increase jurors' perceptions of witness credibility (Bell & Loftus, 1988, 1989). When it comes to confessions as well, the presence of crime details increases perceptions of credibility and the likelihood that jurors evaluate the confessors as guilty (Appleby, Hasel, & Kassin, 2013).

Given the persuasive power of factual details at every stage in the criminal justice process, it is easy to understand how narrative false confessions can sometimes mislead decision makers. That false confessions can mislead individuals underscores an important point: People *expect* confessions to contain details that betray guilty knowledge. There is thus a prevailing assumption in the criminal justice system that perpetrators can accurately recall the details of their crimes. Despite this assumption concerning perpetrator memory, however, empirical research is virtually nonexistent. The substantial literature on crime memory has instead focused on eyewitnesses who are bystanders to a crime (Lindsay, Ross, Read, & Toglia, 2007; Toglia, Read, Ross, & Lindsay, 2007), and suggests bystanders' memories can be flawed and highly prone to error. In order for the belief in superior perpetrator memory to hold, perpetrators must therefore remember crimes better than bystanders. There are no clear theories to account for this presumed superiority. Indeed, the only existing model of perpetrator memory classifies perpetrators as simply another type of witness (Herve, Cooper, & Yuille, 2007). It is important to note, however, that perpetrators do experience crimes differently than eyewitnesses. Whether or not those differences--which center on action, motivation, and arousal--would actually result in differential recall between perpetrators and other witnesses remains an open empirical question and the focus of the current research.

CHAPTER 2: CURRENT STATE OF RESEARCH ON CRIME MEMORY: AN OVERVIEW OF EYEWITNESS MEMORY RESEARCH

A common adage in the literature on human cognition is that memory is not like a video recorder. Humans do not perceive or record events in memory exactly as they happen. Rather, information is encoded, stored, and retrieved in stages (Barnier, Sutton, Harris, & Wilson, 2008; Derryberry & Tucker, 1994; Loftus & Loftus, 1976), and the content of a memory may be altered at each stage. Encoding involves attention and the perception of an event (Shuman & Smith, 2000). Following this acquisition phase, various consolidation and rehearsal strategies are used to enter that information into long-term memory storage (Levine & Edelstein, 2009; Shuman & Smith, 2009). Once stored, that information should be available for subsequent retrieval when needed.

When an eyewitness views a crime, the observed information goes through this three-stage process. Of course, not all information about the crime may be processed. Our visual environment contains more information than humans are able to cognitively process (Jacoby, 1991; Hester & Garavan, 2005). As a result, only a sample of event information is noticed and subsequently processed. Once this portion of the event has been encoded in memory, it is stored until the witness needs is called upon to retrieve it. Should too much time elapse before an eyewitness retrieves the memory, or should the witness obtain new information about the event after its occurrence, the form and content of that memory can be revised if not completely altered (Loftus 1979/1996). Finally, the methods of retrieval that are used (e.g., wording of questions asked about the crime) can further influence the quality and accuracy of the memory that is reported.

At various points during these information-processing stages, eyewitness failures can occur. The reasons for these failures have been divided into two broad categories: Estimator variables and system variables (Wells, 1978). Estimator variables are those factors affecting eyewitness memory that cannot be controlled by the criminal justice system, such as the duration of the crime and the witness's exposure to it (Deffenbacher, 2008). Hence, the impact of these variables on a specific eyewitness can only be estimated. System variables, on the other hand, are factors that are under the direct control of the criminal justice system, such as the use of a lineup as opposed to a one-person showup or the number and appearance of the foils used in a lineup (Wells, 1978). Perpetrators and eyewitnesses have different experiences in the criminal justice system. Police, seeking to elicit confessions or other incriminating evidence, subject perpetrators identified as suspects to intense interrogations; eyewitnesses recall their observations in non-confrontational interviews and make identifications, typically from a lineup. Although some system variables may affect both perpetrators and witnesses, the majority are likely exclusive to the respective roles. This preliminary research will therefore focus on estimator variables that could apply to perpetrators in a manner similar to eyewitnesses.

Encoding

Estimator variables occur most frequently during the acquisition stage. Witnesses must sort through an enormous amount of visual information in the scene to encode a subset of features. What witnesses choose to pay attention to often depends on what is salient, or figural against the background (Fine & Minnery, 2009). If one object in the environment stands out, it will draw attention away from the other features (Lu & Han, 2009). If multiple items in the environment are all equally salient, witnesses will divide their attention among those that are most relevant to their active goals (Henderson, Malcolm, & Schandl, 2009; Hester & Garavan, 2005). Estimator variables often impact the acquisition process by affecting what information witnesses deem most salient. Typically, these acquisition factors have been separated into two types: those related to the crime event itself and those related to the witness.

Event factors.

Event factors are related to the nature of the crime and influence what aspects of a crime draw varying degrees of attention.

Exposure time. If a witness does not have time to fully perceive an event, it will be nearly impossible to accurately encode all relevant details. Exposure time thus has an impact on the quality of the crime memory, with correct suspect identifications increasing as exposure duration increases (Memon, Hope, & Bull, 2003; Shapiro & Penrod, 1986). Memory for other details of a crime event, such as the perpetrator's gender and the type of weapon used, also improve with longer exposure time (Sharps, Janigian, Hess, & Hayward, 2009). Under conditions of greater exposure, witnesses have more time to attend to the event and encode the important details that will need to be remembered later.

Weapon focus. A crime detail that is likely to draw witnesses' attention is the presence of a weapon. In fact, the presence of a weapon can be so salient that it leads witnesses to focus on the weapon to the detriment of other details of the crime scene (Loftus, Loftus, & Messo, 1987). Dubbed the weapon focus effect, research shows that witnesses focus central attention towards a weapon during a crime, leading to less accurate identification of the perpetrators and other, more peripheral details (Pickel, 1999; Steblay, 1992). A meta-analysis by Steblay (1992) confirmed this phenomenon, as the presence of a weapon both reduced witnesses' identification accuracy ($d = .13$) as well as their recall for peripheral details ($d = .55$).

Although researchers originally believed that the threat posed by the presence of a weapon was the cause of the weapon focus effect (Wells, Memon, & Penrod, 2006), it appears that novelty is the true driving force (Pickel, Ross, & Truelove, 2006). Any unanticipated item can mimic the weapon focus effect, drawing attention away from other features in the environment and reducing recall for their details (Pickel, 1999). This effect has been demonstrated with various kinds of expectancy violations--such as using celery as a weapon (Mitchell, Livosky, & Mather, 1998), carrying a child's toy into a college classroom (Shaw & Skolnick, 1999), and violating gender norms via a man carrying a knitting needle (Pickel, 2009).

Perhaps the most compelling evidence for a novelty explanation is that the weapon focus effect fails to occur when the weapon is expected (i.e., not novel; Pickel, 1999). Novelty alone may not be enough, however, as it appears to interact with other variables to produce the weapon focus effect. Some research shows that weapons still garner more attention than other novel objects, which indicates self-protective motivations play a part in the process as well (Hope & Wright, 2007). Witnesses in an extended crime scenario often have time for the novelty of an unexpected item to wear off. At that point, attention paid to the weapon would have to be due to another factor, such as the previously dismissed threat argument. As motivation to attend to an object likely holds attention longer than the novelty of the object, it appears that although novelty initially captures attention, motivation causes it to endure.

Witness factors.

Witness factors are those related to the dispositional and situational characteristics of the witness to a crime. How a witness processes information, how much stress is experienced, and what information the witness knows about the crime, can all impact what crime-related information the witness later recalls.

Stress. In violent crimes, when a weapon is present, or when there is an imminent threat, eyewitnesses are likely to become anxious, fearful, and physiologically aroused, producing myriad physical and psychological effects. According to Deffenbacher's (1994) catastrophe model, the effect of stress on eyewitness memory is a function of cognitive anxiety (worry) and somatic anxiety (physiological activation). These two factors combine to impact memory, leading to either an arousal or activation mode of attention. The arousal mode of attention leads to an orienting response, which should enhance recall for crime-relevant details and subsequent identifications of the perpetrator but reduce recall for peripheral details (Brown, 2003; Christianson, 1992). On the other hand, the activation mode of attention causes defensive responses, such as a primed flight-or-fight response or even greater controls on attention.

Similar to the Yerkes-Dodson law (1908), this model predicts that high levels of arousal will lead to a detriment in performance; however, Deffenbacher's model predicts the relationship is actually nonlinear. According to the model, at high levels of cognitive anxiety, memory will be facilitated as physiological activation increases until a threshold is reached, leading to a catastrophic drop in performance produced by shifting to the activation mode of attention. A later meta-analysis confirmed that although stress at low levels can improve memory, stress at high levels compromises memory (d = -.31; Deffenbacher, Bornstein, Penrod, & McGorty, 2004).

Highly violent, traumatic, or otherwise arousing crimes that cause very strong perceptions of threat are therefore likely to result in stress levels that inhibit memory performance. Two recent studies provide good examples of the catastrophic drop in memory accuracy at high levels of stress. Morgan and colleagues (2004) used a sample of 509 active-duty military personnel enrolled in a survival school. Participants were detained in a mock prisoner-of-war camp for 12 hours (during which they were deprived of food and sleep) and then subjected to interrogation. Subjects endured both a low-stress (no physical confrontation) and a high-stress (actual physical confrontation) interrogation (participants in studies 3 and 4 experienced either the high-stress or low-stress interrogation, but not both), each lasting about 40 minutes and featuring different interrogators. After a 24-hour recovery period following release from the camp, the participants were asked to identify their interrogators in a 15-person live lineup, a 16-person photo spread, or a sequential presentation of photos of up to 16 individuals. Consistent with the catastrophe model, accurate identifications dropped dramatically in the high-stress condition compared to the low-stress condition for each lineup presentation method (30% vs. 62%; 34% vs. 76%; 49% vs. 76%, respectively) while incorrect identifications increased (56% vs. 38%; 68% vs. 12%; 51% vs. 25%, respectively).

In another investigation of stress, Valentine and Mesout (2009) conducted a study in which they scared 56 visitors to the London Dungeon, an interactive tourist attraction featuring various forms of torture used in the Middle Ages. During part of the tour, participants walked through the Labyrinth of the Lost, a horror mirror maze where an actor dressed as a ‘scary person’ jumped out at participants and blocked their path. At the end of the tour, approximately 45 minutes later, the participants were asked to complete the State Anxiety Scale, a questionnaire assessing their memory of the actor, and an identification task using a 9-person simultaneous lineup. The self-reported stress of the participants on the SAI had a significant association with identification accuracy: 75% of witnesses who scored below the median on the SAI identified the actor correctly, compared to only 17% of witnesses above the median. Just as stress caused by a traumatic event (like detention in a prisoner of war camp) can significantly impair eyewitness memory, so, too, can stress caused by a brief, frightening encounter.

Crime seriousness. Just as prior expectations can influence how a witness perceives and attends to an event, so can prior knowledge about the crime. In one study, researchers manipulated whether participants were aware of the value of a stolen object before its theft (Leippe, Wells, & Ostrom, 1978). During the research session, the experimenter faked receiving a call from a previous participant who claimed to have left an object in the experimental room--either a high-value calculator or a low-value carton of cigarettes. After a confederate located the bag containing the item, the experimenter left to inform the prior participant that her belongings had been found. At that point, the confederate took the bag and fled the room, dropping the bag in the process to make sure all participants noticed him. In a follow-up identification task, 56 percent of participants in the high-value crime condition correctly identified the thief as compared to only 19 percent in the low-value crime condition. When the value of the object was unknown before the crime, there was no difference in identification accuracy upon being told the value of the object. Apparently, advanced knowledge of a crime's seriousness can affect how carefully a witness attends to the event. When the crime is serious, witnesses are more invested and focused on the perpetrator, which allows for better identification performance.

Cross-race effect. One of the most researched estimator variables in the eyewitness literature has been the cross-race effect (also known as own-race bias or the other-race effect). Multiple meta-analyses of laboratory and field studies have found that individuals have a harder time recognizing members of a different race compared to members of their own race (Bothwell, Brigham, & Malpass, 1989; Meissner & Brigham, 2001; Shapiro & Penrod, 1986). In the most recent meta-analytic review of this literature, Meissner and Brigham (2001) found that witnesses were 1.56 times more likely to make a mistaken identification when the suspect was of a different race than the same race and 2.2 times more likely to accurately recognize previously-viewed same-race faces compared to other-race faces. At first glance this effect may seem to be a product of social biases, but racial attitudes have not been linked to the cross-race effect. Likewise, contact with another racial group--which often interacts with attitudes toward that group (Brigham & Malpass, 1985; Meissner & Brigham, 2001)--accounts for only about two percent of the variability in the effect (Meissner & Brigham, 2001).

Several researchers have advanced social cognitive theories to explain the cross-race effect, many hypothesizing that it stems from feature processing differences between same-race and other-race faces (Wells & Olson, 2001; Young, Hugenberg, Bernstein, & Sacco, 2012). Sporer (2001), for example, has argued that processing of other-races is a two-step process compared to same-race faces, which would be a one-step process. When viewing an other-race face, the witness first characterizes that individual as an out-group member. This categorization makes feature differences among the races (race markers) most salient, so attention is first focused on those factors. Although all races are equal in facial heterogeneity (Goldstein, 1979), what features are distinctive can vary from race to race (Ellis, Deregowski, & Shepherd, 1975; Maclin & Malpass, 2001). Attention to distinguishing features therefore draws attention away from features that actually discriminate among members of the opposite race, negatively impacting encoding quality. Same-race faces are not believed to be subject to the same initial categorization process, so attention is focused more globally, resulting in a holistic impression of the face (Greenberg & MacGregor-Hannah, 2010).

Cross-race research using ambiguous faces has provided some support for this theory. Maclin and Malpass (2001) had participants view racially ambiguous (composite Hispanic-Black faces) faces with which they varied a single racial marker: hairstyle. Just this one change was enough to produce a cross-race identification effect: Hispanic participants showed greater identification accuracy for ambiguous faces with prototypical Hispanic hairstyles than for those with prototypical Black hairstyles (*A'* = .705 vs. .576, respectively). It appears a single racial marker is sufficient to trigger the characterization process that impacts attention. Should the cross-race effect be due to differential attention focusing for same-race and other-race faces, longer exposure to the criminal should attenuate this bias as witnesses incorporate distinguishing features into their visual survey. Research finding that increased viewing time decreases the magnitude of the cross-race effect supports this hypothesis (Meissner & Brigham, 2001).

Storage

After information is encoded, it must be stored until it is needed; however, waiting too long to retrieve the details can actually compromise the memory. This compromise can take one of two forms. First, meta-analyses have shown that forgetting increases with the length of the retention interval (Deffenbacher, Bornstein, McGorty, & Penrod, 2008; Shapiro & Penrod, 1986). Archival research with actual cases has also shown that identification accuracy suffers significantly after a delay of seven or more days (Behrman & Davey, 2001).

This forgetting is affected by both time-decay and storage-interference processes (Deffenbacher, 2008; Deffenbacher et al., 2008; Wickelgren, 1974). Time-decay over the course of a retention interval is associated with high levels of forgetting in the first seconds and minutes after the crime, as weakly or partially encoded information is forgotten; however, the rate of forgetting slows over time. As a result, later forgetting occurs at a more gradual pace than the initial period of memory loss. The negatively accelerated rate of forgetting occurs because the rate of decay is proportional to fragility of the memory trace or how strongly the information was initially encoded. In practical terms, the retention of information central to a crime (e.g., details that draw witnesses' attention or directly impact their active goals) tends to last longer than the retention of peripheral details (e.g., background information that is unimportant for understanding the crime) because of stronger initial memory traces (Levine & Edelstein, 2009).

Storage-interference, on the other hand, is directly related to how similar the details to be remembered are to information encountered after the crime, which is expected to create difficulty holding the correct object representation in memory (Deffenbacher et al., 2008; Wickelgren, 1974). The level of interference expected in any given memory task therefore varies as a function of the details to be remembered. For example, Deffenbacher and colleagues (2008) note that interference expected for other-race faces is 10 times greater than that for same-race faces. This finding may be due to the more general processing of other-race faces, as discussed previously, causing a greater number of faces encountered subsequent to the crime event to be perceived as similar to the actual perpetrator.

The content of the memory can also shift over time. Although individuals are generally good at remembering surprising information at shorter retention intervals (Tuckey & Brewer, 2003), memories tend to adapt over time to fit prior beliefs and stereotypes (Davis & Loftus, 2009). For example, witnesses in one study observed sets of slides where a woman and a man performed actions that were consistent or inconsistent with gender roles (Kleider, Pezdek, Goldinger, & Kirk, 2008). When tested immediately afterward, participants recalled a greater number of role-inconsistent actions compared to role-consistent actions. After two days, this effect was attenuated. Recall for the role-inconsistent actions became more gender role-consistent, resulting in more memory errors for participants tested in the delay condition compared to those tested in the immediate recall condition. Just as details strongly encoded at the outset are more likely to persist over time than those that are weakly encoded, however, central details are also more resistant to reinterpretation (Loftus, 1979/1996). Whereas increasing retention intervals will increase the number of expectation-conforming errors made in memory, surprising central details should be accurately remembered longer than surprising peripheral details.

Retrieval

At the retrieval stage, witnesses attempt to recall the crime details that have been encoded and stored in memory. The type of retrieval attempted by witnesses has an impact on their reported memories. Two general methods of retrieval are often distinguished: Recall- and recognition-based (Jacoby, 1991). Recall memory tends to be a more accurate, context-based, and effortful recollection of events, whereas recognition memory is based on a feeling of familiarity (Robinson & Johnson, 1996). Narrative descriptions of a crime draw upon recall memory, but identification decisions typically involve recognition memory – matching the representation of the witness in the lineup or mug shot with the memorial representation the witness holds from the crime.

Overall, it appears that recall-based retrieval results in fewer memory errors than recognition, but recognition-based retrieval yields a greater number of total details (Loftus, 1979/1996; Robinson, Johnson, & Robertson, 2000; Wells, 1978). These results indicate that recognition-based retrieval relies on a looser response criterion than recall-based retrieval as both hits and errors are increased (Welford, 1986), which supports the characterization of recognition as a less effortful process than recall. The implications of relying upon recognition memory rather than recall memory are clear: witnesses are more likely to falsely ‘recognize’ information during a recognition task (which poses a direct threat to innocent suspects) than they are to generate that incorrect information during a free recall about a crime. Considered in conjunction with the previously discussed effects of retention interval, this problem becomes amplified: as memories tend to degrade and details are lost, individuals may shift from recall of the actual contextual details of an event to a more familiarity-based memory judgment. As previously mentioned, central details are more resistant to decay, so it may be possible for witnesses to recall the important features of a crime even when using familiarity-based judgments for peripheral details (Levine & Edelstein, 2009).

Eyewitness memory is clearly far from perfect. At any stage in the processing of a crime memory, information can be forgotten, ignored, or contaminated. The attention applied during the acquisition stage clearly has a lasting influence on the final memory that is retrieved for the police. After all, people remember the things to which they pay attention (Fine & Minnery, 2009; Norman, 1969). Those items that receive the most attention are encoded the most strongly and are the most resistant to corruption throughout the process. An understanding of this process, and the factors that affect its accuracy, has already proven valuable in the criminal justice system, leading to reform of many practices that introduced error into eyewitness memories.

It is possible that the understanding of the memory process provided by eyewitness memory can similarly aid consideration of perpetrator memory within the criminal justice system. The question to be answered first, of course, is whether the factors that influence eyewitness memory accuracy have the same impact on perpetrators. The following section of this review therefore lays out a proposed model of the differences between perpetrators and witnesses, giving consideration to the previously discussed factors influencing eyewitness memory.

CHAPTER 3: PROPOSED DIFFERENCES BETWEEN PERPETRATORS AND WITNESSES

The extensive literature on eyewitness memory provides a strong framework for determining when memories can be trusted or viewed with suspicion. Despite the breadth of this research, the overwhelming focus on bystander eyewitnesses limits its utility in predicting the crime memories of perpetrators. They too are eyewitnesses, but perpetrators and bystanders experience crimes differently. Perpetrators commit the crimes; witnesses observe their execution. Perpetrators and bystanders are also differently motivated: Perpetrators want to successfully complete their crimes without being caught, whereas witnesses primarily want to avoid harm and perhaps recall what they see for identification purposes. The stress of meeting these various goals likely differs as well, especially as the crime becomes more complicated or dangerous. Research in other areas--such as attribution, motivated reasoning, and social facilitation--suggests that actors and observers differ in three basic domains: action, motivation, and stress/arousal.

Action

Action constitutes the clearest distinction between perpetrators and witnesses. Although the physical act of carrying out a crime distinguishes perpetrators from witnesses, this is only one action dimension on which they differ. Perpetrators also have close-range tactile interaction with objects that witnesses only see (e.g., weapons, victims, or objects at the crime scene). In contrast, witnesses typically view the crime from some distance compared to perpetrators, which leads to different visual perspectives of the crime as well. Finally, perpetrators and witnesses differ in their prior knowledge of what will likely occur during the commission of the crime: Perpetrators often plan and visualize their actions ahead of time; witnesses cannot similarly plan their observations. Taken together, these differences suggest that it is imperative to consider the potential influence of action on memory, as it can affect many different aspects of the crime.

Memory for actions. Research on memory for actions has specifically looked at whether physical motion, tactile interaction with objects, planning, or a combination of factors influences memory. This literature has revealed the "enactment effect", which demonstrates that performing a task personally leads to better recall for those actions over watching another person perform the same tasks (Hornstein & Mulligan, 2004; Lampinen, Odegard, & Bullington, 2003; Senkfor, Van Petten, & Kutas, 2002). According to Bäckman and Nilsson (1985), the superiority of subject-performed task (SPT) memory comes from the multimodal components of the task. It is not the motor component per se that causes SPTs to be better remembered than experimenter-performed tasks (EPTs) or verbal tasks (VTs), but rather the richer encoding that takes place with a SPT versus a simple verbal task. As EPTs combine visual information as well as semantic information to be encoded into memory, their memory traces should be richer than VTs but not as rich as SPTs (that combine semantic, visual, and motor information), which is supported by the memory performance results of this literature.

Perpetrators are likely to be exposed to more kinds of information than eyewitnesses during a crime; both perpetrators and witnesses receive visual information, but perpetrators have the tactile and motor components as well. Although this research would seem to suggest that perpetrators should show superior memory for the crime, real-life crimes are a great deal more complex than a series of simple and discrete actions. The more complex an action becomes, the less attention actors have left to focus on the external environment (Koriat, Ben-Zur, & Druch, 1991). This reduced attention can reduce memory for its features as well as the contextual information surrounding the actors' actions (Hornstein & Mulligan, 2001), which suggests complex actions can reduce attention and impair formation of episodic memory

If the memory for actions literature is based on research too simplistic to reflect real-life processes, then more ecologically valid research should fail to show the same enactment effect. The only study directly comparing perpetrator and witness memory may have failed to show differences between perpetrators and witnesses for this very reason (Price, Lee, & Read, 2009). In this study, researchers were interested in investigating the impact of arousal, proximity, and gender on crime memory for active and passive participants. Participants were assigned to perpetrator and accomplice dyads and instructed to commit a mock theft. They were given a map and then instructed to locate a professor's office and steal an exam off the professor's computer. After two weeks, participants were brought back into the lab to complete a cognitive interview about the experience, and they were asked to draw a map of the route they traveled to get to the professor's office as well as a map of the crime scene.

No memory differences were found between the active and passive participants. It is important to note, however, that the passive participants served as accomplices that directly shadowed the perpetrators throughout the crime, so the only difference between the two conditions was the actual physical motion of carrying out the crime. According to the memory for actions literature, the additional action multimodal component should have been enough to improve the active participants' memory over the passive participants, but clearly this was not the case. Physical motion alone does not seem to lead to differences in memory in between perpetrators and witnesses. In real-life situations, additional multimodal traces may be necessary for improving perpetrator memory.

Imagination inflation and implantation. It is possible that individuals with guilty knowledge (such as eyewitnesses or innocent suspects fed information during interrogation) fail to differ from perpetrators not because the additional motor memory trace is insufficient, but because imagination improves a witness's memory. Originally an effect whereby individuals experienced increased confidence that an event actually occurred in reality after simply imagining its execution (Garry, Manning, Loftus, & Sherman, 1996), further research has shown that imagining an event can also lead to the formation of false memories related to the performance of the event (e.g., Mazzoni & Memon, 2003; Lampinen et al, 2003; Thomas, Bulevich, & Loftus, 2003). The more detailed the imagining, the more likely it is that the individual will form a false memory of the event's execution (Thomas et al., 2003). At times, imaginational exercises may be sufficient to create false memories similar to those caused by false evidence (Nash, Wade, & Lindsay, 2009). Researchers have explained this effect in terms of fluency: imagining an event makes it easier to process information about the event, which increases subsequent familiarity judgments and therefore confidence that its execution actually occurred (Goff & Roediger, 1998; Sharman, Garry, & Beuke, 2004). Another explanation suggests that imagining an event increases the amount of perceptual detail attached to the event, leading to source confusion over whether the detail was internally generated or actually experienced (Thomas & Loftus, 2002). Neural activation for memory and imagination consists of several of the same areas, which may also partially explain why the two processes become confused (Schacter, Guerin, & St. Jacques, 2011).

Regardless of the mechanisms by which imagination inflation and implantation take place, it may seem counterintuitive to consider imagination in terms of witness memory. The typical eyewitness does not imagine the execution of an event – he or she actually sees the crime take place. However, the typical eyewitness is often asked to imagine the crime again during an interview with the police. Imagination is a common component of the cognitive interview (witnesses are asked to reinstate the crime context in their mind when trying to recall the event), which was used in the Price, Lee, and Read study (2009). Although there may have been memory differences between perpetrators and witnesses in Price et al. (2009) after execution of the mock crime, the method of testing memory may have minimized those differences. The imagination implantation effect clearly lends itself to a discussion of false confessors. Innocent suspects in the interrogation room are sometimes asked to imagine enacting a crime and are sometimes fed certain details about how the crime occurred (Inbau et al., 2013). If imagining can lead to the creation of perceptually rich memories about enacting events that were actually only imagined, this may help explain in part why false confessions tend to be so detailed.

Although imagination research suggests that individuals would display worse memory after imagining an event (discrimination accuracy between previously performed and previously imagined objects tends to decrease as the number of imaginings increase), an alternative view specific to the crime context must be considered. In these studies, participants perform or imagine actions as a within-group manipulation and are asked to discriminate between the actions after a delay (Garry et al., 1996; Goff & Roediger, 1998). The imagining of, or exposure to, an event then increases confidence that the event was actually performed by the subject, even sometimes leading to false memories. In the crime context, the execution of the crime is between-subjects; witnesses know they did not execute the crime. Therefore, the increased fluency when thinking about crime events should actually improve memory, as the witnesses should remember more events, but ultimately correctly attribute them to the perpetrator. As for false confessors, imagining the event should increase the perceptual detail in their recollection of the event, making the subsequent false memory account appear more realistic.

How well memory would improve is still questionable. Although research has shown that self-reported quality of memory increases after repeated imaginings (Lampinen et al., 2003; Mazzoni & Memon, 2003), imagined events are still not remembered as well as SPTs (Lampinen et al., 2003; Senkfor et al., 2002). Most of the research showing a difference between enacted and imagined actions occurs in the same memory for actions paradigm previously criticized as being too simplistic. In one study, researchers instead had participants take a nature walk around a college campus, stopping to perform or imagine familiar or bizarre actions along the way (Seamon, Philbin, & Harrison, 2006). After a delay, participants went on a second walk, again performing or imagining familiar or bizarre actions on the walk. After a second delay, participants were asked to report whether the action had been present in the first walk, and further distinguish whether it had been performed or imagined. Although imagining an event in the second session did make it more likely that participants would falsely report enacting the event in the first session, both performed and imagined actions in the first session were recognized fairly accurately, especially those that appeared in both sessions. Analogous to the typical eyewitness, participants who performed actions on the first walk and then imagined the actions on the second walk displayed superior memory for those actions (.77 and .91 for familiar and bizarre events, respectively) compared to those that did not imagine the events on the second walk (.64 and .78, respectively). Actions that individuals did not perform on the first walk but were imagined on the second walk are analogous to a kind of false confessor. Those actions were also (falsely) recognized at a higher rate compared to those actions that were not used on either walk, but the proportion of recognized responses was much lower. However, participants were trying to accurately report on their memory in the study, whereas false confessors are encouraged to include as many details (which are actually false) as possible, so how many actions those participants would have been able to supply if they had been asked to report on imaginings in the second session is unknown. Ultimately, there is still a question about whether the memories of the imagined events, when accompanied by guilty knowledge, would be as perceptually rich as the enacted events. Memory research has shown in general that false memories tend to have less detail than true memories (Thomas et al., 2003), however, so imagination may not be enough in the end to explain the richness of false confession accounts.

Attribution. In a realistic crime scenario, physical motion and planning are not the only differences between active perpetrators and passive witnesses. Attribution research shows that actors and observers differ in terms of knowledge, motivation, and visual orientation (Jones & Nisbett, 1972; Stafford, Waldron, Infield, 1989). First, actors have more privileged information about their own past actions and internal states (e.g., their own prior thoughts and plans) than do observers. Actors are aware of how their behavior changes from situation to situation and can attribute cause to environmental influences in a way that observers cannot do without the same prior knowledge. Observers must instead infer actors' internal states by observing their behavior (Malle & Pearce, 2001). Second, actors and observers differ in terms of the information they are motivated to find (Watson, 1982). Actors have greater incentive to focus their attention outward to the task and background situation that condition their actions because their behaviors are already a known element (Harvey, Arkin, Gleason, & Johnston, 1974). On the other hand, the observer is motivated to focus on the actor to determine how the actor will behave and how this may affect the observer. Finally, actors and observers differ in terms of visual perspective (Jones & Nisbett, 1972). Actors cannot easily monitor their own actions because their senses are naturally focused outward on the environment around them, but observers' outward focus would include the actions of the actor.

The differential focus between actors and observers (actors on the environment and observers on the actor) has typically been explained in terms of perceptual salience, which predicts that the most salient aspects of a situation draw attention and perceptions of causality (Robins, Spranca, & Mendelsohn, 1996; Taylor & Fiske, 1975). Actors are likely to perceive their surroundings as more dynamic and salient because their actions require interacting with the environment (Arkin, Duval, & Duval, 1978). Observers do not similarly interact with the environment because they have no active role. Consequently, observers pay more attention to the actor, whose actions are dynamic and developing, than to background situational factors, which are relatively more static and unchanging. As memory is largely limited to details that draw attention (Hastie, 1984), actors and observers should encode and later recall different elements of an event (Stafford et al., 1989).

In one study, researchers had observers watch a conversation between two confederates posing as randomly chosen participants (Taylor & Fiske, 1975). Observers were either seated behind one of the actors or seated where they had an equal view of both actors. As predicted, when observers could only see (and therefore focus attention on) one actor, that actor was seen as the causal agent in the conversation. Observers with an equal view of both actors, on the other hand, gave approximately equal attributional ratings. In the second experiment of the study, the researchers used videotaped conversations and not only found that the individual that observers could see clearly were seen as more causal, but also the observers remembered more of what the seen individual said.

Similar results have been found in the forensic context. An extensive body of literature has looked at videotaped interrogations and the impact of camera perspective on viewers' judgments of confession voluntariness, suspect guilt, and sentencing recommendations (Ware, Lassiter, Patterson, & Ransom, 2008). This research has typically compared suspect focus (where the camera solely focuses on the front view of the suspect), detective focus (where the camera solely focuses on the front view of the interrogator), and equal focus (where the camera focuses equally on the side views of the suspect and interrogator) (Lassiter & Irvine, 1986). Overall, findings in this area have also supported the perceptual salience hypothesis, as suspects are viewed as more causal, and their confessions more voluntary and truthful, when they are the sole focus of attention as compared to equal focus or detective focus conditions (Lassiter et al., 2001, 2002a, 2002b; Lassiter & Dudley, 1991). Disrupting perceptual processes eliminates those findings (Ratcliff, Lassiter, Schmidt, & Snyder, 2006; Ware et al., 2008).

The differences between actors and observers outlined in the attribution literature may also indicate differences between perpetrators and witnesses. As mentioned previously, the weapon focus effect occurs because witnesses' attention is drawn toward novel objects such as weapons. These findings support the perceptual salience hypothesis in the attribution literature; witnesses' attention is drawn towards the dynamic actor, but because the weapon is even more salient, attention is further narrowed onto the weapon. To perpetrators, however, the weapon they bring to the crime is not a novel or unanticipated object. Hence, they should focus their attention outward on the environment with which they are interacting in order to commit their crime.

Therefore, it appears that action should lead to a broader, more complete memory of the crime for perpetrators compared to eyewitnesses. Perpetrators should focus more widely on the crime environment, remembering more details about their surroundings than eyewitnesses. As perpetrators, given their broader focus, should process more information, they should remember more information than witnesses over longer retention intervals.

Motivation

Although action constitutes one source of difference between perpetrators and witnesses, motivation is another source. Motivation is driven by individuals' purposes and goals (Green et al., 1985). Clearly the motivation, or relevant goals, of perpetrators and witnesses differ during the execution of a crime. Perpetrators are trying to execute a plan, so their goals include avoiding detection, completing the task successfully, and containing individuals who could alert the police. In contrast, witnesses often try to identify what is going on, whether they are in danger, what the best escape route may be, and potentially what features of the perpetrator they should remember to aid police in their capture. As motivation is considered an important factor governing attention in social interactions (Malle & Pearce, 2001), it is essential to consider how motivation differentially impacts encoding, and later recall, of crime information for perpetrators and witnesses.

Attribution. As previously mentioned, motivation is a basic difference between actors and observers according to the attribution literature (Jones & Nisbett, 1972; Kelley & Michela, 1980). Observers have different motivations than actors due to a lack of information (Harvey et al., 1974); observers do not know the actors' plans or goals and must closely attend to the actors' behaviors in order to infer that information (Chen, Yates, & McGinnies, 1988). Although not all observers will care about actors' plans or goals, those that do care become invested in the event they are observing, becoming 'active' in a sense. Passive observers simply view the event; they do not influence the actors and avoid influence themselves (Cunningham, Starr, & Kanouse, 1979). Active observers (or actor-observers), on the other hand, receive the outcomes of the actors' behaviors, so the actors influence active observers and they often influence the actors' behavior in turn (Miller & Norman, 1975).

When active observers are motivated to focus further on the actor, the typical actor-observer effect is strengthened. Miller and Norman (1975) devised a study in which observers thought they were either participating in a bargaining game with another participant (as active observers) or merely listening to a pair of individuals play the bargaining game (as passive observers). In reality, the active observers were run alone with the experimenter reading a predetermined list of responses as their partners. The active observers attributed more causality to their partner when asked why they personally behaved the way that they did during the game than did passive observers. Passive observers did not show the typical actor-observer effect at all, as they attributed more causality for the players' behavior to the game than either player. Active observers needed to focus on their imaginary partners more so than the game itself to successfully plan their strategy and monitor outcomes, so they were motivated to focus on their partners' moves, leading to the typical actor-observer effect. Passive observers, however, had both actors equally in their perceptual field as they merely heard the experimenter reading the moves of each individual over an intercom, so the game itself became the most dynamic, salient feature of the interaction and drew the most attributions.

When observers are motivated to focus on other information than the actor, the typical actor-observer effect becomes reversed. For example, instilling expectations for future involvement in the same task the actor is currently completing can lead observers to change their attributions to match those of actors (Wolfson & Salancik, 1977). In one study, observers watched an actor complete a social intelligence test and receive either positive or negative feedback about their results (Chen et al., 1988). Active observers were led to believe they would be completing the task next; passive observers did not believe they would be taking the test. Passive observers showed the typical preference for dispositional attributions for the actors' behavior, but active observers' attributions actually mimicked the attributions of the actors who completed the test. Active observers were motivated to prepare themselves for taking the test, so their focus of attention shifted to the situation the actors were in. The passive observers had no concerns about preparing themselves to take the test, so they simply focused on the most visually dynamic feature in the environment – the actor who was taking the test.

Differences between actors and observers cannot be attributed merely to visual perspective. Rather, differences in information processing must be considered as well. Consider, for example, a violent crime. Both perpetrators and victim witnesses are involved in the situation and influenced by the other individual in a physically violent interaction. The perpetrator's attention should be narrowed to focus on the victim as the intended recipient of the perpetrator's action goals, leading an observer-like focus on the victim. The victim (or potential victim), on the other hand, is motivated more than ever to pay close attention to the perpetrator in order to anticipate and try to defend against his or her actions. Although you would typically expect that the victim would simply show a stronger focus on the perpetrator – and therefore better memory for the perpetrator's actions – the victim is likely also motivated to find a means of escape, a person to notify for help, or a weakness in the perpetrator to exploit to avoid harm. These competing motivations, depending on their strength relative to each other, should actually lead to decreased memory on the part of victims compared to uninvolved witnesses, as they lead to divided attention and impair memory for the event (Lane, 2006).

In another scenario, consider the witness who is unaware that a crime event is occurring compared to one that has noticed, and is engaged by, a crime. The witness unaware of the crime is passive; there is no motivation to pay attention to a crime that is not even noticed. The witness engaged by the crime, however, is motivated to pay attention to what is happening and is thus active. Just as those witnesses aware of the seriousness of the crime in the Leippe et al. study (1978) showed better memory for the crime than those unaware of the seriousness of the crime, the active witness should narrow attention onto the crime event and remember more information than a passive witness would be expected to retain.

Motivated reasoning. Motivated reasoning may also contribute to differences between actors and observers. According to the motivated reasoning model, directional goals (e.g., motives to arrive at a specific conclusion) influence individuals' beliefs, reasoning strategies, and information sought (for a review, see Kunda, 1990). Individuals' cognitions are influenced by their active goals in terms of what information they incorporate and how that information is used, but individuals must also be able to reasonably justify the preferred outcome or conclusion (Krizan & Windschitl, 2007; Piercey, 2009). Motivated reasoning can even extend to visual perception (Balcetis & Dunning, 2010; Cole, Balcetis, & Dunning, 2013). Using a motivated reasoning lens, perception is biased toward obtaining rewards and avoiding consequences (Balcetis & Dunning, 2006). As the visual bias occurs at the perceptual level, it is considered an unconscious process even though the motivated reasoning model has typically been characterized as conscious and deliberate.

Directly testing this recent hypothesis, Balcetis and Dunning (2006) led participants to believe that they were going to be assigned to a desirable or an undesirable task. Individuals were further told that a symbol would appear on their computer that would tell them which of the conditions they were in; however, the symbols were actually ambiguous figures that could be interpreted in two ways, each interpretation representing one of the outcomes. In five studies, the researchers found that individuals tended to see the ambiguous figure in whichever interpretation supported their current motivational goals and that the tendency to report the favorable interpretation was not due to conscious efforts to end up in the desired condition. Instead, individuals' active goals unconsciously affected how the figures were in fact perceived.

In follow-up research, Balcetis and Dunning (2010) demonstrated that motivated vision could also bias perception of the physical environment. In five studies, individuals estimated the distance to a desirable or undesirable object. Overall, there was an effect for participants judging favorable objects as physically closer than unfavorable objects. In their explanation for the results, the researchers posited that 'wishful seeing' could function as a motivation for subsequent behavior: individuals see their goals as more attainable and be more likely to go after them, but they will see undesirable outcomes in a biased way that makes subsequent behavior towards that outcome less likely. This biased visual perception effect has also been replicated when judging threatening objects, as participants perceive threatening objects as closer than nonthreatening objects (Cole et al., 2013).

The impact of motivated reasoning can also be applied to suggest another basis for a difference between perpetrators and witnesses. As mentioned previously, the weapon focus effect leads to attention focusing on weapons and other novel objects. Although action explains why novel, and therefore dynamic, objects initially capture attention, motivation explains why weapons may hold attention longer than other types of novel objects. Witnesses' visual perception should be biased towards perceiving and attending to the elements of the crime most central and relevant to the event. When a weapon is present, the active goals for witnesses narrow onto the weapon: figuring out how, when, where, and on whom the perpetrator will use it. These active goals should lead to a prolonged focus on a weapon compared to other novel objects that fail to influence the witnesses' motivations. Perpetrators should instead be biased toward objects or individuals in the environment that enhance the likelihood of meeting their active goal: successfully executing the planned crime. Perpetrators are also motivated to avoid consequences associated with detection, so they should also bias their attention toward information that could thwart their performance. Because the motivated vision literature suggests perpetrators may see obstacles as worse than they are in reality, perpetrators may divide their attention between the competing motivations and exhibit reduced recall for their crime.

Compared to the relatively straightforward effects that action should have upon perpetrators and witnesses, the impact of motivation on memories for a crime is more complex. Depending on what goals an individual has, motivation can influence whether attention is focused broadly on the situation, more narrowly on a specific aspect of the situation, or divided between different elements of the situation. Witnesses unaware that a crime is being committed should have no active goals relevant to the crime, so their memory should be broad and unfocused, resulting in the least recall for the event. Witnesses aware of and engaged by a crime, on the other hand, should show improved recall for the event, as it becomes the primary focus of their attention. As their active goals become more focused (e.g., concerning how a weapon will be used), witnesses' attention should narrow further on the relevant features of the crime. When an additional competing goal, such as personal safety, is activated, memory should again be impaired, also leading to recall for only limited, focused aspects of the crime.

Unlike witnesses, perpetrators always have at least one active goal – to execute the crime. When there is little chance of being caught (e.g., burglarizing an empty house with no security system), perpetrators should not have additional competing goals to divide attention. As even an imagined audience can influence behavior (Hogg, 2000; Jones, 1998), however, perpetrators' motivations may often include avoiding capture and controlling the situation, which could divide attention and impair overall memory for the crime. Although the witness memory literature provides clear support for the role of motivation, the current literature on perpetrator memory cannot be used to support the proposed effect of motivation on attention and encoding. Rather, motivation has been investigated with respect to its influences on later lying and biased recall (Christianson & Bylin, 1999; van Oorsouw & Giesbrecht, 2008; van Oorsouw & Merkelbach, 2004; van Oorsouw & Merkelbach, 2006), which is beyond the scope of the current investigation.

Stress/Arousal

A third possible distinction between actors and observers concerns differences in stress and arousal. Stress and arousal can have a multitude of effects on information processing (Herve et al., 2007). Under certain circumstances, emotionally arousing information can enhance memory for central details of an event (Levine & Edelstein, 2009; Murphy & Isaacowitz, 2008). Individuals tend to orient toward arousing information over nonarousing information, which should trigger greater encoding and attention. On the other hand, when arousal is too high, it is experienced as unpleasant stress or anxiety and can lead to defensive responses, such as attention narrowing to threat stimuli or possible coping stimuli (Levine & Edelstein, 2009). Although lower levels of arousal should affect overall focus of attention, higher levels adversely affect breadth of attention, first reducing encoding for peripheral details and then, in extreme cases, central details as well (Easterbrook, 1959).

A previous model has already considered stress and arousal influences on both witnesses and perpetrators. Herve and colleagues (2007) developed a "biopsychosocial" model of witness memory that characterized perpetrators as simply another type of witness to a crime. The model makes predictions about the types of attentional biases and memory distortions witnesses should display at differing levels of event-related arousal on the basis of individual differences in arousal sensitivity. Arousal sensitivity is generally seen as normally distributed. Individuals at the low extreme are characterized as hypersensitives (experiencing arousal quickly at low levels of stimulation), and individuals at the high extreme are characterized as hyposensitives (not experiencing arousal until high levels of a stimulation), much like the characterization of introverts versus extroverts (Eysenck, 1967). At moderate levels of arousal, individuals should remember the most about the witnessed event, as their focus shifts outward toward the environment and the most central details (Herve et al., 2007). At high levels of arousal, however, individuals should shift their focus inward, negatively impacting recall for central details and leading to dissociative memory at extreme levels.

Although the model focuses primarily on arousal during a crime and its predicted effect on attention, it also acknowledges the impact of other psychological and social variables (Herve et al., 2007). For example, certain mental disorders can influence an individual's level of arousal sensitivity, and one's affective state can influence how arousing he or she perceives the subsequent crime. As arousal increases, cognitive resources become overloaded (or depleted), and failures in memory begin to occur. In terms of social variables, past experiences can affect how sensitive an individual will be in subsequent events, which again affects how arousing an event is perceived to be. Moreover, certain contextual variables, such as the feelings of safety during a crime, help determine an individual's affective response to an event, which can influence rehearsal and strength of encoding.

The Herve et al. model (2007), though useful for understanding personal vulnerabilities, primarily focuses on individual differences and largely fails to incorporate situational factors and their impact on arousal and stress. The model does acknowledge certain differences between perpetrators and other types of witnesses, but these are mostly discussed in terms of individual differences in the stress caused by a crime (e.g., repeat offenders should find committing a crime much less stressful than a first-time crime witness would find witnessing the same crime). Crimes are inherently social events and are likely to produce at least minimal levels of arousal. This arousal can change an individual's primary motivation, or active goal, which could change the focus of attention one would normally expect. For an eyewitness who suddenly fears that he or she can become a victim, arousal is likely to increase significantly, and active motivation may switch from observation to self-protection. For perpetrators, the presence of a witness who could identify them might lead them to feel additional stress, leading to changes in attentional orientation. It is important to consider how social influences can at least partly dictate how perpetrators and witnesses are affected by stress. The literature on social facilitation can provide a useful framework for considering this issue.

Social facilitation. Social facilitation refers to the general finding that individuals' performance is enhanced when performing tasks for which they are expert but impaired on tasks for which they are unskilled when completed in the presence of others (Zajonc, 1965). Originally, the theory was posited as a drive theory wherein the mere presence of others increases arousal, which facilitates the dominant response (Zajonc & Sales, 1966). Subsequent revisions have come to identify distraction-conflict (Baron, 1986), as well as evaluation apprehension (Geen & Gange, 1977) as important mediators of the effect. Several modern theories of social facilitation have combined these two mediators to create an overall model of social facilitation that accounts for arousal, attention, and task difficulty in the presence of likely social consequences (Feinberg & Aiello, 2006; Geen, 1991; Guerin, 1999; Muller & Butera, 2007). Distraction-conflict theory holds that the presence of others creates attentional conflict for an individual, who must then split attention between the task and observers (Baron, 1986). This conflict is considered a form of negative arousal (e.g., stress or anxiety) that needs to be reduced (Feinberg & Aiello, 2006; Geen, 1991). Attentional resources are finite (Lavie, 2001), so individuals must resolve the conflict by withdrawing attention from cues peripheral to the task so they have resources available to expend on the observers (Muller & Butera, 2007). When the peripheral cues are unnecessary (or the task is easy), task performance will be enhanced. When peripheral cues are useful for task completion (or the task is difficult), on the other hand, performance will be inhibited.

Evaluation apprehension, or anxiety caused by fear over negative outcomes, is seen as another source of arousal (Geen & Gange, 1977). Although the original theory of social facilitation stated that the mere presence of other individuals was enough to produce social facilitation (Zajonc & Sales, 1966), evaluation apprehension theory holds that the effect only appears when the observing individuals serve an evaluative function over the person completing the task (Geen, 1991). The social facilitation effect should only occur when the individual feels threatened in some way by the possibility of a negative evaluation (Muller & Butera, 2007; Wilson, Chattington, Marple-Horvat, & Smith, 2007). Because threatening others are likely to demand more attention resources than nonthreatening others, models have combined evaluation apprehension and distraction-conflict and found that attentional focusing only occurs when there is a threat, or potential threat, to the individual (Muller, Atzeni, & Butera, 2004; Muller & Butera, 2007).

Performance pressure is another important feature to consider. Performance pressure arises from a number of factors--such as the presence of others, the contingent rewards and punishments for the behavior, competition, and how the performance reflects on the individual (Baumeister & Showers, 1986). As this performance pressure increases, so does self-focus (Baumeister, 1984; Jackson, Ashford, & Norsworthy, 2006; Wicklund, 1975). Self-focus can negatively influence performance for well-learned tasks because it leads to focus on the physical actions, or process of performance, disrupting the automatic nature of the well-learned response (Baumeister, 1984; Langer, 1978; Lewis & Linder, 1997). When performance pressure is present, individuals' performance during an event can therefore be hindered as attention focuses inward, also impairing memory for the task itself.

Considered as a whole, social facilitation predicts a wide range of effects on perpetrators and witnesses, dependent on the level of arousal being experienced. For eyewitnesses, level of involvement should interact with social facilitation. Naïve or uninvolved witnesses are unlikely to feel threat from, or be distracted by, the perpetrator; thus, evaluation apprehension is unlikely, and memory should not be affected. When witnesses become involved, however, their attention should narrow and focus on the perpetrator, increasing memory of his/her appearance and actions. However, research has shown that distraction and evaluation apprehension can combine to produce greater effects than either alone (Feinberg & Aiello, 2006); therefore, as level of threat to witnesses increases (as would occur if the likelihood of being a victim of the crime increased), the level of pressure present should increase significantly as well. As a result, witnesses should also shift from an external focus to an internal focus, thereby greatly reducing attention and subsequent recall for the crime.

The eyewitness research previously discussed provides limited support for these potential effects of social influences on arousal. Under conditions of low personal threat and task difficulty, bystander and victim witness recall accuracy does not diverge (Hoch & Bothwell, 1990), but bystander witness recall is superior to that of victim recall when task difficulty rises (Kassin, 1984). Despite the fact that this pattern supports the present contentions, field study research has actually found limited differences between the two witness types (Christianson & Hibernate, 1993). However, given the lack of control and delay between crime and memory assessment in the field study research, several other variables that could affect retention and recall may be present that would obscure the present encoding differences hypothesized.

On the other hand, the social influences discussed are consistent with Deffenbacher's (1994) model of eyewitness stress. Indeed, stress manipulations and social facilitation manipulations have shown identical results on experiments using the Stroop task (Booth & Sharma, 2009; Hogue, Galvanic, Montréal, & Dumas, 1999), where participants must ignore the meaning of words presented and respond instead to the color in which they are presented (Stroop, 1935). Irrespective of the particular manipulation, stress or distraction and arousal created by the presence of evaluative others leads individuals to ignore irrelevant information, thereby enhancing performance on the task.

Although stress at lower levels should aid witnesses, higher levels of stress should impair overall memory for the crime as attention shifts to an internal focus. Deffenbacher (1994) predicted that the eventual decline in performance happens as a catastrophic drop, which may seem at odds with the present model, but it has been noted that facilitation effects do not hold once attentional demands become too high (Feinberg & Aiello, 2006). Therefore, highly violent, traumatic, or otherwise arousing crimes that cause very strong perceptions of threat and high resulting stress levels are likely to severely inhibit performance (perhaps by facilitating an intense inward focus instead as a result of extreme levels of performance pressure), as has been reported in the literature (e.g., Morgan et al., 2004; Valentine & Mesout, 2009).

In the context of committing a crime, perpetrators are also likely to feel stress and arousal (the level of which could be attenuated by level of experience with the particular crime). When committing a crime, there is often the chance that a witness or the police may show up during the task or that a mistake during the commission of the event would give important evidence to the police that would aid in the perpetrator's capture. Even when no witnesses are explicitly present, perpetrators may be focused on the potential arrival of an audience or the likely audience to the post-event evidence as well as potential escape routes. When witnesses are actually present, perpetrators would need to allocate attention to the witnesses to be alert and prepared to respond to any changes in their behaviors (Feinberg & Aiello, 2006). Ultimately, when the crime being committed is easy, such as a property crime or petty theft, perpetrators' performance should be enhanced, as has been shown in laboratory mock crime polygraph studies (e.g., Path, Vessel, & Gamer, 2012). As a result, recall for the central details of the crime should not suffer, though recall for peripheral details would be reduced. On the other hand, when the crime is difficult or attentional demands are so great that capacity is overloaded, perpetrators should exhibit a reduction in task performance as well as reduced recall of central crime details, as perpetrators' focus should shift from external to internal.

Paradoxically, the present literature does not support the current hypotheses. Rather than perpetrators reporting reduced recall for crimes that would be considered more difficult and higher pressure (such as murder), perpetrators actually relate more details of those crimes as compared to nonviolent crimes (Woodworth et al., 2009). However, these memories cannot be verified for ground truth; therefore, the veracity of the details reported is in question. Considering the well-documented effect that victims of trauma often relate very detailed, albeit incorrect, versions of their traumatic experiences (Shuman & Smith, 2000), it is possible that the greater level of details for these types of crimes arises from ruminations on the execution of the act afterward (Evans, 2006) rather than actual superior encoding during the event.

CHAPTER 4: CONCLUSION

It makes intuitive sense to expect superior memory from perpetrators than from other witnesses. After all, they are the ones who committed the crime, which may have included planning and in which they were actively engaged. In contrast, witnesses are often surprised by the crimes they observe, receive only a brief exposure, and are not actively engaged. Under ideal circumstances, the proposed model supports the existence superior perpetrator memory. However, the research also suggests that perpetrators may not always show superior memory to witnesses, who often have flawed recollections of crimes. Although perpetrators may be expected to show superior memory for a crime when action is considered alone, the influence of motivation and arousal may erase these advantages. Motivation likely improves eyewitness memory but may lead to feelings of self-consciousness and divided attention in perpetrators. Likewise, although arousal probably functions to enhance memory for central details similarly for both perpetrators and witnesses up to a certain point, perpetrators likely feel more stress than eyewitnesses during the commission of a crime, except when witnesses are faced with a serious threat of victimization.

In short, perpetrator memory may not be as strong as is typically assumed. The eyewitness memory literature provides important support for understanding what factors may negatively impact perpetrator memory, but the systematic differences between perpetrators and eyewitnesses may also moderate those effects. To date, there has been very little research examining the actual content and accuracy of perpetrators' memories and compared them to the existing body of knowledge for eyewitness memory (but see Price et al., 2009). Research must address the type of errors to be expected on the part of perpetrators in order to improve our understanding of the reliability of perpetrator accounts

CHAPTER 5: OVERVIEW

Three studies were conducted to compare perpetrator and eyewitness memory and investigate whether any potential differences in recall are the result of action, motivation, and arousal dissimilarities between perpetrators and witnesses at encoding. Study One investigated the basic differences that may be expected between perpetrators and witnesses by manipulating whether participants engage in or merely observe the commission of a mock crime. Perpetrators completed a 10-step scavenger hunt-type mock theft by following taped clues to a potentially valuable object they were to steal while witnesses observed the mock crime from inside the room. If actors are more likely to focus their attention externally whereas observers are more likely to focus on actors (Robins et al., 1996), then there should be systematic differences in the number and type of details recalled by perpetrators and witnesses. Perpetrators should pay greater attention to the objects and spaces of the room during the mock crime phase, thereby improving the strength of their memories for the non-task (peripheral) items compared to eyewitnesses. Because perpetrators must physically enact the mock crime that eyewitnesses are watching, however, there should not be significant differences in the recall of task-specific (central) items for the crime. The enactment effect may make memories more resistant to decay over time (Notice, Notice, & Kennedy, 2000), such that perpetrators would display better memory for both central and peripheral items compared to eyewitnesses after a delay. To test the possible impact of time delay, participants returned one day or one week after the mock crime task to complete memory measures including a free recall task, Remember/Know/Guess test, and a forced-choice recognition test. Possible gender differences were also explored, as past research has shown an inconsistent effect of gender on memory for crimes (see Lindholm & Christianson, 1998; Price et al., 2009; Areh, 2011).

Study 2 sought to parcel out the impact of motivation from that of action by independently varying whether the actors and observers were motivated to have the mock crime completed successfully. In Study 1, perpetrators were motivated to complete the theft successfully to obtain a benefit unavailable to the witnesses (i.e., keeping the stolen item). In Study 2, actors and observers in a "motivated" condition were instructed that they would split the value of the object between themselves and their partners. Motivated observers thus served as "accomplices" in the crime as they had a stake in the outcome (motivated participants were also warned that a loud alarm that would ring if the task was not successfully completed, thereby creating a double-prong motivation to both obtain a reward and avoid a punishment). In contrast, actors and observers in an "unmotivated" condition were told they would have to return the stolen item regardless of the actors' success; they were also not warned about an alarm. Should actors' focus of attention narrow onto specific, competing goals when motivated compared to when unmotivated (Kunda, 1990), perpetrators should experience divided attention between multiple competing goals, reducing recall for central information about the crime. On the other hand, an eyewitness engaged by a crime should narrow attention on the perpetrator and criminal actions occurring, resulting in improved recall over an unmotivated witness, especially one who is unaware that a crime is taking place. Additional data from solo actors was also collected to assess whether the presence or absence of an observer in this paradigm impacted the pattern of findings. It is possible that actors may be additionally motivated (via social facilitation) or distracted (via an additional competing goal of attending to the witness) by the presence of a witness, so the performance of the unmotivated actors in pairs was compared to unmotivated actors performing the task alone to see whether there were any differences in performance.

Study 3 sought to replicate the results under less structured conditions. Rather than follow tapes around the room in a designated sequential order, perpetrators were shown a picture of a gift box and told that it contained a potentially valuable object that they were to steal. The box was hidden in the room (in a safe disguised as a dictionary), and perpetrators were given no clues as to where it may be located. Perpetrators were also told they would need to find a set of keys to access the gift box, but again they were not told where the keys were located (they were taped under the table). Crimes do not typically proceed in an orderly and predefined sequential fashion as in the procedure for the first two studies, so making the mock crime more open-ended was designed to increase the mundane realism and complexity of the experimental situation. The level of pressure present in the task was also varied. Pressure should affect task difficulty through a manipulation of the stress felt during the commission of the crime. Because the level of arousal inherent in this paradigm was moderate not "catastrophic" (Deffenbacher, 1994), I expected an increase in arousal to improve witness memory. Conversely, evaluative concern should rise in perpetrators as task pressure rises, so even the moderate level of stress may compromise perpetrators' performance (Muller & Butera, 2007).

This study also included two "imagination" conditions to extend the investigation of crime memory to include false confessors (with guilty knowledge) as well. Participants in the imagination condition (imaginers) were given the same instructions as the perpetrators and asked to imagine how they would follow the instructions while standing in the mock crime room. The imaginers were then subjected to the memory phases using the same procedure as the perpetrators. Although the research on the effects of imagination on memory is mixed (see Mazzoni & Memon, 2003; Senkfor et al., 2002), the overall body of literature suggests that imagination does not produce memories similar to physically enacting a task (Seamon et al., 2006). The two imagination groups extend this line of research by allowing comparisons between perpetrators and imaginers in the mock crime task as a potential explanation for why false confessions are so detailed (Garrett, 2010). As this investigation was limited to differences at encoding at this point, the design did not investigate the impact of imagination on witnesses' memory. Gender differences were also explored in this study.

CHAPTER 6: STUDY ONE: EFFECTS OF ROLE AND DELAY ON MEMORY

Method

Participants and Design

Participants were 135 community members (*M* age = 32.07 years; 49% female; 2 participants did not self-report gender) paid $20 for their participation. Actors received an additional $1 scratch-off lottery ticket. Data from 25 participants were excluded: Eleven participants did not return for the second half of the research and 14 were part of a session where the actor failed to complete the task properly (e.g., did not find the task items, left early, etc.). An additional 29 participants were run solo when their partners did not come to the session and later excluded to keep cell sizes even. The final sample thus consisted of 81 participants--including 23 African Americans, 33 Caucasians, 9 Hispanic, 5 Asian/Pacific Islander, 6 who self-identified as multiethnic, and 5 who self-identified as "other". These participants were randomly assigned to one of four cells (*n*s of 20 to 21) created by a 2 (Role: Perpetrator vs. Witness) X 2 (Time Delay: 24 hours vs. 1 week) factorial design.

Procedure

Participants were recruited via Craigslist to participate in a two-day study concerning event perception. Participants were randomly assigned to conditions upon recruitment, at which point they were asked to agree to attend both sessions before they were scheduled to participate. Participants were not told in advance that their memory was to be tested.

In the first experimental session, participants were scheduled in pairs. A perpetrator was always paired with a witness when both participants came to the session. Equal numbers of males and females were assigned to each condition. When only one participant showed up for the first experimental session, he or she was run as a solo perpetrator. After giving informed consent (see Appendix A), each participant was read instructions for the next phase and instructed not to speak with one another during the task (see Appendix B). All participants were told that they had five minutes to complete the entire task.

Role manipulation. Role was manipulated by whether the participant personally enacted the multi-step task (active perpetrator) or watched another participant complete the same task (passive witness). Those assigned to the perpetrator role were told there was an object in the task room that was potentially worth a great deal of money and that their job was to locate and steal the item in a scavenger-hunt type task. They were instructed to follow a series of tapes with clues around the room (e.g., the first tape said to "find the object that tells time", which led the participants to a clock with the second tape attached to the back) to reach the potentially valuable object. They were told that one of the items would have a set of keys attached to it that may or may not help them access the object they were to steal. Perpetrators were told that they must leave the room immediately after finding the object and hiding it on their person so as not to exceed the five-minute limit. The perpetrators were further warned that an individual would be observing them and rooting for their success but that the person could not speak. Finally, perpetrators with a partner were motivated by being told that they would get to keep the stolen item (which turned out to be a $1 scratch-off lottery ticket) should they complete the task successfully; perpetrators completing the task alone were told they would not be able to keep the stolen item.

Witnesses were told to enter the room at the same time as the perpetrators and stand on a marked spot inside the room and observe. The room used was small (approximately 10' by 8') to facilitate witnesses' viewing of the entire mock theft. All items in the room were placed as to be clearly visible from the marked spot on which witnesses were directed to stand. The witnesses were also told to make sure to leave the room directly behind the perpetrators. Witnesses were informed, regardless of the perpetrators' success, they would not get to keep any part of the proceeds. Finally, they were warned not to speak or interact with the perpetrators in any way. The five-minute time limit was repeated to both participants as a reminder before progressing to the next phase.

Mock crime phase. The mock crime simulated a theft. Perpetrators were given a tape to put in a tape recorder located in the center of the room. The tape provided a clue as to the first item they needed to locate (i.e., "find an object that tells time", which led them to a clock). Each item yielded another tape to play in order to receive the next clue. The tapes ultimately led participants to find a key (on the 8th step) and a lock box (on the 10th step). Inside the lock box, perpetrators found the item to be stolen–a scratch-off lottery ticket. In total, perpetrators were led to interact with ten objects, plus the lock box, lottery ticket, keys, and tapes (see Appendix C). The room also contained about 60 stationary objects, furniture, and wall art in the background.

During the mock crime phase, a metronome beat at 60 beats per second to punctuate the level of time pressure. The mock crime phase was covertly videotaped to check whether participants followed the experimental rules. The amount of time that participants were in the room was measured via stopwatch and verified by videotape when necessary.

After completing the mock crime task, participants completed the crime perceptions questionnaire (see Appendix D), State Anxiety Scale (based on their feelings during the mock crime phase; see Appendix E), and provided their demographic information.

Time-delay manipulation. After completing the questionnaire, all participants were reminded of their scheduled return time, paid cash for their first visit ($5), asked to sign a form allowing for the use of the covertly videotaped data (Appendix F), and dismissed. Half of the participants were scheduled to return roughly 24 hours later. The other half of the participants was scheduled to return in seven days.

Memory assessment phase. Upon returning to the lab, both perpetrators and witnesses completed the free recall questionnaire (see Appendix G), Remember/Know/Guess test (see Appendix H), and recognition test (see Appendix I). Participants completed these measures at their own pace and were encouraged to be accurate and thorough. After completing the memory measures, participants were orally debriefed as to the nature of the study. Prior to dismissal, participants were paid cash for the second day of the study ($15).

Measures

Crime-perception questionnaire. Participants answered eleven questions regarding their perception of the mock crime task on 7-point Likert-type scales. Participants rated: (1) the difficulty of the task; (2) the clarity of the tapes; (3) actors' level of stress caused by the time limit; (4) observers' level of stress caused by time limit; (5) how important it seemed to the actor to be successful; and (6) how important it seemed to the observer to be successful. Participants also rated how important a series of variables were to the perpetrators' ultimate success or failure: (1) presence of an observer; (2) ability to concentrate; (3) task time limit; (4) level of attention to detail; and (5) level of motivation.

State-Anxiety Scale. Participants completed a six-item short version of the State scale of the Spielberger State-Trait Anxiety Inventory (STAI) regarding their feelings of anxiety during the mock crime phase (Cronbach's α of .82; Marteau & Bekker, 1992). This short form was chosen over an alternative 6-item shortened version (Chlan, Savik, & Weinert (2003), because the Marteau and Bekker short form is more focused on cognitive anxiety whereas the Chlan and colleagues version is more focused on physical feelings of anxiety (Tluczek, Henriques, & Brown, 2009).

Demographic questionnaire. Participants completed a demographic questionnaire, providing information on age, race, and gender.

Free-recall memory test. Participants were asked to respond to two open-ended questions assessing their memory for the objects in the room. The first open-ended question asked participant to list the steps of the task in chronological order and identify the item that corresponded with each step. Participants were asked to provide as much detail as possible about each item (e.g., color, shape, distinguishing marks, etc.). The second open-ended question asked participants to identify all remaining items that were in the room, including any objects on the walls and furniture, along with their accompanying details.

Remember/Know/Guess test. Participants completed a Remember/Know/Guess (RKG) test (Gardiner, Richardson-Klavehn, & Ramponi, 1997; Tulving, 1985). This test was developed to distinguish between recollection-based (remember) and familiarity-based (know) memory. Recollection based memory is considered a stronger indicator of memory than mere familiarity, so this distinction should give an indication of the strength of participants' memories. Participants were asked to first determine whether each item was in the task room during the mock crime phase. They were then instructed to indicate for each item they said was in the room whether they remembered its presence in the room, knew it was present in the room, or were guessing. Participants were told to endorse remember judgments only when they could access a specific memory of the item in the room and endorse know judgments when they could not access a specific memory of the item in the room but felt that it was present in the room.

The list was comprised in equal parts of new items, old items, and lure items. Old items were those that were previously in the room. Half were items that were part of the mock crime task (central), and half were items that were simply present in the room (peripheral; Gamer, Kosiol, & Vessel, 2010; Nahari & Ben-Shakhar, 2011). New items were those that were not in the room and would not plausibly be present (e.g., a chandelier or a rocking chair in an office setting). Lure items were items that were not present in the room but whose presence would be plausible (e.g., a computer in an office setting). New items were ultimately excluded from analyses because of floor effects in choosing rates.

Recognition test. Participants were shown ten pairs of photos based on objects in the room. Pictures of items that were in the room were paired with altered pictures of the items or related items (e.g., different color, shape, or placement). For each pair of items, participants chose which item had been in the room and rated their confidence in that choice. Half of the items were central and half were peripheral. The order of items was counter-balanced, and no items were repeated between the Remember/Know/Guess test and the recognition test.

Free Recall Coding

A master's student, blind to the research hypotheses, coded participants' open-ended free recall statements. In addition, a doctoral-level independent rater, also blind to the research hypotheses, randomly coded approximately 25% of the participants (*n* = 30 cases) for reliability analyses. The instructions on participants' free recall questionnaires were redacted prior to coding to keep coders blind to condition as much as possible[1].

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[1] Some participants wrote in narrative form rather than lists as requested. These narratives at times referred to what the actor did during the task, thus revealing the participant's status as a perpetrator or witness via choice of pronouns (e.g., I found vs. he/she found).

Raters first calculated a task item total by summing the number of task (central) items listed as such by participants. Raters then calculated a central item order difference score based on participants' chronological ordering of the task (central) items: raters summed the absolute value of the difference in participant placement for each item and the item's corresponding actual placement in the ten-item search. Raters then coded the frequency of participants' details about the items in the room into the following five categories: (1) location; (2) color; (3) other; (4) incorrect; (5) subjective. Location and color were chosen as separate categories from other details because of their greater prevalence in participants' responses. Coders also identified items incorrectly listed as task items. These items were separated into two categories: (1) transference intrusions and (2) other intrusions. Transference intrusions were items present in the room that were incorrectly identified as task items. Other intrusions were items that were not present in the room, representing errors of commission. Coders summed the number of intrusions for each category to create intrusion scores. Raters coded the details of transference intrusions using the same five categories. Details about other intrusions were simply summed, aside from subjective details counted separately, as there was no way to verify the accuracy of the details.

Raters completed similar coding for the non-task (peripheral) items in the room. They calculated a non-task item total by summing the number of unique categories of items listed by participants (e.g., three chairs counted as one item). Quantity was therefore added as a sixth coding category in addition to those noted above for non-task items. Non-task items were also separated between correct and incorrect items, and incorrect items were again separated between transference and other intrusions. Non-task transference intrusions referred to task items that were incorrectly identified as non-task items, and non-task other intrusions were items not present in the room. Reliability for all ratio categories was calculated using Krippendorf's α, which ranged from .65 to 1. When Krippendorf's α could not be computed due to a lack of variation in a category, a percentage agreement was calculated (all were 100 percent). Disagreements were resolved by averaging the values.

Raters also coded for the presence of specific items in the participants' narratives. Specifically, raters coded for the presence/absence of the cash box (which held the potentially valuable object), the keys (that participants were told may be necessary to access the potentially valuable object), the lottery ticket (the potentially valuable object), and the tapes participants followed around the room. Participants also coded the location of the cash box, keys, and lottery ticket as correct, incorrect, or not mentioned. These nominal categories were assessed for reliability using Cohen's κ, which ranged from .86 to 1. I resolved disagreements between coders for the nominal categories.

Hypotheses

Study 1 tested whether action improves perpetrator memory via improved attention to the peripheral detail in the room compared to eyewitnesses. The study also tests whether physically enacting the mock crime enhances memory for the crime and makes it more resistant to forgetting. Gender differences were also explored, but no specific *a priori* hypotheses were made.

H1: There should be a main effect for role, such that perpetrators exhibit greater overall recall than witnesses.

H2: The main effect for role will be qualified by an interaction with type of details, such that observers will recall fewer peripheral details than perpetrators but show similar recall for central items.

H3: There will be a main effect for time delay, such that participants will better recall after a 24-hour delay as opposed to a 1-week delay.

H4: The main effect predicted in H3 will be larger in observers as perpetrators will show a greater resistance to forgetting than witnesses, represented by a two-way interaction of time delay and action.

H5: The main effect predicted in H3 will be larger for peripheral details as central detail will be more resistant to forgetting over time, represented by a two-way interaction of time delay and type of details.

CHAPTER 7: STUDY ONE RESULTS

Crime Perceptions

Participants completed a crime perceptions questionnaire immediately following conclusion of the mock theft phase. Participants rated five items on a 7-point Likert-type scale (1 = not at all important; 7 = very important) as to their *importance to the perpetrators' success* during the mock crime phase (1 = witness presence; 2 = ability to concentrate; 3 = task time limit; 4 = perpetrators' level of attention to detail; and 5 = perpetrators' level of motivation). A 2 (role) x 2 (time delay) x 2 (gender) multivariate analysis of variance (MANOVA) on these ratings revealed no significant multivariate effects of role, $F(5, 69) = 1.77$, $p = .13$, $\eta_p^2 = .11$, time delay, $F(5, 69) = .82$, $p = .54$, $\eta_p^2 = .06$, or gender, $F(5, 69) = 1.29$, $p = .28$, $\eta_p^2 = .09$, and there were no significant interactions (ps > .10). Participants did not statistically vary by condition in their ratings of the importance of the witnesses ($M = 1.74$, $SD = 1.35$), perpetrators' ability to concentrate ($M = 4.95$, $SD = 2.11$), the time limit ($M = 5.03$, $SD = 2.02$), perpetrators' level of attention to detail ($M = 5.18$, $SD = 1.84$), and perpetrators' level of motivation ($M = 5.63$, $SD = 1.70$).

Participants also rated an additional six items on 7-point Likert-type scales concerning their *perceptions of the crime* (1 = task difficulty; 2 = tape clarity; 3 = perpetrators' stress caused by the time limit; 4 = witnesses' stress caused by the time limit; 5 = importance of success to the perpetrator; and 6 = importance of success to the witness. Items three and four of the latter items were recoded into a variable representing participants' perceptions of how stressed they were by the time limit, and items five and six were recoded into a variable representing how important it was to the participant to be successful. Using Pillai's trace, a 2 (role) x 2 (time delay) x 2 (gender) MANOVA revealed a significant multivariate main effect of role, $V = .27$, $F(4, 70) =$

6.61, $p = .001$, $\eta_p^2 = .27$. Follow-up ANOVAs revealed a significant univariate main effect of role on perceptions of how stressed participants felt by time limit, $F(1, 73) = 17.55$, $p < .001$, $\eta_p^2 = .19$. Pairwise comparisons (Bonferroni[2]) showed perpetrators reported feeling more stressed by the time limit ($M = 4.75$; $SE = .30$) than was reported by witnesses ($M = 3.01$; $SE = .29$), $M_{diff} = 1.74$, 95% CI [.91, 2.57].

There was a significant multivariate main effect of gender, $V = .14$, $F(4, 70) = 2.87$, $p = .03$, $\eta_p^2 = .14$. Follow-up univariate ANOVAs revealed a significant univariate effect of gender on participants' ratings of how stressed they were by the time limit, $F(1, 73) = 9.98$, $p = .002$, $\eta_p^2 = .12$. Females ($M = 4.54$, $SE = .29$) reported higher levels of stress caused by the time limit than did males ($M = 3.23$, $SE = .30$), $M_{diff} = 1.31$, 95% CI [.48, 2.14]. There was no significant multivariate main effect of time delay, $V = .07$, $F(4, 70) = 1.26$, $p = .29$, $\eta_p^2 = .07$, but there was a significant multivariate gender by time delay interaction, $V = .17$, $F(4, 70) = 3.61$, $p = .01$, $\eta_p^2 = .17$. Follow-up ANOVAs revealed a significant gender by time delay interaction on participants' perceptions of the task difficulty, $F(1, 73) = 6.72$, $p = .01$, $\eta_p^2 = .08$. Whereas males did not significantly differ in their perception of task difficulty between the one-day delay condition ($M = 1.90$, $SE = .33$) and the one-week delay condition ($M = 2.65$, $SE = .33$), $t(73) = 1.62$, $p = .11$, $d = .54$, 95% CI [-.17, 1.67], females judged the task as significantly more difficult in the one-day delay condition ($M = 3.25$, $SE = .33$) than the one-week condition ($M = 2.31$, $SE = .32$), $t(73) = 2.05$, $p = .04$, $d = .58$, 95% CI [.03, 1.86]. There were no other effects of time delay, which is appropriate given the crime perceptions data was collected before the manipulation.

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[2] SPSS adjusts p values when calculating a Bonferroni pairwise comparison, so $p = .05$ remained the criterion for significance.

State Anxiety

Participants also completed the State-Anxiety Scale to assess the amount of anxiety participants felt during the mock crime phase. Three of the items (calm, relaxed, and content) were reverse-scored according to the original instructions for the scale. Scores were then summed to create a state anxiety score, which ranged from 6 (low anxiety) to 24 (high anxiety). The scale showed good reliability in our sample (Cronbach's $\alpha = .84$). A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA revealed a main effect of role, $F(1, 73) = 4.49$, $p = .04$, $\eta_p^2 = .06$. As expected, perpetrators reported higher anxiety during the mock crime phase ($M = 12.30$, $SE = .63$) than did witnesses ($M = 10.44$, $SE = .62$), $M_{diff} = 1.86$, 95% CI [.11, 3.62]. There was also a significant main effect of gender, $F(1, 73) = 7.36$, $p = .01$, $\eta_p^2 = .09$. Females ($M = 12.56$, $SE = .62$) reported significantly higher state anxiety than did males ($M = 10.18$, $SE = .63$), $M_{diff} = 2.39$, 95% CI [.63, 4.14].

These effects were qualified by two significant interactions. There was a significant interaction between role and time delay, $F(1, 73) = 5.36$, $p = .02$, $\eta_p^2 = .07$. Whereas there was no difference in anxiety between perpetrators (($M = 11.55$, $SE = .89$) and witnesses ($M = 11.72$, $SE = .87$) in the one-week delay condition, $t(73) = .14$, $p = .89$, $d = .04$, 95% CI [-2.29, 2.64], witnesses ($M = 9.15$, $SE = .89$) reported significantly higher state anxiety than perpetrators ($M = 13.05$, $SE = .89$) in the one-day condition ($p = .003$), $t(73) = 3.12$, $p = .001$, $d = 1.04$, 95% CI [1.81, 6.79]. There was also a significant role by gender interaction, $F(1, 73) = 4.73$, $p = .03$, $\eta_p^2 = .06$. Whereas male ($M = 10.20$, $SE = .89$) and female ($M = 10.67$, $SE = .87$) witnesses did not differ, $t(73) = .38$, $p = .70$, $d = .13$, 95% CI [-2.94, 1.99], female perpetrators ($M = 14.45$, $SE = .89$) reported significantly higher state anxiety than did male perpetrators ($M = 10.15$, $SE = .89$), $t(73) = 3.44$, $p = .001$, $d = 1.13$, 95% CI [.03, 1.86].

Free Recall

Participants completed a free recall task that had them separately list the central (task-related) and peripheral (non-task) items during the mock crime and provide details about the items. Overall, participants correctly recalled a mean of 13.48 items (*SD* = 4.17) collapsed across categories. Participants also reported an average of 1.93 incorrect items (*SD* = 1.61) overall. To calculate accuracy for each participant, the total number of correct items was divided by the total number of items reported. Participants were highly accurate overall in their characterization of the remembered items (overall *M* = 87.35%, *SD* = 10.26). A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on overall accuracy revealed a significant main effect for time delay, $F\ (1,73) = 11.14$, $p = .001$, $\eta_p^2 = .10$. Participants in the one-day delay condition (*M* = 90.89, *SE* = 1.47) were more accurate than those in the one-week delay condition (*M* = 83.99, *SE* = 1.45), $M_{diff} = 6.90$, 95% CI [2.78, 11.03]. There was also a significant three-way interaction between time delay, role, and gender, $F(1, 73) = 10.05$, $p = .002$, $\eta_p^2 = .12$. For male participants, there was a nonsignificant time delay by role interaction, $F(1, 73) = .15$, $p = .69$, $\eta_p^2 = .002$. For female participants, the time delay by role interaction was also nonsignificant, $F(1, 73) = .10$, $p = .75$, $\eta_p^2 = .001$.

A second comparison assessed overall recall by dividing the number of correctly recalled items by the total number of items in the room ($n = 49$; each item type was only counted once for this calculation because quantity was a detail category). Participants had an overall recall percentage of 27.50% (*SD* = 7.79). A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on overall recall revealed a main effect for time delay, $F(1, 73) = 9.24$, $p = .003$, $\eta_p^2 = .11$. Participants were more accurate after a one-day delay (*M* = 30.28, *SE* = 1.27) than a one-week delay (*M* = 24.83, *SE* = 1.26), $M_{diff} = 5.45$, 95% CI [1.88 – 9.02]. There was also a main effect of role, *F*(1, 73) = 5.03, *p* = .03, η_p^2 = .06. Perpetrators were more accurate than witnesses, M_{diff} = 4.02, 95% CI [.45, 7.59] (see Figure 1).

The central items were to be listed in chronological order following the steps of the mock crime task. The task item total was combined with the cash box, keys, lottery ticket, and tapes present/absent categories to calculate a central item score that could range from 0 to 14. A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on central item scores revealed a main effect of role, *F*(1, 73) = 4.16, *p* = .05, η_p^2 = .05. Perpetrators (*M* = 8.68, *SE* = .38) recalled more central items than did witnesses (*M* = 7.59, *SE* = .37), M_{diff} = 1.09, 95% CI [.03, 2.15]. There was also a significant main effect of time delay, *F*(1, 73) = 11.26, *p* = .001, η_p^2 = .13, as participants recalled significantly more central items after a one-day delay (*M* = 9.03, *SE* = .38) than a one-week delay (*M* = 7.24, *SE* = .37), M_{diff} = 1.79, 95% CI [.73, 2.85]. There were no significant interactions, and there was no effect of gender, *F*s ≤.67, *p*s ≥ .42, η_p^2s ≤ .01.

The non-task items participants incorrectly identified as part of the 10-item crime task were summed to create a task transference score for each participant. A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on participants' task transference scores did not reveal any significant main effects as participants made few transference intrusions overall (*M* = .26, *SD* = .58), *F*s ≤ 1.98, *p*s ≥ .16, η_p^2s ≤ .03. Likewise, a 2 (role) x 2 (time delay) x 2 (gender) ANOVA on participants' task other intrusions scores failed to show any significant effects, again due to a floor effect in the overall number of other intrusions, or errors of commission (*M* = .27, *SD* = .53), *F*s ≤ 3.73, *p*s ≥ .06, η_p^2s ≤ .05.

Central item order difference scores reflected participants' ability to put the task items in the chronological order encountered during the mock crime phase. To control for the variable number of task items on which the order difference scores were based (only items listed by participants were used to calculate order difference scores), an average order error difference score was created by dividing participants' order difference scores by their task item totals. A 2 (role) x 2 (time delay) x 2 (gender) ANOVA on these error scores revealed a main effect of time delay, $F(1, 73) = 5.00$, $p = .03$, $\eta_p^2 = .06$. Participants were significantly less accurate in placing the task items in chronological order after a one-week delay ($M = 2.88$, $SE = .22$) than a one-day delay ($M = 2.19$, $SE = .22$), $M_{diff} = .70$, 95% CI [.08, 1.31]. There was no significant effect of action, gender, or any interactions, Fs ≤ 1.29, ps $\geq .26$, η_p^2s $\leq .02$.

Central item details were coded into five categories: (1) location details; (2) color details; (3) other details; (4) incorrect detail; and (5) subjective details. As the mean number of details for the correct detail categories were low (see Table 1), these three categories were collapsed into one correct details category. Correct details, incorrect details, and subjective details were then analyzed via a 2 (role) x 2 (time delay) x 2 (gender) MANOVA. There were no significant multivariate main effects for role, time delay, gender, or any interactions, Fs ≤ 1.35, ps $\geq .27$, η_p^2s $\leq .05$. Overall, participants did not differ as a function of conditions in the number of correct task details ($M = 6.38$, $SD = 6.61$), incorrect task details ($M = 2.15$, $SD = 2.08$), or subjective task details ($M = .99$, $SD = 1.40$) reported. Because participants made so few task transference intrusions ($M = .26$, $SD = .58$) and other intrusions ($M = .27$, $SD = .53$), details for those item categories are not reported due to floor effects.

Peripheral free recall results were similarly analyzed. A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on non-task item total (all correctly listed peripheral items in the mock crime room) revealed a significant time delay by gender interaction, $F(1, 73) = 5.18$, $p = .03$, $\eta_p^2 = .07$. Male participants ($M = 6.58$, $SE = .53$) recalled a greater number of peripheral items than did female participants ($M = 5.05$, $SE = .53$) after a one-day delay, $t(73) = 2.05$, $p =$

.04, *d* = .68, 95% CI [.04, 3.01], but male participants in the one-week delay condition (*M* = 4.50, *SE* = .53) were not significantly different than female participants in the one-week delay condition (*M* = 5.36, *SE* = .52), *t*(73) = 1.17, *p* = .25, *d* = .34, 95% CI [-2.33, .61].

A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on non-task transference scores revealed a main effect of role, *F*(1, 73) = 3.93, *p* = .05, η_p^2 = .05. Perpetrators incorrectly recalled a greater number of task items as non-task items (*M* = .34, *SE* = .08) than did witnesses (*M* = .12, *SE* = .08), M_{diff} = .22, 95% CI [-.001, .44].

A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on participants' non-task other intrusions, or commission errors, revealed a significant three-way interaction between role, time delay, and gender, *F*(1, 73) = 4.92, *p* = .03, η_p^2 = .06. In the one day delay condition, the gender by action interaction was not significant, *F*(1, 73) = 1.15, *p* = .29, η_p^2 = 02. Participants in the one-day delay condition tended to make about .94 non-task other intrusions (*SD* = 1.01). In the one week delay condition, there was a significant gender by action interaction, *F*(1, 73) = 4.29, *p* = .04, η_p^2 = .06, but the simple main effects were not significant, *t*s ≤ 1.85, *p*s ≥ .09, *d*s ≤ .59

Peripheral item details were coded into six categories: (1) location details; (2) color details; (3) quantity details; (4) other details; (5) incorrect detail; and (6) subjective details. As the mean number of details for the correct detail categories were again low (see Table 1), these four categories were collapsed into one peripheral item correct details category. A 2 (role) x 2 (time delay) x 2 (gender) MANOVA for correct, incorrect, and subjective details revealed no significant differences, *F*s ≤ 2.22, *p*s ≥ .09, η_p^2s ≤ .09. Overall, participants recalled a mean of 4.73 (*SD* = 4.09) correct details, 2.37 (*SD* = 1.98) incorrect details, and .64 (*SD* = 1.11) subjective details. Because participants overall reported few non-task transference (*M* = .23, *SD*

= .51) or other intrusion items (*M* = 1.18, *SD* = 1.27), details analyses pertaining to those categories are not reported due to floor effects.

Remember/Know/Guess Test

Participants completed the Remember/Know/Guess test by first making a dichotomous judgment about whether each item was in the room during the mock crime phase (Old/New). If participants indicated an item was old, they were asked indicate the strength of their memory using three categorical response options (Remember/Know/Guess). Raw proportion correct scores were subjected to 2 (role) x 2 (time delay) x 2 (gender) x 2 (detail type) mixed model analysis of variances (ANOVAs), both for overall proportion correct and separately for *remember*, *know*, and *guess* judgments. Overall, participants selected as "old" (collapsed across remember, know, and guess) a mean proportion of .76 target items (*SD* = .15, *n* = 81). The mixed model ANOVA on "old" judgments revealed a large main effect for type of details, V = .58, $F(1, 73) = 100.28$, $p < .001$, $\eta_p^2 = .58$, such that participants remembered a higher proportion of central details (*M* = .91, *SE* = .02) than peripheral details (*M* = .62, *SE* = .03), M_{diff} = .30, 95% CI [.24, .36]. There was no effect of role, $F(1, 73) = .17$, $p = .69$, $\eta_p^2 = .002$, time delay, $F(1, 73) = .25$, $p = .62$, $\eta_p^2 = .003$, or gender, $F(1, 73) = 1.03$, $p = .31$, $\eta_p^2 = .01$. There were no significant interactions, Fs ≤ 3.70, ps $\geq .06$, η_p^2s $\leq .04$.

A mixed model ANOVA on *remember* judgments[3] for target items revealed a main effect for type of details, $V = .63$, $F(1, 71) = 121.93$, $p < .001$, $\eta_p^2 = .63$, such that participants correctly remembered a greater proportion of central items (*M* = .68, *SE* = .04) than peripheral items (*M* = .19, *SE* = .03), M_{diff} = .50, 95% CI [.41, .58]. There were no significant effects of role, time delay, or gender, Fs ≤ 3.60, ps $\geq .06$, η_p^2s $\leq .05$.

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[3] Two perpetrators in the one-day delay condition skipped items on the test and had to be excluded from these analyses.

On correct *know* judgments for target items, there was a significant three-way interaction of gender, time delay, and detail type, $V = .10$, $F(1, 71) = 7.91$, $p = .01$, $\eta_p^2 = .10$. There was no significant time delay by detail type interaction for males, $F(1, 71) = 2.56$, $p = .11$, $\eta_p^2 = .04$. Males remembered about the same proportion of central ($M = .22$, $SD = .28$) and peripheral ($M = .24$, $SD = .22$) items regardless of condition. For females, there was a significant time delay by detail type interaction, $F(1, 71) = 6.47$, $p = .01$, $\eta_p^2 = .09$. Whereas there was no difference in female participants' *know* judgments between central ($M = .22$, $SE = .06$) and peripheral ($M = .16$, $SE = .05$) items after a one-day delay, $t(71) = .80$, $p = .43$, $d = .26$, 95% CI [-.09, .21], female participants were more likely to indicate knowing a peripheral item ($M = .25$, $SE = .04$) was in the room compared to a central item ($M = .07$, $SE = .06$) after a one-week delay, $t(71) = 2.64$, $p = .01$, $d =$,97 95% CI [.04, .32].

There was a significant effect of detail type on *guess* judgments for target items, $V = .37$, $F(1, 71) = 41.36$, $p < .001$, $\eta_p^2 = .37$. Participants guessed more for peripheral items ($M = .22$, $SE = .03$) than central items ($M = .05$, $SE = .01$), $M_{diff} = .17$, 95% CI [.12, .22]. There were no other significant effects. For lures, there was a significant role by gender interaction, $F(1, 72) = 8.07$, $p = .01$, $\eta_p^2 = .10$. Whereas there were no differences in *remember* judgments to lures between male ($M = .13$, $SE = .03$) and female ($M = .21$, $SE = 03$) witnesses, $t(72) = 1.65$, $p = .10$, $d = .49$, 95% CI [-.18, .02], male perpetrators ($M = .18$, $SE = .03$) were more likely to "remember" lures than female perpetrators ($M = .07$, $SE = .03$), $t(72) = 2.37$, $p = .02$, $d = -.81$, 95% CI [.02, .21]. There were no significant effects on *know* ($M = .19$, $SD = .16$) or *guess* ($M = .19$, $SD = .17$) judgments for lures, Fs ≤ 2.36, ps $\geq .13$, η_p^2s $\leq .03$.

Participants' responses were also analyzed for discrimination accuracy, *Pr*, and response bias, *Br* (Corwin, 1994). Separate *Pr* (Hit Rate (HR) – False Alarm Rate (FAR)) and *Br*

(FAR/(1-Pr)) scores were calculated for remember, know, and guess judgments (Gardiner et al., 1997). To test the manipulations on participants' ability to accurately recollect the items that were in the room during the mock crime phase, 2 (role) x 2 (time delay) x 2 (gender) ANOVAs were conducted. As the FAR cannot be different between central and peripheral items (they were presented with the same lures), these analyses were collapsed across detail type. To test whether the manipulations affected response bias, 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVAs were conducted. For *Pr* scores, an ANOVA on *remember* judgments revealed a significant role by gender interaction, $F(1, 72) = 5.88$, $p = .02$, $\eta_p^2 = .08$. Whereas there was no difference between male perpetrators ($M = .22$, $SE = .05$) and observers ($M = .25$, $SE = .05$), $t(72) = .41$, $p = .68$, $d = -.13$, 95% CI [-.16, .11], female perpetrators ($M = .40$, $SE = .05$) showed significantly higher discrimination accuracy for *remember* judgments than female witnesses ($M = .20$, $SE = .05$), $t(72) = 3.02$, $p = .004$, $d = 1.02$, 95% CI [.07, .33].

There was a significant main effect of gender on discrimination accuracy of participants' *know* judgments, $F(1, 72) = 5.68$, $p = .02$, $\eta_p^2 = .07$, such that male participants ($M = .06$, $SE = .03$) were more accurate at discriminating between targets and lures when making *know* judgments as compared to female participants ($M = -.04$, $SE = .03$), $M_{diff} = .11$, 95% CI [.02, .19]. There were no significant effects of time delay, role, or interactions, $F\text{s} \leq 2.41$, $p\text{s} \geq .13$, $\eta_p^2\text{s} \leq .03$. There were no significant effects for *guess* judgments, $F\text{s} \leq 3.46$, $p\text{s} \geq .07$, $\eta_p^2\text{s} \leq .05$. Participants showed an overall mean accuracy of -.05 ($SD = .14$).

In terms of response bias, an ANOVA on *remember* judgments revealed no significant effect for time delay, $F(1, 72) = 2.86$, $p = .10$, $\eta_p^2 = .04$. There was a significant role by gender interaction, $F(1, 72) = 4.17$, $p = .05$, partial $\eta^2 = .06$. There were no difference in response criterion between male perpetrators ($M = .26$, $SE = .04$) and witnesses ($M = .21$, $SE = .04$), $t(72)$

= 1.03, *p* = .31, *d* = .33, 95% CI [-.05, .15], but there was a nonsignificant tendency for female witnesses (*M* = .27, *SE* = .04) to be more liberal in their response criterion than female perpetrators (*M* = .18, *SE* = .04), *t*(72) = 1.86, *p* = .07, *d* = -.59, 95% CI [-.01, .19]. There were no significant differences in response bias for *know* (*M* = .21, *SD* = .13 or *guess* (*M* = .20, *SD* = .13) judgments, *F*s ≤ 1.99, *p*s ≥ .12, η_p^2s ≤ .03.

Recognition Test

Participants also completed a two-alternative forced choice recognition test, which required dichotomous judgments about which item in a pair of items correctly displayed a test item or placement. Participants made ten forced-choice judgments about pairs of items (Left/Right), half of which were central (crime-related) and half of which were peripheral (not crime-related. Participants also rated their confidence in each choice using 10-point Likert-type scales (1 = not at all confident; 10 = very confident). Raw proportion correct scores were subjected to a 2 (role) x 2 (time delay) x 2 (gender) x 2 (detail type) MANOVA with detail type as the repeated measure. Overall, participants correctly chose a mean proportion of .66 target items (*SD* = .15). A mixed model ANOVA on participants' raw proportion correct performance on the recognition test revealed no significant effects of role, time delay, gender, detail type, nor any interactions, *F*s ≤ 2.38, *p*s ≥ .13, η_p^2s ≤ .03. Overall performance (*M* = .65, *SD* = .16) was significantly better than chance, *t*(80) = 8.32, *p* < .001.

Responses were also analyzed for accuracy, *d'* (Macmillan & Creelman, 2005). To allow computation of the accuracy score, spatial separation was used to calculate hits and false alarms. The hit rate was calculated as *P* ("old on left"| <Old, New>) and the false alarm rate was calculated as *P*("old on left" | <New, Old>). This computation did not allow for the comparison of central and peripheral items because the number of each type of item was too small. *D*' was calculated as $(1/\sqrt{2})[z(H) - z(F)]$. Hit rates and false alarms of 1 and 0 were transformed before calculation of *d*' to avoid indeterminate z-scores. Scores of 0 were adjusted by adding .05 and scores of 1 were adjusted by subtracting .05. As each trial requires a decision, a response bias measure was not calculated (Stanislaw & Todorov, 1999). A 2 (role) x 2 (time delay) x 2 (gender) univariate ANOVA on participants' *d'* scores also failed to show significant differences for role, time delay, gender, or any interactions (Fs ≤ 2.77, ps $\geq .10$, η_p^2s $\leq .04$, overall $d' = M = .61$, $SD = .68$)

Participants also rated their confidence in their recognition test selections. Participants' confidence ratings were subjected to a 2 (role) x 2 (time delay) x 2 (gender) x 2 (detail type) MANOVA, with detail type as the repeating factor. A mixed model ANOVA revealed a significant main effect of detail type, $V = .66$, $F(1, 73) = 141.94$, $p < .001$, $\eta_p^2 = .66$, such that participants were more confident in their recognition choices concerning central items ($M = 6.99$, $SE = .17$) than peripheral items ($M = 4.79$, $SE = .17$), $M_{diff} = 2.20$, 95% CI [1.84, 2.57]. There was a main effect of time delay, $F(1, 73) = 4.71$, $p = .03$, $\eta_p^2 = .06$, such that participants were more confident after a one-day delay ($M = 6.20$, $SE = .20$) than a one-week delay ($M = 5.59$, $SE = .20$), $M_{diff} = .61$, 95% CI [.05, 1.16]. There was also a significant main effect of role, $F(1, 73) = 9.45$, $p = .003$, $\eta_p^2 = .12$, such that witnesses ($M = 6.32$, $SE = .20$) were more confident in their recognition choices than perpetrators ($M = 5.46$, $SE = .20$), $M_{diff} = .86$, 95% CI [.30, 1.42].

These main effects were qualified by several interactions. There was a significant detail type by time delay interaction, $V = .09$, $F(1, 73) = 7.49$, $p = .01$, $\eta_p^2 = .09$. Participants were significantly more confident in their recognition choices for central items after a one-day delay ($M = 7.55$, $SE = .24$) than a one-week delay ($M = 6.44$, $SE = .23$), $t(73) = 3.34$, $p < .001$, $d = -.72$, 95% CI [.45, 1.78], but time delay did not affect participants' confidence in their recognition choices for peripheral items ($M = 4.84$, $SE = .24$ for one-day delay; $M = 4.74$, $SE = .24$ for one-week delay), $t(73) = .30$, $p = .77$, $d = -.06$, 95% CI [-.57, .77]. There was also a significant detail type by gender interaction, $V = .07$, $F(1, 73) = 5.25$, $p = .03$, $\eta_p^2 = .07$. Although both male and female participants were significantly more confident for recognition choices concerning central items ($M = 6.85$, $SE = .25$ and $M = 7.14$, $SE = .23$, respectively) than peripheral items ($M = 5.07$, $SE = .24$ and $M = 4.52$, $SE = .24$, respectively), the magnitude of the difference was larger for female participants, $t(73) = 10.10$, $p < .001$, $d = 1.64$, 95% CI [2.11, 3.15], than male participants, $t(73) = 6.77$, $p <.001$, $d = 1.04$, 95% CI [1.26, 2.30]. There was a significant time delay by gender interaction, $F(1, 73) = 8.74$, $p = .004$, $\eta_p^2 = .11$. Female participants ($M = 6.55$, $SE = .28$) were not significantly more confident in their recognition choices than male participants ($M = 5.85$, $SE = .28$) after a one-day delay, $t(73) = 1.76$, $p = .08$, $d = .52$, 95% CI [-.09, 1.49], but male participants ($M = 6.07$, $SE = .28$) were significantly more confident than female participants ($M = 5.11$, $SE = .28$) after a one-week delay $t(73) = 2.42$, $p = .02$, $d = -.72$, 95% CI [.17, 1.74].

CHAPTER 8: STUDY ONE DISCUSSION

In general, participants did not vary much in their perceptions of the mock crime task between conditions. Although there was some variation in perceptions of the task difficulty, ratings indicated that participants in general found that the mock crime was easy (all ratings were below the midpoint of the scale). Manipulation checks supported the success of the role manipulation. Perpetrators were motivated to obtain the potentially valuable object they stole but witnesses were explicitly told they would not obtain a reward even if the perpetrators were successful. We hypothesized that perpetrators would therefore feel more time pressure during the task than witnesses. Perpetrators did in fact report feeling more stressed by the time limit than did witnesses. Likewise, perpetrators reported greater state anxiety during the mock crime task than did the witnesses, which again supports the additional pressure that perpetrators were facing compared to observers who had no stake in whether the theft was successfully completed. There was an unexpected interaction in state anxiety scores between time delay and role, however, such that perpetrators only reported higher state anxiety than witnesses in the one-day delay condition but not the one-week delay condition. State anxiety scores should not have been affected by time delay as they were presented before the manipulation; however, discussion with observer participants during debriefing revealed that many observers assumed that they would be completing the mock crime during their second research session (participants were not specifically forewarned of what the second research session would entail). It is possible that observers in the one-week delay condition were more stressed by the idea that they would have to reenact the crime after a longer time interval than the one-day participants when watching the mock crime, thereby attenuating the stress differences between perpetrators and witnesses in the one-week delay condition. It is also possible that random assignment failed to distribute individual differences in anxiety across conditions due to the small sample sizes.

Hypothesis 1 predicted that perpetrators would exhibit greater overall recall than witnesses. This hypothesis was partially supported. In the most stringent test of memory, the free recall task, perpetrators recalled a significantly greater percentage of room items than did witnesses, though they showed no difference in overall accuracy when characterizing the items as task or nontask items. When broken down further, results showed that perpetrators remembered significantly more central items than witnesses, but there was no statistical role difference in recall of peripheral nontask items. Perpetrators also recalled significantly more peripheral non-task transference intrusions (central items incorrectly reported as peripheral items), reflecting better memory for the overall presence of the items in the room though confusion between their statuses as central or peripheral items. Conversely, perpetrators did not report more correct details about the items they remembered, whether central or peripheral. The weakness of the findings concerning the details may be due to the fact that participants reported few details overall, despite requests to furnish as much information about the items in the room as possible.

Female perpetrators also showed stronger discrimination accuracy for *remember* judgments on the RKG test than female witnesses, which would arguably be the best representation of participants' memories for the items on the test, as they represent actual recollections rather than the mere familiarity indicated by *know* judgments. Male perpetrators and witnesses did not show differences in *remember* judgments discrimination accuracy, however. There were no role differences for accuracy on the recognition test for either male or female participants. The recognition test was the easiest of the three memory tasks, as it provided pictures of actual items in the room (visual cues), so it may not have been sensitive enough to find the predicted differences.

Overall, where differences between perpetrators and witnesses were found, they were in the expected direction. Interestingly, witnesses were overall more confident than perpetrators in their recognition test decisions despite no difference in performance, indicating perpetrators may have better perception about their memory abilities than witnesses.

Hypothesis 2 predicted that perpetrators should show superior memory for peripheral items but similar memory for central items compared to witnesses. This hypothesis was generally not supported. There were no differences between the number of details reported by perpetrators and witnesses for central items or peripheral items in the free recall task. There were no role by detail interactions for the proportion correct scores on the RKG and recognition test scores. Rather, it appears that perpetrators tended to show better memory for both central and peripheral items, as predicted in Hypothesis 1. This finding may be due to the fact that enactment effect was enough to produce superior memory for perpetrators' recall of the central task items over witnesses, whereas their broader focus in the room improved recall for peripheral items under some conditions.

Hypothesis 3 predicted a main effect of time delay, specifically that participants would show poorer recall after a retention interval of one week than one day. This hypothesis was partially supported. On the free recall test, participants were more accurate, correctly recalled a higher percentage of room items, and recalled significantly more central items after a one-day delay than a one-week delay, and they were more accurate in placing those items in their proper task orders after only a one-day delay as well.

There were not, however, any differences due to time delay in recall for peripheral items or their details. Participants' performance on the RKG and recognitions tests also did not support the hypothesis as there were no significant effects of time delay. For the recognition test, it is possible that having the visual cue for each item was enough to trigger the associated memories and overcome effects of time delay. Interestingly, although recognition test scores failed to show a difference due to time delay, participants were more confident in their choices after a one-day delay than a one-week delay, again indicating participants' confidence scores are not always reflective of accuracy. These results suggest that time delay affects participants' ability to generate uncued memories of an event, but cued recall – whether by recognizing task item from a written list or set of photos – is more resistant to forgetting, at least under the short delay duration used in the present study.

Hypothesis 4 predicted that time delay would interact with role as perpetrators should show greater resistance to forgetting than witnesses. This hypothesis was generally not supported. Participants showed similar rates of memory decay for central items and peripheral items on the free recall test, and there was no effect of time delay on detail scores. The results of the RKG and recognition tests also failed to show differences between perpetrators and witnesses over time. Overall, it appears that physically enacting the crime did not strengthen resistance to decay.

Hypothesis 5 predicted that time delay would interact with detail type, such that central items would be more resistant to forgetting than peripheral items. This hypothesis was not supported. There was no time delay by detail type interaction for RKG or recognition test scores. Recent research using a realistic mock crime scenario also failed to find that central items tend to be remembered better over time than peripheral items (Nahari & Ben-Shakhar, 2011). The researchers explained their result by noting that much of the past research finding differences in recall of central versus peripheral items over time confounded memory traces with centrality (e.g., central items were encoded via instructions and action whereas peripheral items were only encoded through action). When centrality is not confounded with number of memory traces, central items may be forgotten at a similar rate to peripheral items over time.

I also explored gender effects in this study with no specific a priori hypotheses. There were few gender differences overall. There was no impact of gender on participants' free recall accuracy, overall recall percentage, central item free recall scores, average order difference scores, transference errors, or commission errors. There were also no gender differences in the number of details provided about central items. Gender did not impact participants' free recall of peripheral item details. Gender did not impact the overall proportion of correct "old" judgments on the RKG test, nor did it impact proportion correct or discrimination accuracy for the recognition test.

Female and male participants did show different patterns of results for some variables, but the patterns were inconsistent. Male participants recalled a greater number of peripheral items than did female participants after a one-day delay, but male participants were not different than female participants after a one-week delay. Conversely, male and female participants showed no difference in confidence regarding their recognition test performance after a one-day delay, but male participants were more confident than female participants after a one-week delay. Male participants also showed greater discrimination accuracy on *know* judgments in the RKG test than female participants. There was no difference in discrimination accuracy for *remember* judgments on the RKG test between male perpetrators and witnesses, but female perpetrators were more accurate than female witnesses.

This pattern of findings may be due to possible differences in the impact of the variables on the genders. Female participants reported being more stressed by the time limit than men, and female perpetrators reported higher state anxiety than male perpetrators. As stress and anxiety can impact performance (Deffenbacher, 1994), it is possible that the role manipulation, specifically the motivation prong, had a stronger impact on female participants.

The potential differential impact of role on male and female participants also brings up an important facet of the current study design. Although the results show perpetrator superiority on various memory measures, it is unclear what drove the effect. As perpetrators were motivated and witnesses were unmotivated in this study to reflect typical crime conditions, motivation and action were necessarily confounded. This particular design gives us a better idea of the differences in memory that may occur in a “traditional” unplanned, nonviolent crime, but it also gives rise to the question of whether action, motivation, or a combination of both, is the reason for the results found in this first study. It is therefore necessary to parcel out the individual effects of action (committing versus observing the mock crime) and motivation (obtaining the reward versus no reward), which was the purpose of the second study.

CHAPTER 9: STUDY TWO: THE EFFECTS OF ACTION AND MOTIVATION ON MEMORY

Method

Participants and Design

Participants were 163 community members (*M* age = 33.69 years; 52% female; 1 participant did not report age or gender) paid $20 for their participation. Those in the motivation condition received an additional $1 scratch-off lottery ticket. Data from 31 participants were excluded: Fifteen did not return for the second half of the research and 16 were part of a session where the actor failed to complete the task properly. The final sample thus consisted of 127 participants, including 30 African Americans, 12 Asian/Pacific Islander, 55 European Americans, 17 Hispanic, 7 who self-identified as multiethnic, and 4 who self-identified as "other". Two participants did not self-report ethnicity. Participants were randomly assigned to one of five cells created by a 2 (Actor vs. Observer) X 2 (Motivated vs. Unmotivated) factorial design (*n*s = 25) with an additional unmotivated solo actor control group (*n* = 27).

Procedure

Participants were again recruited via Craigslist to participate in a two-day study concerning event perception. They were randomly assigned to conditions upon recruitment, at which point they were asked to agree to attend both sessions before they were scheduled to participate. Participants were not told in advance that their memory was to be tested.

In the first experimental sessions, participants were scheduled in pairs. In the paired conditions, an active participant was always paired with a passive participant and both members in a pair received the same motivation manipulation. The solo active participants were unmotivated. After giving informed consent (see Appendix J), each participant was read instructions for the next phase and instructed not to speak with one another during the task (see Appendix K).

Action manipulation. Action was manipulated in a similar manner as role in Study 1 with half of the participants enacting the mock crime task (actor) and half observing the mock crime phase (observer). The motivation component was parceled out into a separate variable, however, so participants were not told they would be able to keep the stolen item as part of the action manipulation nor warned about an alarm.

Motivation manipulation. Motivation was a two-pronged manipulation to mimic an actual crime. In the first prong, motivated participants were incentivized by the prospect of obtaining a promised reward – the stolen item. Motivated participant pairs were told they would get to split the proceeds from the valuable item should the active participant complete the task successfully. Participants were only told that the potentially valuable object (a $1 scratch-off lottery ticket) they could receive was potentially worth a great deal of money to avoid individuals being differentially motivated at the thought of receiving a lottery ticket. The safe always contained one scratch-off card, but an additional card was presented to the motivated passive participants whose partners were successful.

For the second prong, motivated participants were incentivized to avoid a negative consequence. Specifically, they were warned there was an alarm in the room that activated when they entered and would only deactivate when they left. They were told the alarm was rigged to sound if they did not leave the room within the time limit (in reality no alarm was set and all participants received up to 10 minutes to complete the task). The experimenter then triggered the alarm briefly to strengthen the manipulation and demonstrate that it was unpleasantly loud.

Participants in the low-motivation condition were specifically told they could not keep the stolen item regardless of performance, and the experimenter made no mention of an alarm.

Mock crime phase. The procedure for the mock crime phase followed that of Study 1, including the same 10 task items (see Appendix C). After completing the mock crime phase, participants completed the crime perception questionnaire and provided their demographic information (see Appendix L). Participants were paid cash for the first day ($5), asked to give consent for use of their videotaped data (see Appendix F), and reminded to return the next day.

Memory assessment phase. Upon returning to the lab, all participants completed the free recall questionnaire (see Appendix G), Remember/Know test (see Appendix M), and recognition test (see Appendix I). Participants completed these measures at their own pace and were encouraged to be thorough.

After completing the memory measures, participants were orally debriefed as to the nature of the study. Prior to dismissal, participants were paid cash for the second day of the study ($15).

Measures

Crime-perceptions questionnaire. Participants answered ten questions on a 7-point Likert-type scale (1=not at all important; 7 = very important) rating the importance of a series of variables to the actors' ultimate success or failure: (1) the layout of the room; (2) the task difficulty; (3) the presence of an observer; (4) the actor's ability to concentrate; (5) the actor's intelligence; (6) the clarity of the tapes; (7) the actor's ability to analyze clues; (8) the time limit; (9) the actor's level of attention to detail; (10) the actor's level of motivation. Participants also answered 6 questions regarding their perceptions of the mock crime task on 7-point Likert-type scales. They rated: (1) the difficulty of the task; (2) whether the observer made the task easier;

(3) whether the observer made the task more difficult; (4) the clarity of the tapes; (5) level of stress caused by the time limit; and (6) how important it was to be successful. They also answered an additional question asking them to indicate the percentage to which the situation or aspects of the actor influenced performance, summing to 100%.

Remember/Know test. Participants completed a Remember/Know (RK) test (Tulving, 1985). This test was similar to the RKG test from Study 1, but the judgments were collapsed into one decision: participants were asked to indicate for each item whether they remembered its presence in the room, knew it was present in the room, or that the item was new (not previously in the room). The same 30 items were used as in Study 1, and responses were again analyzed based on a subset of 20 items.

Free-recall coding

A master's student, blind to the research hypotheses, coded participants' open-ended free recall statements. A second master's-level student, also blind to the research hypotheses, independently coded a random sample of about 25% of the participants (*n* = 32 cases) for reliability analyses. Instructions on free recall questionnaires were redacted as done in Study 1 to make coders are blind to condition as possible.

Coders used the same coding scheme as in Study 1 and interrater reliability was again assessed using Cohen's κ (κs > .82) for nominal categories. Ratio categories were calculated using Krippendorf's α (αs > .54) or percentage agreement, as appropriate (see Table 2). Disagreements were again resolved by averaging.

Hypotheses

Study 2 attempted to separate the influence of action and motivation to measure their independent effects on memory. The solo actor control group also served as a test of whether the presence of the observer in the room impacted actors' performance on the task.

H1: There will be a main effect of action, such that active participants will show greater overall recall than passive participants.

H2: As motivation should impact focus of attention differently for perpetrators and witnesses, there will be an interaction between action and motivation. On one hand, motivation should create competing goals for actors, leading to divided attention and reduced recall for central details of the crime compared to unmotivated actors. On the other hand, motivated observers should narrow attention onto the crime (as they are not in personal danger), leading to improved recall for the central details of the crime compared to unmotivated observers.

H3: There will be an interaction between action and motivation on recall of peripheral details in that motivation should not affect recall of peripheral details for observers, but unmotivated actors should also recall more peripheral details than motivated actors.

CHAPTER 10: STUDY TWO RESULTS

Crime Perceptions

As in Study 1, participants completed a crime perceptions questionnaire immediately following the conclusion of the mock theft phase. One subset of items concerned perceptions about the importance of the variables to the actors' success during the mock theft. In this study, participants responded to ten items rating their importance to the actors' success during the mock crime phase (room layout; task difficulty; observer presence; actor's ability to concentrate; actor's intelligence; tape clarity; actor's ability to analyze clues; the time limit; actor's level of attention to detail; and actor's level of motivation). All pairwise comparisons for this study were Bonferroni-adjusted. A 2 (action) x 2 (motivation) MANOVA[4] revealed a multivariate interaction between action and motivation, $V = .20$, $F(10, 83) = 2.08$, $p = .04$, $\eta_p^2 = .20$. Follow-up univariate analyses revealed a significant univariate action by motivation interaction on participants' ratings of how important the task difficulty was to the actors' success, $F(1, 92) = 9.49$, $p = .003$, $\eta_p^2 = .09$. Whereas unmotivated actors ($M = 5.64$, $SE = .33$) rated the task difficulty as significantly more important than unmotivated observers (bystander witnesses; $M = 4.25$, $SE = .34$), $t(92) = 2.96$, $p = .004$, $d = .87$, 95% CI [.46, 2.32], motivated actors (perpetrators; $M = 4.78$, $SE = .34$) were no different than motivated observers (accomplices in our study; $M = 5.46$, $SE = .34$), $t(92) =1.41$, $p = .16$, $d = -.40$, 95% CI [-1.63, .28].

As in Study 1, participants did not show variation between conditions in their ratings of the observers' presence ($M = 2.60$, $SD = 1.94$); the room layout ($M = 5.19$, $SD = 1.75$); actors' ability to concentrate ($M = 5.84$, $SD = 1.38$); actors' intelligence ($M = 5.07$, $SD = 1.61$); tape clarity ($M = 6.29$, $SD = 1.11$); actors' ability to analyze clues ($M = 5.86$, $SD = 1.31$); time limit

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[4] Chronologically, Study 2 was conducted first. Gender was added as a factor afterward, so it is not analyzed in this study due to unequal sample sizes.

(*M* = 4.75, *SD* = 2.01); actors' level of attention to detail (*M* = 5.65, *SD* = 1.43); and actors' level of motivation (*M* = 5.71, *SD* = 1.51) as important to the actors' success or failure during the mock crime task.

Additional data from unmotivated solo actors assesses the impact of having the observer in the room on actors' memory performance in case having an observer present additionally motivated actors to be successful or otherwise impact accuracy via increased arousal or social facilitation. All of the analyses for this study were calculated again with one-way ANOVAs and MANOVAs directly comparing the solo-unmotivated actors group with the unmotivated actors who were paired with observers. Partnered and solo actors were compared on the same items with the exception of the observer importance question. A 2 (partner: pair vs. solo) MANOVA revealed no significant multivariate effect of partner on participants' ratings, $V = .28$, $F(9, 35) = 1.50$, $p = .19$, $\eta_p^2 = .28$. The actors did not vary by condition in their ratings of the room layout (*M* = 4.82, *SD* = 2.00); actors' ability to concentrate (*M* = 5.84, *SD* = 1.33); actors' intelligence (*M* = 4.93, *SD* = 1.47; tape clarity (*M* = 6.27, *SD* = 1.30); actors' ability to analyze clues (*M* = 5.98, *SD* = 1.37); time limit (*M* = 4.56, *SD* = 1.94); actors' level of attention to detail (*M* = 5.62, *SD* = 1.37); and actors' level of motivation (*M* = 5.44, *SD* = 1.67) as important to their success or failure during the mock crime task.

Participants responded to an additional four questions about their perceptions of the mock theft (task difficulty; whether the observer made the task easier; whether the observer made the task more difficult; and tape clarity). A 2 (action) x 2 (motivation) MANOVA revealed no significant multivariate effects across conditions, $F\text{s} \leq 1.50$, $p\text{s} \geq .21$). Across conditions, participants rated the task as relatively easy (*M* = 2.32, *SD* = 1.21), did not believe that the observer made the task easier (*M* = 2.36, *SD* = 1.76) or more difficult (*M* = 2.01, *SD* = 1.36), and believed that the tapes were clear (*M* = 6.32, *SD* = .82).

Paired and solo-unmotivated actors were compared on their responses to the task difficulty and tape clarity questions. A one-way (partner) MANOVA showed no differences between paired and solo unmotivated actors, *V* = .01, *F*(2, 47) = .17, *p* = .84, η_p^2 = .01. Unmotivated actors, whether paired or solo, again found the task to be relatively easy (*M* = 2.34, *SD* = 1.21) and the tapes clear (*M* = 6.10, *SD* = 1.05).

Participants also rated the importance of the situation and characteristics of the actor in terms of their relative impact on the actors' success during the mock crime phase. As these percentages summed to 100 percent, the situation attributions were analyzed via a 2 (action) x 2 (motivation) univariate ANOVA. There was a significant main effect of action, *F*(1, 91) = 6.77, *p* = .01, η_p^2 = .07. Observers (*M* = 57.09, *SE* = 3.09) rated the situation as significantly more important to the successful completion of the crime than did actors (*M* = 46.02, *SE* = 2.93), M_{diff} = 11.07, 95% CI [2.62, 19.53]. Conversely actors were more likely to attribute their success in the mock crime task (all participants included in the analyses were successful) to themselves rather than the situation. There were no differences between solo and paired unmotivated actors, *F*(1, 47) = .32, *p* = .57, η_p^2 = .01, who overall gave greater attributions to characteristics about themselves than the situation (*M* = 44.29, *SD* = 18.87).

Participants completed two manipulation checks to test the success of the motivation manipulation. Specifically, they rated how stressed they were by the time limit, as motivated participants should be more stressed than unmotivated participants. They also rated how important it was to them that the theft be successful. Each manipulation check was analyzed with a 2 (action) x 2 (motivation) univariate ANOVA. The ANOVA on stress caused by the time limit revealed a significant main effect of action, $F(1, 94) = 11.30$, $p = .001$, $\eta_p^2 = .11$. Actors ($M = 4.42$, $SE = .24$) reported feeling significantly more pressured by the time limit than did observers ($M = 3.27$, $SE = .24$), $M_{diff} = 1.15$, 95% CI [.47, 1.83]. Consistent with prediction, there was also a significant main effect of motivation, $F(1, 94) = 11.60$, $p = .001$, $\eta_p^2 = .11$. Motivated participants ($M = 4.43$, $SE = .24$) reported feeling significantly more pressured by the time limit than did unmotivated participants ($M = 3.26$, $SE = .24$), $M_{diff} = 1.16$, 95% CI [.49, 1.84]. These effects were qualified by an interaction between action and motivation, $F(1, 94) = 9.33$, $p = .003$, $\eta_p^2 = .09$. Motivated observers ($M = 4.38$, $SE = .35$) reported being significantly more stressed by the time limit than did unmotivated observers ($M = 2.17$, $SE = .35$), $t(94) = 4.52$, $p < .001$, $d = 1.35$, 95% CI [1.24, 3.18]. There were no significant differences between motivated ($M = 4.48$, $SE = .34$) and unmotivated ($M = 4.36$, $SE = .34$) actors, $t(94) = .25$, $p = .80$, $d = .07$, 95% CI [-1.07, .83], however, which indicated the motivation manipulation may not have been completely successful. There were no differences between solo and paired unmotivated actors, $F(1, 49) = .08$, $p = .78$, $\eta_p^2 = .002$, in their ratings of the stress caused by the time limit ($M = 4.29$, $SD = 1.65$).

The second manipulation check asked participants to rate how important it was for the mock theft to be completed successfully. There was a main effect of motivation, $F(1, 96) = 5.34$, $p = .02$, $\eta_p^2 = .05$. Motivated participants ($M = 6.18$, $SE = .20$) reported it was more important to them that the theft be successful than did unmotivated participants ($M = 5.52$, $SE = .20$), $M_{diff} = .66$, 95% CI [.09, 1.23]. There was no effect of action, $F (1, 96) = 1.77$, $p = .19$, $\eta_p^2 = 02$, or an interaction, $F (1, 96) = 2.16$, $p = .15$, $\eta_p^2 = 02$. A separate ANOVA found no differences between solo and paired unmotivated actors, $F(1, 50) = .69$, $p = .41$, $\eta_p^2 = .01$, as unmotivated actors reported it was important to them to be successful (*M* = 6.06, *SD* = 1.14) regardless of whether they were paired with a partner.

Free Recall

Participants completed the same free recall task as presented in Study 1 and the same data analysis procedure was followed. Collapsed across categories, participants correctly recalled a mean 14.35 items (*SD* = 4.23) and incorrectly reported a mean 1.65 items (*SD* = 1.63). Accuracy was calculated following the same approach used in Study 1. Participants were again highly accurate in their characterization of recalled items (overall *M* = 89.77%, *SD* = 9.90). A 2 (action) x 2 (motivation) univariate ANOVA on overall accuracy revealed no significant differences, $F\text{s} \leq 2.56$, $p\text{s} \geq .11$, $\eta_p^2\text{s} \leq .03$.

A second comparison assessed overall recall again by dividing the number of correctly recalled items by the total number of unique items in the room ($n = 50$; each item was only counted once for this calculation because quantity was a detail category). Participants had an overall recall percentage of 28.69%, *SD* = 8.45). A 2 (action) x 2 (motivation) univariate ANOVA on overall recall revealed a significant main effect of action, $F(1, 96) = 8.60$, $p = .004$, $\eta_p^2 = .08$. Actors were more accurate than observers, $M_{diff} = 4.82$, 95% CI [1.56, 8.08] (see Figure 2).

A 2 (action) x 2 (motivation) univariate ANOVA on participants' central item scores revealed a main effect of action, $F(1, 96) = 11.09$, $p = .001$, $\eta_p^2 = .10$, as actors (*M* = 9.60, *SE* = .31) recalled significantly more central items than did observers (*M* = 8.13, *SE* = .31), $M_{diff} = 1.47$, 95% CI [.59, 2.35].

A second one-way (partner) ANOVA comparing paired and solo actors revealed no effect of partner, $F(1, 50) = .89$, $p = .35$, $\eta_p^2 = .02$. Unmotivated actors recalled a mean of 9.54 items

(*SD* = 2.22) out of 14, regardless of whether an observer was in the room during the mock crime task.

A 2 (action) x 2 (motivation) univariate ANOVA on participants' task transference scores did not reveal any significant effects as participants made few task transference errors overall (*M* = .26, *SD* = .63; see Table 2), *F*s ≤ .89, *p*s ≥ .35, η_p^2s ≤ .01. Likewise, there was no impact of having a partner on unmotivated actors' task transference scores (overall *M* = .21, *SD* = .55), *F*(1, 50) = .13, *p* = .72, η_p^2 =.003.

A 2 (action) x 2 (motivation) univariate ANOVA on participants' other task intrusion scores, however, revealed a significant action by motivation interaction, *F*(1, 96) = 5.12, *p* = .03, η_p^2 = .05. Whereas unmotivated observers (*M* = .40, *SE* = .09) made a significantly higher rate of commission errors than unmotivated actors (*M* = .16, *SE* = .08), *t*(96) = 2.13, *p* = .04, *d* = -.54, 95% CI [.02, .46], there was no difference in the rate of errors between accomplices (*M* = .08, *SE* = .08) and perpetrators (*M* = .20, *SE* = .08), *t*(96) = 1.07, *p* = .29, *d* = .34, 95% CI [-.34, .10]. A one-way (partner) ANOVA revealed no difference between paired and solo unmotivated actors (overall, *M* = .10, *SD* = .30), *F*(1, 50) = 2.27, *p* = .14, η_p^2 = .04.

A 2 (action) x 2 (motivation) ANOVA on participants' average order error scores (*M* = 2.18, *SD* = 1.04) revealed no significant effects of action, motivation, or interaction, *F*s ≤ 1.21, *p*s ≥ .28, η_p^2s ≤ .01. There was likewise no effect of partner on average order error scores (*M* = 2.18, *SD* = 1.29) for unmotivated actors, *F*(1, 50) = .56, *p* = .50, η_p^2 = .01.

Participants' central item details were coded into the same five categories used in Study 1 (see Table 2). Once again, a correct details category was created by collapsing across location, color, and other details. Correct details, incorrect details, and subjective details were analyzed via a 2 (action) x 2 (motivation) MANOVA. There was a significant multivariate main effect of action, $V = .16$, $F(3, 94) = 6.00$, $p = .001$, $\eta_p^2 = .16$. Follow-up univariate ANOVAs revealed a significant main effect of action on the number of correct item details recalled by participants, $F(1, 96) = 9.66$, $p = .002$, $\eta_p^2 = .09$. Actors ($M = 9.66$, $SE = .82$) recalled significantly more details than did observers ($M = 6.08$, $SE = .82$), $M_{diff} = 3.58$, 95% CI [1.29, 5.87]. There was no effect of motivation or interaction, Fs $\leq .48$, ps $\geq .70$, η_p^2s $\leq .02$. Participants recalled similar amounts of incorrect ($M = 1.49$, $SD = 1.64$) and subjective ($M = .59$, $SD = 1.03$) details pertaining to the task central items across conditions. There was no significant multivariate main effect of partner on the amount of details about central items reported by unmotivated actors, $F(3, 48) = 1.77$, $p = .17$, $\eta_p^2 = .10$. Unmotivated actors reported similar correct ($M = 9.10$, $SD = 7.32$), incorrect ($M = 1.59$, $SD = 1.86$), and subjective ($M = .76$, $SD = 1.66$) details regardless of whether an observer was present.

Peripheral free recall results were similarly analyzed. A 2 (action) x 2 (motivation) univariate ANOVA on participants' peripheral item scores revealed no significant differences, Fs ≤ 2.94, ps $\geq .09$, η_p^2s $\leq .03$. A second one-way (partner) ANOVA revealed no significant differences between solo ($M = 5.61$, $SE = .43$) and partnered ($M = 5.74$, $SE = .44$) unmotivated actors, $F(1, 50) = .04$, $p = .84$, $\eta_p^2 = .001$.

A 2 (action) x 2 (motivation) univariate ANOVA on participants' non-task transference scores revealed no significant differences, Fs $\leq .15$, ps $> .7$, η_p^2s $\leq .002$). Participants overall made few non-task transference intrusions ($M = .37$, $SD = .76$). There was likewise no significant difference between partnered ($M = .40$, $SE = .65$) and solo ($M = .41$, $SE = .57$) unmotivated actors, $F(1, 50) = .002$, $p = .97$, $\eta_p^2 \leq .001$.

A 2 (action) x 2 (motivation) univariate ANOVA on participants' non-task commission errors likewise showed no significant differences, Fs $\leq .70$, ps $> .41$, η_p^2s $\leq .01$), as participants also made few non-task commission errors (*M* = .81, *SD* = 1.07). A one-way (partner) ANOVA also revealed no significant difference between solo (*M* = .76, *SE* = .78) and partnered (*M* = .64, *SE* = 1.08) unmotivated actors, *F*(1, 50) = .21, *p* = .65, η_p^2 = .004.

Participants' peripheral item details were coded into the same six categories as Study 1. Due to low reliability, the incorrect and subjective peripheral item detail categories were not analyzed. I again collapsed across location, color, quantity, and other details to create a peripheral item correct details score. A 2 (action) x 2 (motivation) univariate ANOVA on the peripheral item correct details score revealed a significant main effect of action, *F*(1, 96) = 6.07, *p* = .02, η_p^2 = .06. Actors (*M* = 6.18, *SE* = .60) reported significantly more correct peripheral item details than did observers (*M* = 4.10, *SE* = .60), M_{diff} = 2.08, 95% CI [.40, 3.76]. A separate one-way (partner) ANOVA on unmotivated actors' correct peripheral item detail scores revealed no effect of partner, *F*(1, 50) = .00, *p* = 1, η_p^2 = .00. Unmotivated actors recalled a similar number of details whether solo (*M* = 5.85, *SE* = .96) or partnered (*M* = 5.86, *SE* = 1.00). Because participants overall reported few non-task transference (*M* = .38, *SE* = .72) or non-task other intrusion items (*M* = .80, *SE* = 1.01) and details (*M*s ≤ .63), details analyses pertaining to those categories are not reported due to floor effects (see Table 2).

Remember/Know Test

Participants completed the Remember/Know test by making a categorical judgment between Remember, Know, or New. As in Study 1, there were 10 target items, half central and half peripheral. To calculate overall proportion of correct old responses, I collapsed across *remember* and *know* judgments. Overall, participants correctly selected "old" for a mean proportion of .80 items (*SD* = .16). The raw proportions were analyzed via a 2 (actor) x 2 (motivation) x 2 (detail type) mixed model ANOVA, with detail type as the repeated factor.

There was a main effect for type of details, *V* = .53, *F*(1, 96) = 109.28, *p* < .001, η_p^2 = .53, such that participants remembered more central items (*M* = .95, *SE* = .01) than peripheral items (*M* = .63, *SE* = .03), M_{diff} = .32, 95% CI [.26, .38]. There were no effects of action, motivation, or significant interactions, *F*s ≤ 1.91, *p*s > .17, η_p^2s ≤ .02. A second mixed model ANOVA comparing solo and partnered unmotivated actors revealed a similar main effect of detail type, *V* = .61, *F*(1, 50) = 79.48, *p* < .001, η_p^2 = .61. Again, participants in this analysis remembered more central items (*M* = .97, *SE* = .01) than peripheral items (*M* = .59, *SE* = .04), M_{diff} = .37, 95% CI [.29, .46]. There was no significant main effect for partner, *F* (1,50) = .19, *p* = .66, η_p^2 = .004.

Additional 2 (action) x 2 (motivation) x 2 (detail type) mixed model ANOVAs were also conducted on participants' *remember* and *know* judgments separately. A mixed models ANOVA on *remember* judgments for target items revealed a main effect for type of details, *V* = .73, *F*(1, 96) = 261.29, *p* < .001, η_p^2 = .73, such that participants remembered more central items (*M* = .86, *SE* = .02) than peripheral items (*M* = .26, *SE* = .03), M_{diff} = .60, 95% CI [.53, .68]. There were no effects for action, motivation, or significant interactions, *F*s ≤ 1.27, *p* ≤ .26, η_p^2s ≤ .01. A mixed models ANOVA on *know* judgments also revealed a main effect of type of details, *V* = .42, *F*(1, 96) = 68.68, *p* < .001, η_p^2 = .42, as participants were more likely to report "know" to peripheral items (*M* = .37, *SE* = .03) than central items (*M* = .09, *SE* = .02), M_{diff} = .28, 95% CI [.22, .35]. There were no effects of action, motivation, or significant interactions, *F*s ≤ 2.12, *p*s ≥ .28, η_p^2s ≤ .02.

Incorrect responses to lures were analyzed in separate 2 (action) x 2 (motivation) univariate ANOVAs for *remember* and *know* judgments. For *remember* judgments, there was a significant main effect of motivation on responses to lures, *F*(1, 96) = 4.03, *p* = .05, η_p^2 = .04, as unmotivated participants ($M = .20$, $SE = .03$) were significantly more likely to report "remember" to lure items than motivated participants ($M = .12$, $SE = .03$), $M_{diff} = .07$, 95% CI [.001, .15]. There were no significant effects of action, motivation, or a significant interaction on participants' *know* judgments for lures ($M = .36$, $SD = .21$), $F\text{s} \leq .37$, $p\text{s} \geq .55$, $\eta_p^2\text{s} \leq .004$.

For comparisons of solo and partnered unmotivated actors, there was a significant main effect of detail type on *remember* judgments, $V = .83$, $F(1, 50) = 247.81$, $p < .001$, $\eta_p^2 = .83$. Participants remembered significantly more central items ($M = .90$, $SE = .03$) than peripheral items ($M = .23$, $SE = .04$), $M_{diff} = .68$, 95% CI [.59, .76]. There was no effect of partner, $F(1, 50) = .89$, $p = .35$, $\eta_p^2 = .02$. There was also a main effect of detail type on *know* judgments, $V = .50$, $F(1, 50) = 49.53$, $p < .001$, $\eta_p^2 = .50$. Participants "knew" more peripheral items ($M = .37$, $SE = .04$) were in the room than central items ($M = .06$, $SE = .02$), $M_{diff} = .30$, 95% CI [.22, .39]. There was no significant effect of partner, $F(1, 50) = .23$, $p =.63$, $\eta_p^2 = .01$.

Solo and partnered unmotivated actors incorrect responses to lures were analyzed in separate 2 one-way (partner) ANOVAs for *remember* and *know* judgments. There was no effect of partner on unmotivated actors' *remember* judgments ($M = .19$, $SD = .22$) to lures, $F(1, 50) = .26$, $p = .61$, $\eta_p^2 = .01$. Likewise, there was no effect of partner on unmotivated actors' *know* judgments ($M = .30$, $SD = .20$) to lures, $F(1, 50) = .32$, $p = .58$, $\eta_p^2 = .01$.

Discrimination accuracy, *Pr*, and response criterion, *Br*, were calculated using the same method as Study 1, and I conducted separate 2 (action) x 2 (motivation) ANOVAs on *remember* and *know* judgments. For *Pr* scores, an ANOVA on *remember* judgments revealed a main effect for motivation, $F(1, 96) = 7.32$, $p = .01$, $\eta_p^2 = .07$, such that motivated participants ($M = .41$, $SE = .03$) showed better discrimination accuracy when making *remember* judgments than unmotivated participants ($M = .31$, $SE = .03$), $M_{diff} = .10$, 95% CI [.03, .17]. An ANOVA on discrimination accuracy for *know* judgments ($M = -.11$, $SE = .22$) revealed no significant differences between conditions, Fs ≤ 1.38, ps $\geq .24$, η_p^2s $\leq .01$. A one-way (partner) ANOVA on unmotivated actors' discrimination accuracy for *remember* judgments ($M = .34$, $SD = .20$) revealed no effect for the presence of an observer, $F(1, 50) = .02$, $p = .88$, $\eta_p^2 < .001$. Likewise, a one-way (partner) ANOVA on unmotivated actors' *know* judgments also failed to reveal an effect for the presence of an observer on unmotivated actors' discrimination accuracy ($M = -.08$, $SD = .19$), $F(1, 50) = .04$, $p = .85$, $\eta_p^2 = .001$.

In terms of response bias, two 2 (action) x 2 (motivation) ANOVAs revealed there were no differences for *remember* ($M = .28$, $SD = .20$) or *know* ($M = .32$, $SD = .13$) judgments, Fs ≤ 1.82, $p \geq .18$, η_p^2s $\leq .02$, Likewise, two one-way (partner) ANOVAs revealed no differences in response bias for unmotivated actors' *remember* ($M = .30$, $SD = .21$) and *know* ($M = .29$, $SD = .13$) judgments, Fs ≤ 1.13, ps $\leq .29$, η_p^2s $\leq .02$.

Recognition Test

Participants also completed the same two-alternative forced choice recognition test as in Study 1. Overall, they correctly chose a mean proportion of .66 items ($SD = .15$). Raw proportion correct scores were analyzed via a 2 (action) x 2 (motivation) x 2 (detail type) mixed model ANOVA with detail type as the repeated measure revealed a main effect for detail type, $V = .06$, $F(1, 96) = 5.80$, $p = .02$, $\eta_p^2 = .06$, as participants recognized a greater proportion of the central items ($M = .68$, $SE = .02$) than the peripheral items ($M = .62$, $SE = .02$), $M_{diff} = .06$, 95% CI [.01, .12]. There were no significant effects of action, motivation, or interactions, Fs ≤ 3.31, ps $\geq .07$, η_p^2s $\leq .03$.

For the unmotivated actor comparison, there was a significant main effect of detail type on raw proportion of correct responses, $V = .11$, $F(1, 50) = 6.05$, $p = .02$, $\eta_p^2 = .11$. Participants recognized a significantly greater proportion of central items ($M = .74$, $SE = .03$) than peripheral items ($M = .65$; $SE = .03$), $M_{diff} = .09$, 95% CI [.02, .16].

Discrimination accuracy, *d'*, was calculated using the same approach as in Study 1, with hit rates and false alarms with values of 0 or 1 again being adjusted by .05. A 2 (actor) x 2 (motivation) univariate ANOVA revealed a nonsignificant tendency towards an action by motivation interaction for *d'*, $F(1, 96) = 3.22$, $p = .08$, $\eta_p^2 = .03$. Overall, accuracy was a mean of .61 ($SD = .63$). For the unmotivated actor comparison, there was no difference in *d'* between solo ($M = .85$, $SE = .13$) and partnered ($M = .81$, $SE = .13$) unmotivated actors, $F(1, 50) = .05$, $p = .82$, $\eta_p^2 = .001$.

Confidence ratings were subjected to a 2 (action) x 2 (motivation) x 2 (detail type) MANOVA, with detail type as the repeated factor. There was a significant main effect of detail type, $V = .62$, $F(1, 96) = 157.81$, $p < .001$, $\eta_p^2 = .62$, as participants' were significantly more confident in their selections of central items ($M = 7.44$, $SE = .14$) than peripheral items ($M = 5.33$, $SE = .17$), $M_{diff} = 2.12$, 95% CI [1.78, 2.45].

For solo versus partnered unmotivated actors, there was a significant main effect of detail type on their confidence ratings, $V = .67$, $F(1, 50) = 99.84$, $p < .001$, $\eta_p^2 = .67$. Participants were significantly more confident in their recognition test selections that concerned central items ($M = 7.60$, $SE = .18$) than peripheral items ($M = 5.37$, $SE = .22$), $M_{diff} = 2.22$, 95% CI [1.78, 2.67]. There was no significant difference on the basis of being alone ($M = 6.54$, $SE = .23$) versus with a partner ($M = 6.42$, $SE = .24$), $F(1,50) = .13$, $p = .72$, $\eta_p^2 = .003$.

CHAPTER 11: STUDY TWO DISCUSSION

As in Study 1, participants did not much vary in their perceptions of the mock crime task. They found the task to be relatively easy. Manipulation checks generally supported the success of the motivation manipulation. Motivated participants reported being significantly more stressed by the time limit than unmotivated participants. This effect was qualified by an interaction between action and motivation. There was actually no difference in reported stress due to the lime limit between motivated perpetrators and unmotivated actors, suggesting that the action manipulation was sufficient to stress active participants about the time limit, presumably because they felt pressured to finish the theft correctly regardless of whether they would get a reward at the end. The time limit did successfully stress motivated observers, however, as compared to unmotivated observers. Moreover, motivated participants rated success at completing the mock theft as significantly more important than unmotivated participants. The mean of the motivated participants was quite high (above 6 on a 7-point scale), suggesting there may have been a ceiling effect preventing a fully significant result.

Hypothesis 1 predicted that active participants would show greater overall recall than passive participants. This hypothesis was again partially supported. Active participants recalled a larger overall percentage of room items, mainly due to their significantly greater recall of central items on the free recall task as compared to observers. Actors also recalled more details about the central and peripheral items in the mock crime room. Actors did not, however, perform differently than observers on either the RK or recognition tests.

Hypothesis 2 predicted that motivation would interact with action by improving observers' performance and weakening actors' memory performance. This hypothesis was not supported. There was an action by motivation interaction on participants' task commission errors (other intrusions), but there were no differences between motivated perpetrators and unmotivated actors. There were no other action by motivation interactions. The differential impact of the motivation variable on actors and observers may be due to the nature of the motivation manipulation. Although the motivation manipulation was meant to increase investment in the outcome of the mock theft for both actors and observers, the observers have no control over the outcome of the study. Actors, both unmotivated actors and perpetrators, on the other hand, had a tangible interest in the outcome as it was dependent upon their performance and directly reflected upon their abilities. Such an investment may activate self-serving ego protection, evaluation apprehension, or other intrinsic motivations, which could explain the lack of interaction between action and motivation (Baumeister & Showers, 1986; Hodgins, 2008). Perpetrators and unmotivated actors may have both been invested in the outcome of the mock crime because of how it reflected upon them rather than the explicit benefits or consequences attached to their performance.

Hypothesis 3 predicted that unmotivated actors would better remember peripheral details than perpetrators, but there would be no difference between accomplices and witnesses. This hypothesis was not supported. There were very few significant differences in recall for peripheral items or their details between conditions. The failure to see differences in peripheral detail memory between unmotivated actors and perpetrators is likely due to the failure of the motivation manipulation.

Unpaired (solo) unmotivated actors were also compared to unmotivated actors paired with an observer to measure whether the presence of an observer in the room impacted performance. There were no differences between the two conditions, suggesting that the presence of an observer during the mock theft did not affect actors in an appreciable way.

Given that actors tended to report high levels of stress from the time limit regardless of whether they were in the motivation condition, it appears that action (or ego threat) was enough to stress participants. All participants were given a relatively short timeframe (five minutes) for completing the mock crime, however, which raises the question of whether action or time pressure is driving the participants' perceptions of stress caused by the time limit. Therefore, the final study will directly manipulate time pressure while varying action to assess their individual impact.

In Study 1, there was a question as to whether motivation or action drove perpetrators' superior memory compared to witnesses. On the first hand, the current results seem to suggest that action was driving the result, as the motivation manipulation had little impact on actors. On the other hand, there were main effects of motivation because of the improvement in motivated witnesses, which provides the first indication that perpetrator memory may not be as superior to witness memory as it is often assumed to be, particularly when compared to witnesses aware of and motivated to attend to a crime.

Studies 1 and 2 both had active participants (perpetrators and unmotivated actors) complete the mock crime task by following tapes around the room in an artificial manner. Typically, crimes are much more unstructured, particularly when unplanned. There is thus still a question of how accurate perpetrators memory will be when particular items are not made salient due to the structure of the mock crime task. Participants in general have shown strong effects in recalling central items more accurately than peripheral items; however, the central items were central because of our artificial manipulation of attaching tapes to a pre-selected set of items. The third study therefore turns the mock crime task into an unstructured event where participants are equally likely to interact with all items in the room, to see what the impact will be on overall recall (as it will no longer be possible to distinguish between central and peripheral items). Making the event unstructured therefore provides a more stringent test of the comparison between perpetrator and eyewitness memory.

CHAPTER 12: STUDY THREE: THE EFFECTS OF ACTION AND STRESS ON MEMORY

Participants and Design

Participants were 221 community members (*M* age = 31.84 years; 52% female) paid $25 for their participation. Fourteen participants were excluded: six did not return for the second half of the research, seven did not complete the task according to instructions (e.g., touching items in the imagination condition, playing on phone, gave up early), and one was medically ineligible (i.e., blind in one eye). The final sample thus consisted of 207 participants, including 57 African Americans, 15 Asian/Pacific Islander, 84 European Americans, 28 Hispanic, 1 Middle Eastern, 18 who self-identified as multiethnic, and 3 who self-identified as “other”. These participants were randomly assigned to one of eight cells created by a 3 (Role: Perpetrator vs. Accomplice vs. Witness) x 2 (Time Pressure: High vs. Low) + 2 (Imagination: Motivated vs. Unmotivated) factorial design. There were 21 unmotivated observers in each of the low and high time pressure conditions; 23 motivated observers in the low time pressure condition and 19 in the high time pressure; 41 motivated actors in each of the low and high time pressure conditions; 20 participants in the unmotivated imagination condition; and 21 participants in the motivated imagination condition.

Procedure

Participants were recruited via Craigslist to participate in a two-day study concerning event perception. Participants were randomly assigned to conditions upon recruitment, at which point they were asked to agree to attend both sessions before they were scheduled to participate. Participants were not told in advance that their memory was to be tested.

In the first experimental sessions, most of the participants were scheduled in pairs. In paired sessions, a perpetrator was always paired with an observer (motivated accomplice or unmotivated witness). Participants scheduled alone, or those whose partner did not come to the first session, were randomly assigned to one of the two imagination conditions. After giving informed consent (see Appendix N), each participant was read instructions for the next phase and instructed not to speak during the task (see Appendix O).

Role manipulation. As in the two previous studies, perpetrators and witnesses were distinguished by whether the participant personally enacted the multi-step task (perpetrator) or watched another participant complete the same task (witness/accomplice). The double-prong motivation from the previous two studies was used for perpetrators and accomplices. There were no unmotivated actors, as perpetrators typically have at least one active goal during actual crimes. Those assigned to the perpetrator role were told there was a potentially valuable object inside a gift box that they were to locate and steal. The potentially valuable object (a $1 scratch-off lottery ticket) was not identified to avoid participants' being differentially motivated by the item. Active participants were shown a picture of a gift box, a 3" x 5" inch Tiffany & Co. box, and told it was hidden in the room and could only be accessed with a key also hidden in room. Perpetrators were told that they must steal the item once found, hide it on their person, and immediately exit the room. Perpetrators were also warned that an individual would be observing them, but they were instructed not to speak or interact with the other participant.

Physically-passive observers (accomplices and witnesses) were told to enter the room at the same time as the perpetrators and stand on a marked spot inside the room (just inside the doorway, but with a clear view of all relevant task objects) and observe the mock theft. The witnesses and accomplices were also told to make sure to leave the room directly behind the perpetrator, and they were instructed not to speak or interact with the perpetrators in any way.

Perpetrators and accomplices were told they would get to keep (or split with their partner) the stolen item if the theft was completed successfully. They were also warned that if the mock crime was not completed before the time limit, an alarm would sound to alert the experimenter to the participants' failure.

Mock crime phase. The mock crime simulated a theft in a more realistic manner, as participants no longer followed tapes to specific items during the mock crime phase. Rather, participants were led into the study room and told they were allowed to touch, but not break, any of the objects inside the room. The room contained about 90 stationary objects, pieces of furniture, and items of wall art.

Time pressure manipulation. Pressure was manipulated by varying the time limit for the task. In the high-pressure condition, participants were told the actors had only five minutes to complete the task. They were further told that pilot testing revealed it took participants an average of seven or eight minutes to complete the task, so they would have to work quickly. During the task a metronome ticked at a rate of 60 beats per minute. In the low-pressure condition, actors were told they had 10 minutes to complete the task and that pilot testing revealed it took participants an average of seven or eight minutes to complete the task, so they should have plenty of time to locate and steal the object. The metronome was silent during the low-pressure sessions. Participants were stopped at the end of their respective time limits regardless of their success or failure.

Imagination. Participants in the imagination condition were instructed to imagine committing a mock crime in the room according to a set of instructions. The participants were then read the same instructions read to the perpetrators in the study (with the exception of the motivation instructions for the unmotivated imaginers). Participants were also shown the same picture of the Tiffany & Co. box. Imagination participants were run in the high time pressure condition, so they were told that they had five minutes to observe the room and imagine how they would search for and steal the potentially valuable object, though pilot testing revealed it usually took seven to eight minutes on average. The metronome was on during their time in the room. *Motivated* imagination participants were given the same motivation as other motivated participants – they were told to imagine that they would get to keep the stolen item and avoid an alarm if successful. *Unmotivated* participants were told they would not keep the stolen item and no mention was made of an alarm.

The task was made purposefully difficult so participants would spend their entire time allotment in the room. No participants successfully located both the hidden box and the hidden key, so all participants were removed from the room at the end of the allotted time (either five or ten minutes depending on whether they were assigned to the high-pressure or low-pressure conditions, respectively).

After completing the mock crime phase, participants completed the crime perception questionnaire (see Appendix P), completed the State Anxiety Scale (see Appendix E), and provided their demographic information. Participants in the imagination condition were told to complete the crime perception questionnaire as if they performed the tasks they imagined during the mock crime phase. Participants were paid cash for the first day ($10), asked to give consent for use of their videotaped data (see Appendix F), and reminded to return the next day.

Memory assessment phase. Upon returning to the lab, all participants completed the free recall questionnaire (see Appendix Q), Remember/Know/Guess test (see Appendix R), and recognition test (see Appendix S). Participants completed these measures at their own pace and were encouraged to be thorough.

After completing the memory measures, participants were orally debriefed as to the nature of the study. Prior to dismissal, participants were paid cash for the second day of the study ($15).

Measures

Crime-perception questionnaire. Participants were asked to rate how important a series of variables were to the actors' ultimate success or failure on a 7-point Likert-type scale (1=not at all important; 7 = very important): (1) presence of an observer, when applicable; (2) actor's ability to concentrate; (3) task time limit; (4) actor's level of attention to detail; (5) actor's level of motivation; and (6) the threat of the alarm, when applicable. Participants also answered questions regarding their perception of the mock crime task on 7-point Likert-type scales. Participants rated: (1) the difficulty of the task; (2) level of stress caused by time limit; (3) perception of partner's level of stress caused by time limit, when applicable; (4) how important it was to be successful; (5) how important it seemed to the participant's partner to be successful, when applicable; (6) level of stress caused by the alarm, when applicable; and (7) perception of partner's level of stress caused by the alarm, when applicable.

Free-recall questionnaire. Participants were asked to respond to two open-ended questions assessing their memory for the objects in the room. The first open-ended question asked participants to list in chronological order the items the actor interacted with during the search for the gift box holding the potentially valuable object. Participants were asked to provide as much detail about each item as possible. The second open-ended question asked participants to identify all remaining items that were in the room, specifically prompting the participants to list everything they could remember. Participants in the imagination condition were told to complete the questionnaire as if they had completed the theft as they imagined.

Remember/Know/Guess test. Participants completed a Remember/Know/Guess test using the two-step format used in Study 1. Items could not be split between central and peripheral details for this study as the participants were free to choose with which objects to interact. The 35-item list was split between new (10), old (15), and lure (10) items as in the two previous studies.

Recognition test. Participants were shown fifteen pairs of photos based on objects in the room using the same procedure as the two previous studies. Items could not be split between central and peripheral items.

Free-recall coding

A doctoral student, blind to the research hypotheses, coded participants' open-ended free recall statements. In addition, I randomly coded about 25% of the results (n = 52 cases) for reliability analyses. Participants' free-recall questionnaires were redacted as done in Study 1.

Because participants were given free rein in the room and each interacted with a different set of objects, no distinctions were made between central and peripheral items because the level of noise in such analysis would be too high. Raters calculated a room items score by summing the number of items correctly listed by participants. Raters then coded the frequency of participants' details about the items in the room into the same six categories used in the previous two studies: (1) location; (2) color; (3) other; (4) quantity; (5) incorrect; (6) subjective. Coders also identified items incorrectly listed as room items; these items were summed to create a room intrusion score. Details about these intrusions were summed into one total details category, with the exception of subjective details counted separately, as there was no way to verify the accuracy of the details.

Raters also coded for the presence of specific items in the participants' narratives; specifically, raters coded for the presence/absence of the Tiffany Box (which was the gift box holding the potentially valuable object for which the participants were shown a photo) and the keys. The keys were coded as to whether the participants specifically mentioned finding the keys. Raters also coded participants' mention of the location of the keys and Tiffany box as correct, incorrect, or not mentioned. These nominal categories were assessed for reliability using Cohen's κ, and reliability was perfect for all items (κs = 1). Details about the Tiffany Box (correct, subjective, and incorrect) were coded into separate detail categories from the other room items as no participants successfully accessed the Tiffany Box during the mock crime phase (as such, any details provided would represent memory of the picture they were shown rather than interaction with the item during the mock crime). Participants rarely reported correct (M = .12, SD = .38), incorrect (M = .01, SD = .10) or subjective (M = .02, SD =.14) details about the Tiffany Box, so those results were dropped from analysis.

Hypotheses

The present study tested whether action and stress/arousal, manipulated via time pressure, would impact memory for crime details. This study also sought to explore whether imagining committing the mock crime would improve memory for crime details over mere witnessing of an event as a proxy for understanding the richly detailed false confessions seen in actual cases.

H1: There will be a main effect for action, such that perpetrators and motivated witnesses will remember more details about the crime event than unmotivated witnesses.

H2: There will be an interaction between action and time pressure. Motivated witnesses should show improved recall in the high pressure condition compared to the low pressure condition as high pressure should serve to increase arousal and lead to further attentional narrowing on the crime. Perpetrators, on the other hand, should show decreased recall in the high-pressure condition compared to the low pressure condition, as perpetrators' focus should shift internally as pressure and evaluative concerns rise. Unmotivated witnesses should show no difference in memory on the basis of pressure, as they would be unlikely to feel arousal or stress during the crime.

H3: Comparisons between the imagination condition and the perpetrator high-pressure condition will show that perpetrators still remember more items from the crime event than do imaginers.

H4: Motivated imaginers should remember more details compared to unmotivated imaginers.

CHAPTER 13: STUDY THREE RESULTS

Crime Perceptions

As in the other two studies, participants completed a crime perceptions questionnaire immediately following conclusion of the mock theft phase. Items relating to perceptions of the mock crime and factors important to the perpetrators' success were analyzed in a 3 (role) x 2 (time pressure) x 2 (gender) MANOVA to compare the overall pattern of results. All participants in the role conditions responded to five items rating their importance to the perpetrators' success during the mock crime phase (observer presence, ability to concentrate, the time limit; actor's attention to detail; and actor's motivation), as well as a sixth item rating the difficulty of the task. A MANOVA revealed no significant differences between conditions on the basis of role, time pressure, or gender, and there were no significant interactions, Fs ≤ 1.52, ps $\geq .12$, η_p^2s $\leq .06$. As in the previous two studies, participants again did not show variation between conditions in their ratings of the witnesses' presence ($M = 2.35$, $SD = 1.74$); time limit ($M = 5.06$, $SD = 1.87$), perpetrators' attention to detail ($M = 5.08$, $SD = 1.86$), and perpetrators' motivation ($M = 4.95$, $SD = 1.93$) as important to the outcome of the mock crime task. Participants rated the mock crime task as difficult ($M = 5.58$, $SD = 1.66$), as the mean is significantly higher than the midpoint of the scale, $t(206) = 13.66$, $p < .001$. Participants perceived perpetrators' ability to concentrate ($M = 4.26$, $SD = 2.05$) as marginally important to success in the task, $t(206) = 1.83$, $p = .07$.

Guided by specific hypotheses about perpetrators compared to participants in the imagination condition, all analyses were repeated with a 3 (imagination) x 2 (gender) design with imagination representing perpetrators, unmotivated imaginers, and motivated imaginers. As all imagination participants were run in the high time pressure condition, the data was filtered by time pressure and imaginers were only compared to the perpetrators in the high time pressure condition as well. To test the specific hypotheses concerning differences by imagination, orthogonal planned Helmert comparisons were conducted. Perpetrators were compared to all imagination participants (collapsed into one group) and then motivated and unmotivated imaginers were directly compared to each other.

A 3 (imagination: perpetrators vs. motivated imaginers vs. unmotivated imaginers) x 2 (gender) MANOVA compared five of the above six items for actors and imaginers (imaginers had no observers, so that item was omitted). There was a significant multivariate main effect of imagination, $V = .48$, $F(10, 144) = 4.56$, $p < .001$, $\eta_p^2 = .24$. Follow-up ANOVAs revealed a significant univariate main effect of imagination on perceptions of how much the time limit affected performance during the theft, $F(2, 75) = 11.45$, $p < .001$, $\eta_p^2 = .23$. Planned Helmert comparisons showed that perpetrators felt the time limit was significantly more important to their success ($M = 5.61$, $SE = 1.58$) than imaginers, $t(75) = 4.77$, $p < .001$, 95% CI [1.17, 2.84], but there was no difference between unmotivated ($M = 3.47$, $SE = 1.90$) and motivated ($M = 3.81$, $SE = 2.29$) imaginers, $t(75) = 2.33$, $p = .61$, 95% CI [-.89, 1.50]. There was also a significant univariate main effect of imagination on perceptions of task difficulty, $F(2, 75) = 22.08$, $p < .001$, $\eta_p^2 = .37$. Perpetrators ($M = 6.16$, $SE = .25$) felt the task was more difficult than did participants in the imagination condition, $t(75) = 6.63$, $p < .001$, 95% CI [1.62, 3.02]. There was no difference between motivated ($M = 3.76$, $SE = .35$) and unmotivated ($M = 3.91$, $SE = .36$) imaginers, $t(75) = -.28$, $d = -.16$, $p = .78$, 95% CI [-1.14, .85].

There was also a significant multivariate main effect of gender, $V = .16$, $F(5, 71) = 2.62$, $p = .03$, $\eta_p^2 = .16$. Follow-up ANOVAs revealed a significant main effect of gender on participants' ratings of the task difficulty, $F(1, 75) = 7.33$, $p = .01$, $\eta_p^2 = .09$. Female participants

($M = 5.11$, $SE = .25$) rated the task as significantly more difficult than did male participants ($M = 4.11$, $SE = .27$), $M_{diff} = 1.01$, 95% CI [.27, 1.75].

As manipulation checks on the arousal and role (motivation prong) manipulations, all participants also completed an additional set of four items concerning their perceptions of the crime (actor's stress caused by the time limit; observer's stress caused by the time limit; importance of success to the actor; and importance of success to the observer), as well as the State anxiety scale. Participants' state anxiety scores were obtained using the same method as study 1, and the scale again showed good reliability (Cronbach's $\alpha = .88$). Items one and two were recoded into a variable representing participant's perceptions of how stressed they were by the time limit, and items three and four were recoded into a variable representing how personally important it was to the participants to be successful.

A MANOVA revealed a significant multivariate main effect of role, $V = .28$, $F(6, 306) = 8.37$, $p < .001$, $\eta_p^2 = .14$. Follow-up ANOVAs showed a significant univariate main effect of action on reported stress caused by the time limit, $F(2, 154) = 18.85$, $p < .001$, $\eta_p^2 = .20$. For all study analyses, pairwise comparisons were made with Bonferroni adjustments; post-hoc tests for role were completed with a Hochberg adjustment because of unequal sample size (there were twice as many perpetrators than participants in the other conditions). Post-hoc tests revealed perpetrators ($M = 5.21$, $SE = .21$) reported being significantly more stressed by the time limit than witnesses ($M = 3.14$, $SE = .29$), $t(154) = 5.69$, $p < .001$, $d = 1.09$, 95% CI [1.18, 2.91], and accomplices ($M = 3.75$, $SE = .30$), $t(154) = 3.84$, $p = .001$, $d = .71$, 95% CI [.52, 2.28]. There was no significant difference between witnesses and accomplices, $t(154) = 1.54$, $p = .33$, $d = .31$, 95% CI [-.36, 1.65].

There was also a significant univariate main effect of role on participants' reported level of motivation that the theft be successful, $F(2, 154) = 13.93$, $p < .001$, $\eta_p^2 = .15$. Post-hoc tests showed that perpetrators ($M = 5.88$, $SE = .20$) were significantly more motivated than accomplices ($M = 4.78$, $SE = .29$), $t(154) = 3.12$, $p = .006$, $d = .23$, 95% CI [.25, 1.95], and witnesses ($M = 4.13$, $SE = .29$), $t(154) = 5.02$, $p < .001$, $d = .96$, 95% CI [.90, 2.57]. There was no significant difference between accomplices and witnesses, $t(154) = 1.60$, $p = .30$, $d = .30$, 95% CI [-.33, 1.61]. There was a significant univariate effect of role on participants' self-reported state anxiety during the mock crime task, $F(2, 154) = 6.34$, $p < .001$, $\eta_p^2 = .18$. Post-hoc tests showed perpetrators ($M = 14.98$, $SE = .49$) reported significantly higher state anxiety than accomplices ($M = 12.62$, $SE = .70$), $t(154) = 2.58$, $p = .03$, $d = .50$, 95% CI [.14, 4.23], and witnesses ($M = 10.28$, $SE = .68$), $t(154) = 5.62$, $p <.001$, $d = 1.06$, 95% CI [2.67, 6.70]. Accomplices also reported higher state anxiety than did witnesses, $t(154) = 2.59$, $p = .03$, $d = .59$, 95% CI [.17, 4.83].

There was also a significant multivariate main effect of gender on participants' self-reported state anxiety, $V = .08$, $F(3, 152) = 4.26$, $p = .01$, $\eta_p^2 = .08$. Follow-up univariate ANOVAs revealed a significant main effect of gender on participants' self-reported levels of stress caused by the time limit, $F(1, 154) = 12.67$, $p < .001$, $\eta_p^2 = .08$. Females ($M = 4.59$, $SE = .22$) reported being significantly more stressed by the time limit than were male participants ($M = 3.48$, $SE = .23$), $M_{diff} = 1.11$, 95% CI [.49, 1.73].

To compare imaginers and perpetrators, a second 3 (imagination) x 2 (gender) MANOVA was performed on the manipulation check variables. There was a significant multivariate main effect of gender, $V = .24$, $F(3, 74) = 7.66$, $p < .001$, $\eta_p^2 = .24$. Follow-up univariate ANOVAs revealed a significant effect of gender on participants' ratings of how stressed they were by the time limit, $F(1, 76) = 5.78$, $p = .02$, $\eta_p^2 = .07$. Female participants ($M = 4.56$, $SE = .330$) reported being significantly more stressed by the alarm than male participants ($M = 3.38$, $SE = .33$), $M_{diff} = 1.18$, 95% CI [.20, 2.16]. There was a significant effect of gender on participants' ratings of how important it was to them to be successful, $F(1, 76) = 9.59$, $p = .003$, $\eta_p^2 = .11$. Males ($M = 6.20$, $SE = .29$) reported higher motivation to be successful than did females ($M = 4.99$, $SE = .26$), $M_{diff} = 1.21$, 95% CI [.43, 1.99]. There was also a significant effect of gender on participants' state anxiety scores, $F(1, 76) = 10.53$, $p = .002$, $\eta_p^2 = .12$. Females ($M = 15.13$, $SE = .70$.) reported significantly higher state anxiety scores than males ($M = 11.72$, $SE = .77$), $M_{diff} = 3.36$, 95% CI [1.30, 5.43]. There was a nonsignificant multivariate main effect of imagination, $V = .16$, $F(6, 150) = 2.13$, $p = .054$, $\eta_p^2 = .08$.

High time pressure participants were subject to an additional manipulation check concerning their level of stress caused by the threat of the alarm as low-pressure participants were not warned about an alarm. That variable was subject to a 3 (role) x 2 (gender) univariate ANOVA. There was a significant main effect of role, $F(2, 75) = 3.45$, $p = .04$, $\eta_p^2 = .08$. Whereas there were no differences between witnesses ($M = 3.14$, $SE = 2.15$) and accomplices ($M = 2.79$, $SE = 2.20$), $t(75) = .52$, $p = .94$, $d = -.16$, 95% CI [-2.01, 1.30], or between perpetrators ($M = 4.17$, $SE = 2.17$) and witnesses, $t(75) = 1.79$, $p = .21$, $d = .48$, 95% CI [-.37, 2.43], there was a nonsignificant difference between accomplices and perpetrators, $t(75) = 2.33$, $p = .07$, $d = .63$, 95% CI [-.07, 2.83].

As imaginers were also in the high pressure condition, a second 3 (imagination) x 2 (gender) univariate ANOVA was performed on the stress caused by the alarm variable. There was no significant difference due to role, $F(1, 57) = 1.57$, $p = .22$, $\eta_p^2 = .03$, but there was a significant main effect of gender, $F(1, 57) = 6.15$, $p = .02$, $\eta_p^2 = .10$. Females ($M = 4.54$, $SE =$

.41) reported being significantly more stressed by the alarm than did males (*M* = 3.06, *SE* = .43), M_{diff} = 1.48, 95% CI [.29, 2.67].

Free Recall

No distinction was made between central and peripheral items in this study. Participants were free to complete the mock theft as they wished, so each perpetrator interacted with different items for differing amounts of time. Hence, physical interaction could not clearly be used for the central/peripheral designation. Moreover, the mock theft took place in a small room throughout which perpetrators freely moved, so proximity could not be used as a designation. Finally, it is impossible to determine about which items the imagination participants imagined interacting (without relying upon their memory reports on the second day of the study which introduces a tautology), so the central/peripheral distinction could not apply for imagination participants.

Across all conditions, participants correctly free-recalled a mean of 14.69 items (*SD* = 4.83) and incorrectly reported a mean of 1.26 items (*SD* = 1.19). Accuracy was calculated following the same approach used in Study 1. Participants were again highly accurate in their characterization of recalled items (overall *M* = 91.97%, *SD* = 7.82). A 3 (role) x 2 (time pressure) x 2 (gender) univariate ANOVA on overall accuracy revealed a significant three-way interaction between role, time pressure, and gender, *F*(2, 152) = 4.22, *p* = .02, η_p^2 = .05. For unmotivated observers, there was a significant time pressure by gender interaction, *F*(2, 152) = 3.09, *p* = .05, η_p^2 = .02. There was no difference in accuracy between male (*M* = 92.27, *SE* = 2.28) and female (*M* = 91.12, *SE* = 2.18) witnesses in the low time pressure condition, *t*(152) = .36, *p* = .72, *d* = .15, 95% CI [-5.08, 7.38], but female witnesses in the high time pressure condition (*M* = 92.74, *SE* = 2.18) were significantly more accurate than male witnesses (*M* = 86.05, *SE* = 2.28), *t*(152) = 2.12, *p* = .04, *d* = .63, 95% CI [.46, 12.93]. For motivated observers, there was also a significant time pressure by gender interaction, *F*(2, 152) = 5.28, p = .01, η_p^2 = .03. In the low time pressure condition, female accomplices (*M* = 95.76, *SE* = 2.08) were more accurate than male accomplices (*M* = 89.70, *SE* = 2.18), *t*(152) = 2.01, p = .05, *d* = .93, 95% CI [.11, 12.01], but there were no differences between male (*M* = 95.14, *SE* = 2.41) and female (*M* = 90.90, *SE* = 2.28) accomplices in the high time pressure condition, *t*(152) = 1.28, p = .20, *d* = .80, 95% CI [-2.32, 10.79]. For motivated actors, there was no time pressure by gender interaction, *F*(2, 152) = .07, p = .93, η_p^2 < .001. Perpetrators had an overall mean accuracy of 93.05% (*SD* = 6.46). A 3 (imagination) x 2 (gender) univariate ANOVA showed there were no significant differences in accuracy for the comparison between actors and imaginers, *F*s ≤ 2.05, *p*s > .14, η_p^2s < .05.

A second comparison assessed overall recall again by diving the number of correctly recalled items by the total number of unique items in the room (*n* = 69, each item was only counted once for this calculation because quantity was a detail category). Participants had an overall recall percentage of 21.29%, *SD* = 6.99). A 3 (role) x 2 (time pressure) x 2 (gender) univariate ANOVA on overall recall revealed a main effect of role, *F*(2, 152) = 4.55, p = .01, η_p^2 = .06. Post-hoc tests revealed perpetrators recalled a significantly higher overall percentage of items than witnesses, but accomplices were not different from either perpetrators or witnesses (see Figure 3). There was also a main effect of time pressure, *F*(1, 152) = 26.86, p < .001, η_p^2 = .15. Participants in the low time-pressure condition (*M* = 24.79, *SE* = .70) recalled a significantly higher percentage of items than did participants in the high time-pressure condition (*M* = 19.58, *SE* = .72), M_{diff} = 5.21, 95% CI [3.24, 7.20].

A separate 3 (imagination) x 2 (gender) univariate ANOVA was conducted to compare the perpetrators and imaginers on their overall recall percentage. There was a significant main effect of imagination, *F*(2, 74) = 11.34, $p < .001$, $\eta_p^2 = .24$. Planned Helmert comparisons revealed that perpetrators (*M* = 21.78, *SE* = .89) remembered more items than did participants in the imagination condition, *t*(74) = 4.69, $p < .001$, *d* = 1.06, 95% CI [3.43-8.506), but there was no difference between unmotivated (*M* = 16.40, *SE* = 1.31) and motivated (*M* = 15.22, *SE* = 1.25) imaginers, *t*(74) = , *p* = .52, *d* = , 95% CI [-4.79, 2.43]. There was no significant difference between male and female participants, *F*(1, 74) = .29, *p* = .59, $\eta_p^2 = .004$.

A 3 (role) x 2 (time pressure) x 2 (gender) univariate ANOVA on participants' room intrusion scores revealed a significant three-way interaction between role, time pressure, and gender, *F*(2, 152) = 4.06, *p* = .02, $\eta_p^2 = .05$. For witnesses (*M* = 1.45, *SD* = 1.32), there was no time pressure by gender interaction, *F*(1, 152) = 1.96, *p* = .14, $\eta_p^2 = .01$. Perpetrators also failed to show a time pressure by gender interaction, *F*(1, 152) = .01, *p* = .99, $\eta_p^2 \leq .001$. For accomplices, however, there was a significant time pressure by gender interaction, *F*(1, 152) = 6.39, *p* = .002, $\eta_p^2 = .04$. In the low time pressure condition, male accomplices (*M* = 1.96, *SE* = .36) made more intrusions than female accomplices (*M* = .83, *SE* = .34), *t*(152) = 2.27, *p* = .02, *d* = .85, 95% CI [.15, 2.10], but there was no significant differences between male (*M* = .67, *SE* = .39) and female (*M* = 1.4, *SE* = .37) accomplices in the high time pressure condition, *t*(152) = 1.25, *p* = .18, *d* = .86, 95% CI [-.34, 1.81].

A separate 3 (imagination) x 2 (gender) ANOVA on participants' room intrusion scores revealed no significant differences across conditions, *F*s ≤ .69, *p*s > .51, $\eta_p^2 = .02$. Perpetrators (*M* = 1.09, *SD* = 1.12), unmotivated imaginers (*M* = 1.42, *SD* = 1.30), and motivated imaginers (*M* = 1.02, *SD* = 1.15) all made a statistically similar number of commission errors.

Participants' room item details were coded into the same six categories used in the previous studies: (1) location details; (2) color details; (3) quantity details; (4) other details; (5)

incorrect details; and (6) subjective details. These categories were analyzed via a 3 (role) x 2 (time pressure) x 2 (gender) MANOVA. There was a significant multivariate main effect of role, $V = .16$, $F(12, 296) = 12.28$, $p = .01$, $\eta_p^2 = .08$. Follow-up univariate analyses revealed a main effect of role on the number of correct quantity details reported, $F(2, 152) = 7.25$, $p = .001$, $\eta_p^2 = .09$. Perpetrators ($M = 2.24$, $SE = .17$) reported significantly more quantity details than did witnesses ($M = 1.46$, $SE = .24$), $t(152) = 2.68$, $p = .02$, $d = .51$, 95% CI [.08, 1.49], or accomplices ($M = 1.22$, $SE = .24$), $t(152) = 3.46$, $p = .002$, $d = .64$, 95% CI [.31, 1.72]. There were no differences between witnesses and accomplices, $t(152) = .68$, $p = .87$, $d = .16$, 95% CI [-.58, 1.03]. There were no significant multivariate effects of time pressure or gender, nor were there any significant interactions, $F\text{s} \leq 1.45$, $p\text{s} \geq .33$, $\eta_p^2\text{s} \leq .06$. Overall, participants recalled similar amounts of location, color, other, incorrect, and subjective details (see Table 3). Due to floor effects, there were no significant differences in the amount of total and subjective details reported about participants' room intrusions (see Table 3 for overall means).

A separate 3 (imagination) x 2 (gender) MANOVA was conducted to compare perpetrators and imaginers on the number of details reported about items in the mock crime room. There were no significant multivariate differences for imagination or gender, $F\text{s} \leq 1.35$, $p\text{s} \geq .20$, $\eta_p^2\text{s} \leq .10$. Overall, perpetrators and imaginers recalled a similar number of location ($M = 3.10$, $SD = 2.92$), color ($M = 4.17$, $SD = 3.74$), quantity ($M = 1.93$, $SD = 1.66$), other ($M = 3.86$, $SD = 3.42$), incorrect ($M = 4.22$, $SD = 3.71$), and subjective ($M = 1.28$, $SD = 1.55$) details.

Remember/Know/Guess Test

Participants completed the Remember/Know/Guess test using the same procedure as described in Study 1. Across conditions, participants selected a correct proportion of .66 items as "old" ($SD = .17$). Raw proportion correct scores were subjected to 3 (role) x 2 (time pressure) x

2 (gender) univariate ANOVAs for overall proportion correct as well as proportion of correct *remember*, *know*, and *guess* judgments. There were no significant differences between conditions for overall "old" responses to target items on the basis of role, time pressure, or gender, nor were there significant interactions, Fs ≤ 2.80, ps $\geq .06$, η_p^2s $\leq .04$. Similarly, there were no significant differences between conditions for *remember* judgments on the basis of role, time pressure, or gender, nor were there interactions, Fs ≤ 2.33, ps $\geq .10$, η_p^2s $\leq .03$. Participants reported remembering a similar proportion ($M = .36$, $SD = .18$) of target items across conditions.

There was a significant role by gender interaction on correct *know* judgments, $F(2, 154) = 4.90$, $p = .01$, $\eta_p^2 = .06$. For male participants, witnesses ($M = .24$, $SE = .04$) did not report "know" to a significantly greater number of target items than did accomplices ($M = .12$, $SE = .04$; $p = .07$), $t(154) = 2.28$, $p = .07$, $d = -.83$, 95% CI [-.01, .25], or perpetrators ($M = .17$, $SE = .03$), $t(154) = 1.72$, $p = .26$, $d = -.44$, 95% CI [-.03, .19]. Male perpetrators and accomplices were also not significantly different, $t(75) = .94$, $p = 1$, $d = .26$, 95% CI [-.07, .16]. In contrast, female accomplices ($M = .27$, $SE = .04$) reported "know" to a significantly higher proportion of target items than perpetrators ($M = .16$, $SE = .03$; $p = .04$), $t(75) = 2.52$, $p =.04$, $d = -.57$, 95% CI [.004, .22], but female witnesses ($M = .17$, $SE = .04$) were not statistically different than female accomplices, $t(75) = 2.00$ $p = .14$, $d = .55$, 95% CI [-.22, .02], or perpetrators, $t(75) = .25$, $p = 1$, $d = -.06$, 95% CI [-.10, .12].

There was also a significant three-way interaction of role, time pressure, and gender on proportion of correct *know* judgments to targets, $F(2, 154) = 3.66$, $p = .03$, $\eta_p^2 = .05$. There was no significant role by time pressure interaction for males, $F(2, 154) = 1.12$, $p = .33$, $\eta_p^2 = .01$. Males "knew" approximately the same proportion of targets were old across conditions ($M = .18$, $SD = .17$). For females, there was a significant role by time pressure interaction, $F(2, 154) =$

3.18, $p = .04$, $\eta_p^2 = .04$. In the low time pressure condition, there were no differences by role in *know* judgments by female participants. Female witnesses ($M = .13$, $SE = .05$) and accomplices ($M = .20$, $SE = .05$) were not statistically different, $t(154) = .96$, $p = 1$, $d = .05$, 95% CI [-.24, .10]. Witnesses and perpetrators ($M = .19$, $SE = .04$) were also statistically similar, $t(154) = .97$, $p = 1$, $d = .06$, 95% CI [-.21, .09]. Finally, accomplices and perpetrators did not statistically vary, $t(154) = .11$, $p = 1$, $d = -.13$, 95% CI [-.14, .15]. In the high time pressure condition, however, female accomplices ($M = .35$, $SE = .05$) reported "knowing" a significantly greater proportion of target items were in the room compared to female perpetrators ($M = .13$, $SE = .04$), $t(154) = 3.35$, $p = .003$, $d = .25$, 95% CI [.06, .37]. Female witnesses in the high time pressure condition ($M = .21$, $SE = .05$) were not statistically different from high-pressure female accomplices, $t(154) = 1.85$, $p = .20$, $d = .48$, 95% CI [-.31, .04] or perpetrators, $t(154) = 1.31$, $p = .58$, $d = .20$, 95% CI [-.07, .23]. There were no differences for *guess* judgments, $F\text{s} \leq 1.71$, $p\text{s} \geq .19$, $\eta_p^2\text{s} \leq .02$, as participants only "guessed" a small proportion of target items across conditions ($M = .12$, $SD = .11$).

For lures, there was a main effect of time pressure on *remember* judgments, $F(1, 154) = 4.86$, $p = .03$, $\eta_p^2 = .03$, such that participants in the high pressure conditions ($M = .12$, $SE = .02$) were more likely to incorrectly report remembering lures than participants in the low pressure conditions ($M = .08$, $SE = .01$), $M_{diff} = .05$, 95% CI [.01, .09]. There was also a significant role by gender interaction, $F(1, 154) = 4.31$, $p = .02$, $\eta_p^2 = .05$. For males, witnesses ($M = .18$, $SE = .03$) reported remembering significantly more lures than both accomplices ($M = .08$, $SE = .03$), $t(154) = 2.67$, $p = .03$, $d = -.62$, 95% CI [.01, .20], and perpetrators ($M = .08$, $SE = .02$), $t(154) = 3.16$, $p = .01$, $d = -.77$, 95% CI [.03, .19], but there were no significant differences between female perpetrators (*M* = .10, *SE* = .02), accomplices (*M* = .08, *SE* = .03), and witnesses (*M* = .07, *SE* = .03), *t*s ≤ 3.16, *p*s = 1, *d*s ≤ .19.

There was a three-way interaction between role, time pressure, and gender on *know* judgments for lures, *F*(2, 154) = 2.99, *p* = .05, η_p^2 = .04. For male participants, there was a significant role by time pressure interaction on the proportion of *know* responses to lures, *F*(2, 154) = 3.28, *p* = .04, η_p^2 = .04. Witnesses in the high time pressure condition (*M* = .18, *SE* = .05) reported knowing a higher proportion of lures were in the mock crime room than did witnesses in the low time pressure condition (*M* = .04, *SE* = .05), *t*(154) = 2.09, *p* = .04, *d* = 1.04, 95% CI [.01, .28]. There was no significant difference between accomplices in the low (*M* = .17, *SE* = .05) or high (*M* = .07, *SE* = .05) time pressure conditions, *t*(154) = 1.43, *p* = .16, *d* = -.59, 95% CI [-.04, .25], nor was there a significant difference between perpetrators in the low (*M* = .07, *SE* = .04) and high (*M* = .14, *SE* = .03) time pressure conditions, *t*(154) = 1.48*, p* = .14, *d* = .56, 95% CI [-.02, .17]. For female participants, there was no significant role by time pressure interaction, *F*(2, 154) = , *p* = , η_p^2 = .04. Overall, female participants made few “know” judgments to lures (*M* = .14, *SD* = .17). For *guess* judgments, there were no significant differences between conditions, *F*s ≤ 2.84, *p*s ≥ .09, η_p^2s ≤ .03. Overall participants guessed there were about .14 lures (*SD* = .14) in the mock crime room.

For analyses comparing the perpetrators and participants in the imagination condition, there were no significant differences in the proportion correct of overall old judgments (overall, *M* = .64, *SD* = .15), *F*s ≤ .24, *p*s ≥ .68, η_p^2s ≤ .01, *remember* judgments (overall, *M* = .34, *SD* = .17), *F*s ≤ 1.61, *p*s ≥ .21, η_p^2s ≤ .04, *know* judgments (overall, *M* = .18, *SD* = .15), *F*s ≤ 1.11, *p*s ≥ .30, η_p^2s ≤ .02, or *guess* judgments (overall, *M* = .12, *SD* = .11), *F*s ≤ 2.69, *p*s ≥.11, η_p^2s ≤ .04.

For lures, there was a significant main effect of gender on *remember* judgments, $F(2, 76) = 6.31$, $p = .01$, $\eta_p^2 = .08$. Males ($M = .17$, $SE = .03$) were more likely to report remembering lures than female participants ($M = .09$, $SE = .02$), $M_{diff} = .09$, 95% CI [.02, .16]. This effect was qualified by a significant role by gender interaction, $F(2, 76) = 3.86$, $p = .03$, $\eta_p^2 = .09$. For male participants, unmotivated imaginers ($M = .22$, $SE = .05$) were significantly more likely to report remembering lures than perpetrators ($M = .08$, $SE = .03$), $t(76) = 2.45$, $p = .05$, $d = 1.00$, 95% CI [.00, .29]. Motivated imaginers ($M = .22$, $SE = .05$) were likewise significantly more likely to report remembering lures than perpetrators, $t(76) = 2.45$, $p = .05$, $d = 1.01$, 95% CI [.00, .29]. There were no differences between female perpetrators ($M = .11$, $SE = .03$), motivated imaginers ($M = .09$, $SE = .04$), or unmotivated imaginers ($M = .06$, $SE = .05$), $t\text{s} \leq .99$, $p\text{s} \geq .98$, $d\text{s} \leq .40$. There were no differences in *know* (overall, $M = .18$, $SD = .18$) or *guess* (overall, $M = .14$, $SD = .14$) judgments for lures, $F\text{s} \leq 1.63$, $p\text{s} \geq .20$, $\eta_p^2\text{s} \leq .04$.

Participants' responses were also analyzed for discrimination accuracy, *Pr*, and response bias, *Br,* following the procedure from Study 1. I calculated separate *Pr* and *Br* scores for *remember*, *know*, and *guess* judgments. A 3 (role) x 2 (time pressure) x 2 (gender) univariate ANOVA on *remember* judgments revealed a main effect of role, $F(2, 154) = 3.55$, $p = .03$, $\eta_p^2 = .04$. Perpetrators ($M = .27$, $SE = .02$) were significantly more accurate at discriminating between targets and lures than witnesses ($M = .18$, $SE = .03$), $t(154) = 2.60$, $p = .03$, $d = .47$, 95% CI [.01, .16], but accomplices ($M = .24$, $SE = .03$) were not statistically different from perpetrators, $t(154) = 1.01$, $p = .68$, $d = .18$, 95% CI [-.05, .11], or witnesses, $t(154) = 1.36$, $p = .44$, $d = .32$, 95% CI [-.04, .14]. This effect was qualified by a significant role by gender interaction, $F(2, 154) = 4.54$, $p = .01$, $\eta_p^2 = .06$. For male participants, perpetrators ($M = .29$, $SE = .03$) were significantly more accurate than witnesses ($M = .12$, $SE = .04$), $t(154) = 3.58$, $p < .001$, $d = .90$, 95% CI [.05,

.28], and accomplices (*M* = .28, *SE* = .04) were significantly more accurate than witnesses (*M* = .12, *SE* = .04), *t*(154) = 2.98, *p* = .01, *d* = 1.18, 95% CI [.03, .29], but there were no differences in accuracy between female perpetrators (*M* = .25, *SE* = .03), accomplices (*M* = .19, *SE* = .04), and witnesses (*M* = .24, *SE* = .04), *t*s ≤ 1.29, *p*s ≥ .60, *d*s ≤ .34.

For discrimination accuracy of *know* judgments, there was a significant three-way interaction between role, time pressure, and gender, *F*(2, 154) = 4.34, *p* = .02, η_p^2 = .05. For male participants, there was a significant role by time pressure interaction, *F*(2, 154) = 2.98, *p* = .05, η_p^2 = .04. Witnesses in the low time pressure condition (*M* = .22, *SE* = .06) were significantly more accurate than witnesses in the high time pressure condition (*M* = .01, *SE* = .06), *t*(154) = 2.64, *p* = .01, *d* = 1.09, 95% CI [.05, .37]. Male accomplices did not show any differences between the low (*M* = -.04, *SE* = .06) and high (*M* = .02, *SE* = .06) time pressure conditions, *t*(154) = .71, *p* = .48, *d* = .32, 95% CI [-.11, .23]. Perpetrators also did not show any differences between the low (*M* = .06, *SE* = .04) and high (*M* = .04, *SE* = .04) time pressure conditions, *t*(154) = .44, *p* = .66, *d* = .16, 95% CI [-.09, .14]. For female participants, there was also a significant role by time pressure interaction, *F*(2, 154) = 3.51, *p* = .03, η_p^2 = .04. Unlike male participants, there were no differences between female witnesses in the low (*M* = -.03, *SE* = .06) and high (*M* = .05, *SE* = .06) time pressure conditions, *t*(154) = 1.05, *p* = .29, *d* = .44, 95% CI [-.24, .07]. There were no differences between female accomplices in the low (*M* = .08, *SE* = .06) and high (*M* = .14, *SE* = .06) time pressure conditions, *t*(154) = .81, *p* = .42, *d* = .29, 95% CI [-.22, .09]. Female perpetrators in the low time pressure condition (*M* = .09, *SE* = .04) were significantly more accurate than female perpetrators in the high time pressure condition (*M* = -.05, *SE* = .04), however, *t*(154) = 2.40, *p* = .02, *d* = .78, 95% CI [.02, .25]. There were no differences in *guess* judgments (overall, *M* = -.03, *SD* = .12), *F*s ≤ 2.06, *p*s ≥ .13, η_p^2s ≤ .03.

For comparisons between imaginers and perpetrators, there was a significant main effect of imagination on discrimination accuracy for *remember* judgments, $F(2, 76) = 4.32$, $p = .2$, $\eta_p^2 = .10$. Planned Helmert comparisons showed that perpetrators ($M = .25$, $SE = .03$) were significantly more accurate than imaginers, $t(76) = 2.94$, $p = .004$, $d = .52$, 95% CI [.04, .19], but there was no difference between motivated ($M = .14$, $SE = .04$) and unmotivated ($M = .14$, $SE = .04$) imaginers, $t(76) = 1.86$, $p = .96$, $d = .04$, 95% CI [-.10, .11]. There was also a significant main effect of gender, $F(1, 76) = 4.98$, $p = .03$, $\eta_p^2 = .06$, in that female participants ($M = .22$, $SE = .03$) were significantly more accurate than male participants ($M = .13$, $SE = .03$), $M_{diff} = .09$, 95% CI [.01, .17]. There were no differences in accuracy for *know* (overall, $M = -.01$, $SD = .20$) or *guess* (overall, $M = -.03$, $SD = .11$) judgments, Fs ≤ 1.69, ps $\geq .20$, η_p^2s $\leq .02$.

In terms of response bias, *Br,* there was a significant role by time pressure interaction on *remember* judgments, $F(2, 154) = 3.12$, $p = .05$, $\eta_p^2 = .04$. Whereas there were no differences between perpetrators ($M = .18$, $SE = .02$), accomplices ($M = .13$, $SE = .03$), and witnesses ($M = .15$, $SE = .03$) in the low time pressure conditions, ts ≤ 1.38, ps $\geq .51$, ds $\leq .74$, witnesses ($M = .24$, $SE = .03$) were significantly more liberal in their response criterion than perpetrators ($M = .16$, $SE = .02$), $t(154) = 2.46$, $p = .05$, $d = -1.17$, 95% CI [.001, .17]. Accomplices ($M = .17$, $SE = .03$) were not statistically different from either witnesses, $t(154) = 1.86$, $p = .19$, $d = -.42$, 95% CI [-.02, .17], or perpetrators, $t(154) = .25$, $p = 1$, $d = -.07$, 95% CI [-.08, .09]. There were no significant differences between groups for response bias in *know* judgments (overall, $M = .16$, $SD = .13$), Fs ≤ 3.59, ps $\geq .06$, η_p^2s $\leq .02$. There were no significant differences in response criterion for *guess* responses (overall, $M = .16$, $SD = .11$), Fs ≤ 2.74, ps $\geq .10$, η_p^2s $\leq .02$.

For perpetrators versus imaginers, there was a significant main effect of gender on response bias in *remember* judgments, $F(1, 76) = 4.90$, $p = .03$, $\eta_p^2 = .06$. Male participants (M

= .23, *SE* = .03) had a significantly more liberal response criterion than female participants (*M* = .15, *SE* = .02), M_{diff} = .07, 95% CI [.01, .14]. This effect was qualified by a significant imagination by gender interaction, *F*(2, 76) = 4.11, *p* = .02, η_p^2 = .10. Whereas there was no difference in response criterion between male (*M* = .14, *SE* = .03) and female (*M* = .18, *SE* = .03) perpetrators, *t*(76) = 1.00, *p* = .32, *d* = .35, 95% CI [-.13, .04], male unmotivated imaginers (*M* = .28, *SE* = .05) were significantly more liberal in their response criterion than female unmotivated imaginers (*M* = .12, *SE* = .04), *t*(76) = 2.49, *p* = .02, *d* = 1.01, 95% CI [.03, .29]. Male motivated imaginers (*M* = .26, *SE* = .05) were not significantly more liberal in their response criterion than female motivated imaginers (*M* = .15, *SE* = .04), *t*(76) = 1.70, *p* = .09, *d* = .68, 95% CI [-.02, .23]. There were no significant differences in response criterion for *know* (overall *M* = .19, *SD* = .12) or *guess* (overall *M* = .17, *SD* = .11) judgments, *F*s ≤ 1.64, *p*s ≥ .20, η_p^2s ≤ .04.

Recognition Test

Participants also completed a two-alternative forced choice recognition test, which required dichotomous judgments about which item in a pair of items correctly displayed a test item or placement. Participants made 15 forced-choice judgments about pairs of items (Left/Right). As in the two previous studies, participants also rated their confidence in their selection decision. Across all conditions, participants correctly selected a mean proportion of .58 items (*SD* = .12). Raw proportion correct scores were subjected to a 3 (role) x 2 (time pressure) x 2 (gender) ANOVA, but there were no significant differences, *Fs* ≤ 2.21, *p*s ≥ .14, η_p^2s ≤ .02. Overall (*M* = .59, *SD* = .12), participants performed significantly above chance, *t*(165) = 9.91, *p* < .001, 95% CI [.07, .11]. Likewise, there were no significant differences in raw proportion correct scores (*M* = .57, *SD* = .12) between perpetrators and imaginers, *F*s ≤ 2.87, *p*s ≥ .06, η_p^2s ≤ .07, who again significantly performed above chance, *t*(81) = 5.03, *p* < .001, 95% CI [.04, .09].

Responses were also analyzed for accuracy, *d'*, using the same formulas and method for calculating hits and false alarm rates as described in Study 1. As there were more items in this study, hit rates and false alarms of 0 and 1 were adjusted by .03 in this study, rather than the .05 used in the previous studies. A 3 (role) x 2 (time pressure) x 2 (gender) ANOVA produced no significant effects, Fs ≤ 3.33, ps ≥ .07, η_p^2s ≤ .02. Average accuracy was .43 (*SD* = .51). For the comparison between perpetrators and imaginers, a 3 (imagination) x 2 (gender) ANOVA also revealed no significant differences in accuracy, Fs ≤ 2.11, ps ≥ .13, η_p^2s ≤ .05.

Confidence ratings were subjected to a 3 (role) x 2 (time pressure) x 2 (gender) univariate ANOVA. There was a significant main effect of gender, $F(1, 154) = 5.16$, $p = .03$, $\eta_p^2 = .03$. Male participants ($M = 5.85$, $SE = .16$) were significantly more confident in their recognition test selections than female participants ($M = 5.36$, $SE = 5.36$, $SE = .15$), $M_{diff} = .49$, 95% CI [.06, .91]. There was also a significant role by time pressure interaction, $F(2, 154) = 4.36$, $p = .01$, $\eta_p^2 =$ .05. Whereas perpetrators ($M = 6.30$, $SE = .21$) were significantly more confident than witnesses ($M = 5.33$, $SE = .28$; $p = .02$), $t(154) = 2.81$, $p = .02$, $d = .66$, 95% CI [.14, 1.82], and accomplices ($M = 5.45$, $SE = .28$; $p = .045$), $t(154) = 2.46$, $p = .05$, $d = .65$, 95% CI [.02, 1.70], in the low-pressure condition, there were no differences between perpetrators ($M = 5.34$, $SE = .21$), accomplices, $M = 5.47$, $SE = .30$), and witnesses ($M = 5.33$, $SE = .28$) in the high-pressure condition, ts ≤ 2.81, ps ≥ .85, ds ≤ .41, as the perpetrators became less confident under conditions of high time pressure.

For the comparison of perpetrators and imaginers, there was a significant main effect of gender, $F(1, 76) = 5.35$, $p = .02$, $\eta_p^2 = .07$, as the male participants ($M = 5.89$, $SE = .22$) were significantly more confident in their recognition test selections than female participants ($M =$ 5.30, $SE = .20$), $M_{diff} = .64$, 95% CI [.09, 1.19].

CHAPTER 14: STUDY THREE DISCUSSION

Once again, participants rated the mock crime task similarly, though they perceived the task as generally difficult in this study (with the exception of the imaginers) unlike the previous two studies. Manipulation checks did not show an effect of time pressure. There were no differences in participants' ratings of stress caused by the time limit or state anxiety scores on the basis of the time pressure manipulation. There were effects of role on the manipulation checks, though, suggesting that action was sufficient for impacting perceptions of pressure. As there were still differences due to time pressure, however, these results may have been a limitation of the self-report nature of the manipulation checks rather than an actual failed manipulation. Price et al. (2009) collected both STAI scores and physiological measures to test their arousal manipulation and found no differences in participants' self-reported state anxiety as measured by the STAI but did find differences on their physiological measures. Thus, the STAI and Likert-type scale questions may not have been sensitive enough to show the effect of time pressure on arousal. Observation of the sessions did suggest that active participants in the high time pressure condition tended to complete the task more frenetically and leave the room in a greater mess than the low time pressure participants, which may provide some anecdotal support that the time pressure manipulation was successful. An alternative explanation concerns the fact that time pressure was confounded with time allotment. Participants in the high pressure condition were also given less time to actually complete the mock crime. The differences obtained as a function of this manipulation may therefore be due to the differences in exposure time during the mock crime room rather than to time pressure. It is consequently impossible to draw conclusions based on the time pressure manipulation.

The manipulation checks did partially support the effectiveness of the role manipulation. Perpetrators reported greater motivation to be successful, higher stress caused by the threat of the alarm, and higher state anxiety. However, there were inconsistent differences between accomplices and witnesses. There were no differences between accomplices and witnesses on level of motivation for the theft to be successful or level of stress caused by the alarm, but motivated observers did report higher state anxiety than did unmotivated observers. Both motivated and unmotivated observers were above the mid-point on the scale for importance of success, suggesting that even unmotivated participants were invested in the outcome of the theft. This may be because all observers, whether motivated or unmotivated, were exposed to the alarm manipulation as all perpetrators were motivated and had to be given the manipulation. The motivation component within the role condition in this study therefore ultimately became the degree to which a difference in positive consequences of the theft (namely, being able to split the proceeds of the unidentified potentially valuable object) led to differences in memory rather than the double-prong manipulation used in previous studies. As this single-prong manipulation is weaker than the previous manipulation, it may not have been strong enough to produce the desired differences.

Within the imagination condition, there were no differences between unmotivated and motivated imaginers on the manipulation check variables. The motivation manipulation was embedded within the scenario that participants had to imagine – namely that they needed to find the item to gain the reward and avoid the alarm when motivated, or they could not keep the item if unmotivated – so it may not have been strong enough to actually produce motivation differences in the imaginers as their own actual performance was not motivated in any way. Most imagination participants (73.2%) reported imagining that they completed the theft successfully, so they may have envisaged scenarios that were much simpler than faced by the actual participants (where none were actually successful), thus negating the influence of motivation.

Hypothesis 1 predicted that there would be a main effect of role, as perpetrators and accomplices should remember more details about the crime event than unmotivated witnesses. This hypothesis was partially supported. Perpetrators showed superior memory for their overall recall percentage on the free recall task compared to witnesses, but accomplices remembered a statistically similar number of room items to both perpetrators and witnesses. Perpetrators also reported more correct quantity details than both accomplices and witnesses, but accomplices again failed to show superior memory to witnesses. Perpetrators displayed greater discrImination accuracy when making *remember* judgments on the RKG test compared to witnesses, but accomplices were again statistically similar to both perpetrators and witnesses. There were no differences on the recognition test.

Generally, few differences were seen between the accomplices and witnesses, which may be reflective of the failure of the motivation manipulation. Another possible explanation may be that the chaotic nature of the task drew observers' attention regardless of motivation. Whereas perpetrators did generally outperform witnesses, they tended to be statistically similar to accomplices, suggesting that accomplices did somewhat outperform witnesses even though the differences were not significant in this study.

Hypothesis 2 predicted that accomplices should show better recall in the high-pressure condition compared to the low time pressure condition, whereas perpetrators should show better recall in the low-pressure condition compared to the high time pressure condition and unmotivated witnesses would show no differences on the basis of time pressure, representing an interaction between role and time pressure. Although there were some interactions between role and time pressure, they did not generally go in directions predicted by the time pressure manipulation. Because of the confounded nature of the manipulation, however, this hypothesis can not be assessed as supported or unsupported. Additional exposure time in the low time pressure condition may have been just as likely to cause the pattern of results found. Main effects for the time manipulation were the more stable findings, and follow what would be predicted by exposure time. In the low time pressure condition (with longer exposure), participants recalled a higher percentage of the room items on the free recall task and claimed to remember fewer lures on the RKG test than participants in the high time pressure condition.

Hypothesis 3 predicted that perpetrators would still show better memory for items during the mock theft than imagination participants. This hypothesis was partially supported. Perpetrators free recalled a greater percentage of room items than imaginers, but they were not more accurate in their characterization of remembered objects. Perpetrators also did not recall more details about the recalled objects than did imaginers. Perpetrators did show greater discrimination accuracy when making *remember* judgments on the RKG test, but there were no differences on *know* or *guess* judgments. Perpetrators also failed to show greater discrimination accuracy than imaginers on the recognition test.

Hypothesis 4 predicted that motivated imaginers would remember more details than unmotivated imaginers. This hypothesis was unsupported, perhaps because the motivation manipulation was ineffective. Unmotivated and motivated imaginers did not statistically differ on any of the measures in the study.

Gender effects again tended to be inconsistent. Female witnesses exhibited greater accuracy on the free recall task than male witnesses in the high time pressure condition, but there was no gender difference in the low time-pressure condition. In contrast, female accomplices were more accurate on the free recall task than male accomplices in the low time- pressure condition but not in the high time-pressure condition. There were no gender differences among perpetrators for free recall accuracy. Whereas male accomplices made more commission errors on the free recall task than female accomplices in the low-pressure condition, there was no difference between male and female accomplices in the high time-pressure condition. There were also no gender differences between perpetrators or accomplices. Male perpetrators and accomplices showed greater discrimination accuracy for *remember* judgments on the RKG test than witnesses, but there were no differences between female perpetrators, accomplices, and witnesses. There were opposite role by time pressure interactions on *know* judgments discrimination accuracy for each gender, with male witnesses, but not perpetrators or accomplices, showing differences between pressure conditions while female perpetrators, but not witnesses or accomplices, showed differences due to time pressure. Finally, there were no gender differences in discrimination accuracy on the recognition test, but male participants were more confident in their selections than female participants. The failure to find consistent gender differences across studies 1 and 3 may be due to the nature of the task. Previous research on gender difference in memory for crime found no reliable difference between genders for action details, though females showed superior memory for person details (Lindholm & Christianson, 1998). As the current studies were focused upon action, it appears the unreliable effect of gender was replicated.

Despite there being more items in the room in Study 3, participants did not seem to remember more items overall than participants in studies 1 and 2. Although total recall on the free-recall task was higher in Study 3 (14.69 items versus 12.08 and 13.14 in studies 1 and 2, respectively), participants in Study 3 actually recalled a smaller percentage of room items overall (21.29% versus 27.50% and 28.69% in studies 1 and 2, respectively). Participants in Study 3 also correctly chose a smaller proportion of correct items on the RKG and recognition tests than in the two previous studies. The relatively less accurate performance on the RKG and recognition tests in Study 3 could be due to a number of factors. First, there were more items on the RKG and recognition tests in Study 3, which could reflect regression towards the mean. Given the very similar results on the tests between studies 1 and 2, however, it seems more likely that the unstructured nature of the task in Study 3 influenced participants' ability to remember the items. It is possible that the lack of structure made the items in the room less memorable overall, which has implications for the assessment and use of perpetrator memory in actual crime scenarios.

CHAPTER 15: GENERAL DISCUSSION

Three studies investigated the impact of action, motivation, and arousal on perpetrator and eyewitness memory to crime-like events. Study 1 explored how 'typical' perpetrators compare to bystander eyewitnesses by varying whether participants completed a mock theft under motivated conditions or merely observed its execution, unmotivated. Study 1 also explored how well perpetrator and eyewitness memory held up over time, by manipulating whether participants returned after a one day or one week delay. Study 2 parceled out the impact of action and motivation to assess their individual effects on perpetrator and eyewitness memory. It also explored the impact of having an observer present in the room, as observer presence could be an additional stressor or motivator. Study 3 attempted to replicate the effects from Studies 1 and 2 under conditions of greater mundane realism and tested whether the effects on memory are influenced by time pressure. Study 3 also explored the impact of imagination on memory for the mock crime and crime room as a proxy for understanding possible mechanisms underlying false confessions.

Overall, the results of the three studies support the hypothesis that action importantly distinguishes between perpetrators and witnesses. Actors in general displayed more accurate and complete memories for the mock crime in the free recall task than did observers. In studies 1 and 2, actors recalled more central items on the free recall task than did observers, which provides support for the basic enactment effect in the memory for actions literature (Bäckman and Nilsson, 1985; Hornstein & Mulligan, 2004). Given the highly structured procedure for studies 1 and 2, the action may not have been complex enough to impair formation of episodic memory, as has been found in the memory for actions research higher in mundane realism (Koriat et al., 1991; Hornstein & Mulligan, 2001).

There were fewer differences across the three studies in the RK/RKG and recognition tests than the free recall task. This pattern of findings suggests that perpetrators and witnesses may actually encode a crime scene in a similar manner overall but only differ in how easily the information is retrieved. Recent neuropsychological research suggests that different encoding processes underlie which information is later retrieved via recognition- or recall-based processes (Sadeh, Maril, & Goshen-Gottstein, 2012). It is therefore possible that perpetrators and witnesses encode certain elements of a crime in a similar recognition – or familiarity-based – process, but perpetrators encode information with greater specificity overall, leading to stronger recall-based memory. If this is the case, it may explain why the polygraph has shown poor field reliability and trouble distinguishing between guilty individuals and informed innocents (Bradley, Malik, & Cullen, 2011), as polygraphs rely upon recognition of guilty information.

Motivation also had an impact on participants' memories for the mock crime task. In Study 1, motivated perpetrators tended to outperform unmotivated witnesses, an effect that was replicated in Study 3. In Study 2, however, motivation did not show the expected interaction with action. As noted in the Study 2 discussion, it appears that the studies may have also tappend an intrinsic, ego-protective motivation for actors, which made unmotivated and motivated actors perform similarly. The results of Study 3, however, show that motivation did have at least some impact on witnesses, as accomplices typically performed similarly to perpetrators. These results generally support the predictions from attribution theory and motivated reasoning theory. Motivation can direct attention towards elements directly relevant to one's goals (e.g., Balcetis & Dunning, 2006; Balcetis & Dunning, 2010). Accomplices were invested in the outcome of the crime, so their attention became more focused on the perpetrator and mock crime, thereby improving central recall over the performance of unmotivated witnesses. Motivated perpetrators were unable to outperform accomplices. This result may be because the double-pronged motivation to obtain a reward and avoid a consequence led to divided attention: perpetrators were trying to find the potentially valuable object, but were also stressed by the time limit and trying to avoid the alarm. Perpetrators may also have searched the room more than unmotivated actors, thereby reducing recall because attention was divided amongst more objects. As divided attention can impair memory (Lane, 2006), the double-prong motivation may have served to somewhat compromise perpetrator recall for the crime. Given the likelihood that perpetrators typically have multiple competing goals during the commission of a crime, this result suggests that perpetrator memory may again often fail to reach the thresholds expected in the real world.

As noted earlier, individuals with guilty knowledge (such as eyewitnesses or informed innocents) may fail to differ from perpetrators because imagination improves memory for the guilty knowledge. The current study, however, failed to find that imagining a crime with guilty knowledge of the task room improved the level of memory so much that informed innocents performed like perpetrators. Although imagination increases fluency of a non-experienced event and can promote the creation of "memory" details pertaining to the event (Goff & Roediger, 1998; Sharman et al., 2004), social influences must also be considered. Specifically, demand characteristics, credibility, consensus, and overcoming resistance are key elements in many imagination inflation and implantation studies (Leding, 2012). Experimenters often present information that an event happened during a participant's past that is supported by a trustworthy secondary source, and experimenters often encourage participants to report many details about the event. As the experimenter is an authority figure, there is built-in pressure for participants to conform their reports with the information provided by that experimenter. Finally, many imagination implantation studies have multiple rounds where the event is imagined, designed to erode resistance to the false memory.

These key elements of imagination may explain why the current study failed to show an impact of imagination as participants were not pressured to change their memory in any way, nor was the event presented to them as one they had experienced. On the other hand, the described elements are often present in police interrogations (Inbau et al., 2013). Police officers are specifically instructed to overcome suspects' denials and resistance, and they also come up with a theory for why the crime happened that they try to make the suspect accept. As authority figures, police interrogators can have a significant influence on suspects in the interrogation room, and they often employ social influence tactics to persuade suspects to provide as much detail about a crime as possible (Inbau et al., 2013; for reviews and critiques, see Kassin et al., 2010; Kassin & Gudjonsson, 2004). As the imagination implantation effect requires a lower threshold for calling a memory true (Nash, Wade, & Lindsay, 2009), certain influence tactics employed by police, such as the presentation of false evidence, may be necessary to produce the effect in a crime context. Future research is therefore needed to explore the impact of interrogation on memories for crime, as the impact of imagination may occur under much more pressured circumstances than the current study.

Practical Implications

Important investigative tools, such as interrogation, the polygraph, and SVA have been built around the assumption that perpetrator memory can be used to determine the actual culprits of a crime and the events that transpired. The Reid technique looks for non-public details about a crime that "only a perpetrator could have known" in interrogations with suspects both to pressure them into admission and to substantiate the narrative confessions that follow (Inbau et al., 2013). Proven false confessions, which had been accepted as true by the police, prosecutors, judges, and juries, have been found to be highly detailed and accurate (Appleby et al., 2013; Garrett, 2010), sometimes despite the suspects' lack of guilty knowledge before the interrogation.

Incorrect information and omissions in a suspect's account for a crime can be due to many factors: lying, true forgetting, or a lack of guilty knowledge. Researchers studying errors in perpetrator statements, however, sometimes characterize them as deliberate attempts to mislead investigators (Wechsler et al., 2010). A tendency to view errors in a perpetrator statement as lies can be very problematic for the effective investigation of a crime. For example, research shows that confirmation bias can influence the types of questions and amount of pressure used in an interrogation (Kassin, Goldstein, & Savitsky, 2003). Should investigators become convinced that an error or inconsistency in a suspect's report constitutes evidence of lying rather than a lack of guilty knowledge or a simple failure in memory, could set in motion a biased interrogation that ultimately leads to a false confession. Because detailed false confessions tend to be convincing (Appleby et al., 2013; Garrett, 2010), that confession may lead to a wrongful conviction.

Details are also considered evidence of truthful statements in SVA (Vrij, 2005; Vrij & Mann, 2006), and polygraph tests are developed to test memory for specific crime details (Nahari & Ben-Shakhar, 2011). Some experts have even advocated for using an examination of a confessor's post-admission narrative, specifically seeking to locate the accuracy and source of the crime details contained within the statement, as a means of assessing whether the confession is true or false (DeClue, 2005; Ofshe & Leo, 1997). Despite the numerous assumptions that are made about perpetrator memory, however, there has existed little in the way of empirical research on the baseline quantity, content, and quality of perpetrator memory.

The present studies attempted to provide a preliminary look at how well perpetrators remember their crimes and explore how they compared to eyewitnesses. Generally, the results suggest that although perpetrator memories may be superior to witnesses under some conditions, certain variables may hinder their accuracy. Perpetrators are not mere eyewitnesses to crime, so the extensive research on eyewitness memory may not be fully applicable or predictive of perpetrator memory success or failure.

Given the research results that perpetrator memory can also be vulnerable to factors that compromise accuracy, and is sometimes no better than witness memory, there are important implications for the use of perpetrator memory within the criminal justice system. Specifically, procedures may need to be developed to guide interrogation practices in a manner that best enhances and protects perpetrator memory for crime. Moreover, some details-based approaches to crime detection, such as the polygraph, may need to be replaced with other investigative tools. Before specific recommendations to abandon certain investigative techniques can be made, however, it is important that more research be conducted on the specific types of details that can be remembered most accurately by perpetrators.

An important note of caution is that this line of research does not incorporate motivational influences after encoding. Perpetrators may be motivated *not* to retain or retrieve memories of their crimes (Bradley et al., 2011), which suggests that perpetrator memory may show even greater impairment in actual cases than is indicated in the current research. Indeed, research on lying during interrogation shows that suppressing memory for one’s criminal actions can impair later retrieval (e.g., Christianson & Bylin, 1999; van Oorsouw & Giesbrecht, 2008;

van Oorsouw & Merkelbach, 2004; van Oorsouw & Merkelbach, 2006), which also suggests that the criminal justice system may need to adjust to a more cautious acceptance of perpetrator memory.

Directions for Future Research

The current research asked participants to recall their actions by listing which items they had interacted with rather than a narrative about what they did. Previous research has suggested that false confessions tend to be quite detailed (Garrett, 2010), but the overall amount of detail provided in the free recalls for the three current studies was low. This discrepancy gives rise to the question of whether perpetrator accounts can be expected to be similarly detailed to the body of false confessions that has been studied. It is necessary to develop a better understanding of what types of details perpetrators can remember most accurately to improve the details-based investigative approaches currently employed (e.g., polygraph, etc.). It is possible that a different design, such as a cognitive interview-based approach to questioning (Fisher & Geiselman, 1992; Fisher, Milne, & Bull, 2011; Price et al., 2009), may yield greater amount of detail than the current methodological approach. Future research could employ different methodologies, such as the cognitive interview or neuropsychological measures, to explore the details question more fully.

It is also important to note that the present research only investigated memory for items in the room. Memory for other aspects of a crime or other event – such as number of steps taken, the amount of time spent, audible sounds, information about the perpetrator, etc. – was not measured and analyzed due to the highly structured nature of the mock crime in studies 1 and 2. Sounds heard and time elapsed are often forensically relevant details, so an understanding of how perpetrators may remember them could be important for investigations. Not collecting information about the perpetrators may also have led to an underestimation of witness memory as the perpetrators were likely a focus of attention. It is possible that memory for these other aspects of a mock crime event may be different than memory for the specific items in the room, so future research should also attempt to assess other forms of memory for crime events.

Although a direct statistical comparison is not possible given the differences in the tasks, it is worth noting that scores on the memory measures, specifically the RKG and recognition tests, tended to be lower in Study 3 than in Studies 1 and 2. There are many possible reasons for this difference. It is possible that performance was lower because the task was more complex, which impaired encoding (Hornstein & Mulligan, 2001). Another possible explanation is that the lack of structure in Study 3 led participants to have such a broad focus of attention that few items became task-relevant, thereby reducing the memorability of the items. Uncertainty about the location of the target items (e.g., the gift box holding the potentially valuable object to be stolen and the keys) may also have served to divide attention, as participants reported being drawn in different directions for their search, alternating between searching areas they believed were plausible for the gift box or the key. Future research should attempt to elucidate the possible impact of crime complexity to address these possible explanations.

The impact of crime planning should also be explored. If perpetrators plan their crimes beforehand, there should be little uncertainty when carrying out the pre-scripted task. Likewise, perpetrators who have committed the same type of crime many times in the past may have a schematic memory of how their crimes typically proceed whereas witnesses may be seeing a crime for the first time. Planned and often repeated crimes should therefore be remembered fairly accurately unless something unexpected occurs. At that point, perpetrators may become very stressed or uncertain about their future actions, which could impact memory accuracy by impairing encoding. On the other hand, perpetrators may remember a schematic version of the crime and report what they planned rather than what occurred.

More investigation is also needed to explore the impact of stress and arousal. The current research, which used an unplanned, nonreactive, nonviolent crime, was only designed to create a moderate level of stress. Although conclusions based on the manipulation were not possible, it also does not approximate the level of stress that may be expected when committing a highly violent crime or one that is reactive to perceived threat (such as justifiable homicide). The existing body of research suggests that perpetrators actually relate more information about their violent crimes than nonviolent crimes (Woodworth et al., 2009); however, that research is based upon self-report of adjudicated offenders that have had to recall their crimes multiple times. Future research is needed to explore the actual effect of stress, separate the effects of crime complexity and stress, and explore the accuracy of memory for crimes committed under different conditions.

The present research only investigated differences between perpetrators and eyewitnesses that would occur because of attentional differences at encoding. Future research should expand the comparison to looking at system variables that may also impact perpetrator memory. For example, just as the eyewitness literature has shown questioning and interaction with others can influence the content and accuracy of eyewitness memory in the latter phases of information processing (Lindsay et al., 2007; Toglia et al., 2007), it is possible that interrogation could similarly affect the form and content of perpetrator memories. Research has shown that even memory for actions are susceptible to misinformation effects (Kassin & Kiechel, 1996; Nash & Wade, 2009; Wright & Schwartz, 2010), so the social influence tactics used during interrogation may therefore negatively influence memory accuracy (Leding, 2012). On the other hand, research has shown that items encoded under stressful conditions are best recalled under stressed conditions as well (Echterhoff & Wolf, 2012), so the stress caused by interrogation may aid retrieval of crimes committed by perpetrators under stressful conditions. The imagination inflation research previously discussed also suggests that interrogation may influence innocent individuals to the point that they look like guilty perpetrators, so it is important to explore the impact of interrogation on both true and false memories for crime.

Conclusion

As would be predicted by the memory literature in general, perpetrator memory is subject to shortcomings and weaknesses that are not currently recognized in many criminal justice approaches to investigating crime. Perpetrators are not simply eyewitnesses, as action has a significant impact on how elements of a crime are remembered and action interacts with other variables to produce differences in perpetrators that are different than those seen in witnesses. Because of perpetrators and eyewitnesses are different, it is essential to conduct further research to gain a greater understanding of the factors that influence perpetrator memory both during and after the commission of a crime. Only by understanding the type of errors to be expected on the part of perpetrators and perpetrators' overall memory reliability can the criminal justice system begin to make adjustments to better understand and use memory accounts to investigate and prosecute crimes.

Table 1. Study 1: Item frequency and details contained within participants' free recall statements.

Detail Category	*M*	*SD*	Krippendorf's α	Interrater %* Agreement
Task Items (10 items)	6.17	1.97	1	
Location	1.19	1.74	.87	
Color	2.09	2.39	.88	
Other	3.10	3.92	.74	
Incorrect	2.15	2.08	.84	
Subjective	0.99	1.40	.90	
Task Transference Intrusions	0.26	0.58	.86	
Location	0.04	0.19		100%
Color	0.02	0.16	1	
Other	0.01	0.11		100%
Incorrect	0.04	0.25	.94	
Subjective	0.01	0.11		100%
Task Other Intrusions	0.27	0.53	.99	
Total	0.27	0.67	.90	
Subjective	0.04	0.19	1	
Peripheral Items	5.36	2.43	.84	
Location	1.35	1.64	1	
Color	1.40	1.57	.86	
Quantity	0.61	0.68	.86	
Other	1.38	1.97	.80	
Incorrect	2.33	1.89	.65	
Subjective	0.64	1.11	.92	
Non-task Trans. Intrusions	0.23	0.51	.98	
Location	0.01	0.11		100%
Color	0.02	0.16		100%
Other	0.05	0.27		100%
Incorrect	0.08	0.29	.94	
Subjective	0.02	0.16	1	
Non-task Other Intrusions	1.18	1.27	.85	
Total	0.96	1.71	.78	
Subjective	0.19	0.55	.84	

* Percentage agreement was used for interrater reliability analyses for variables that exhibited no variation in the subsample coded as other reliability indices are invalid

Table 2. Study 2: Mean item frequency and details contained within participants' free recall statements.

Detail Category	*M*	*SD*	Krippendorf's α	Interrater %* Agreement
Task Items (10 items)	6.93	1.84	.99	
Location	1.66	2.19	.93	
Color	3.15	2.75	.92	
Other	3.18	3.48	.76	
Incorrect	1.44	1.60	.81	
Subjective	0.67	1.34	.80	
Task Transference Intrusions	0.24	0.61	1	
Location	0.08	0.30		100%
Color	0.09	0.31	1	
Other	0.05	0.29	.94	
Incorrect	0.06	0.23	1	
Subjective	0.01	0.09		100%
Task Other Intrusions	0.17	0.38	.99	
Total	0.12	0.49	1	
Subjective	0.02	0.12	1	
Peripheral Items	5.51	2.68	.97	
Location	1.44	1.95	.85	
Color	1.90	1.84	.83	
Quantity	0.66	1.01	.92	
Other	1.29	1.70	.60	
Incorrect	1.15	1.34	.57	
Subjective	0.41	0.73	.55	
Non-task Trans. Intrusions	0.38	0.72	1	
Location	0.06	0.23	1	
Color	0.12	0.39	1	
Incorrect	0.06	0.26		100%
Subjective	0.01	0.09		100%
Non-task Other Intrusions	0.80	1.01	.87	
Total	0.63	1.27	.80	
Subjective	0.06	0.27	.79	

* Percentage agreement was used for interrater reliability analyses for variables that exhibited no variation in the subsample coded.

Table 3. Study 3: Mean item frequency and details contained within participants' free recall statements.

Detail Category	*M*	*SD*	Krippendorf's α
Room Items	14.69	4.83	.95
Location	3.86	3.02	.87
Color	4.89	4.50	.86
Quantity	1.73	1.57	.83
Other	4.37	3.27	.81
Incorrect	4.23	3.37	.81
Subjective	1.37	1.53	.88
Room Intrusions	1.26	1.19	.84
Total	1.25	1.75	.82
Subjective	0.10	0.31	.88

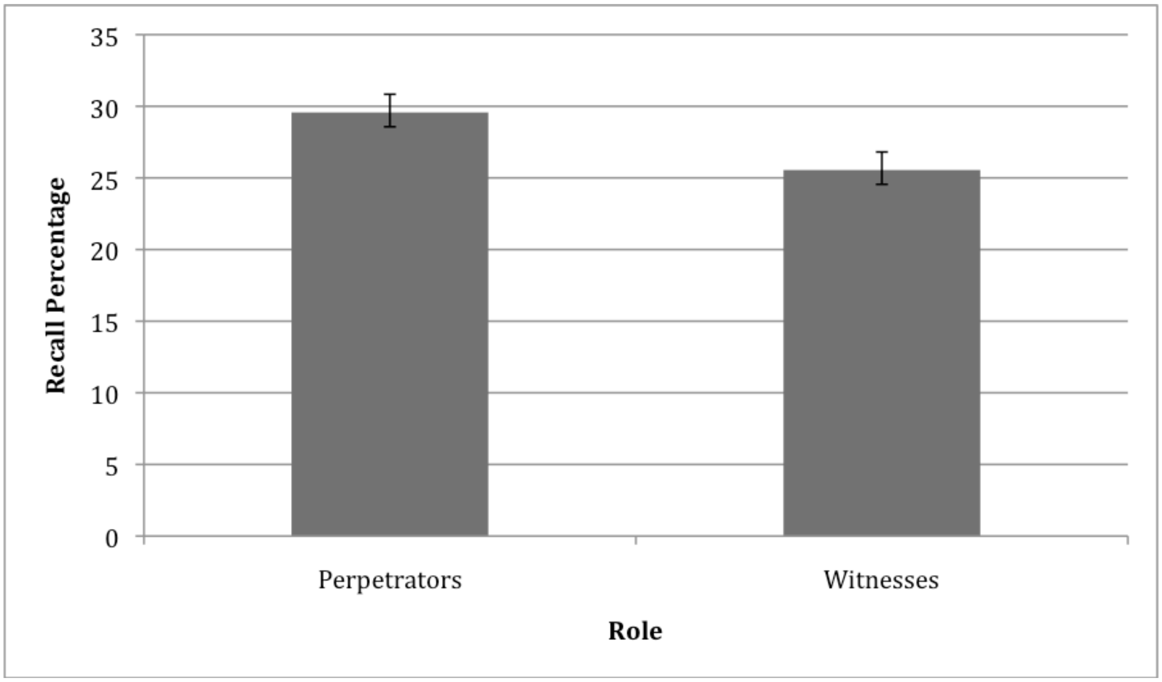

Figure 1. Mean differences in total free recall percentage between perpetrators and witnesses in Study 1. Standard errors are represented in the figure by the errors bars attached to each column.

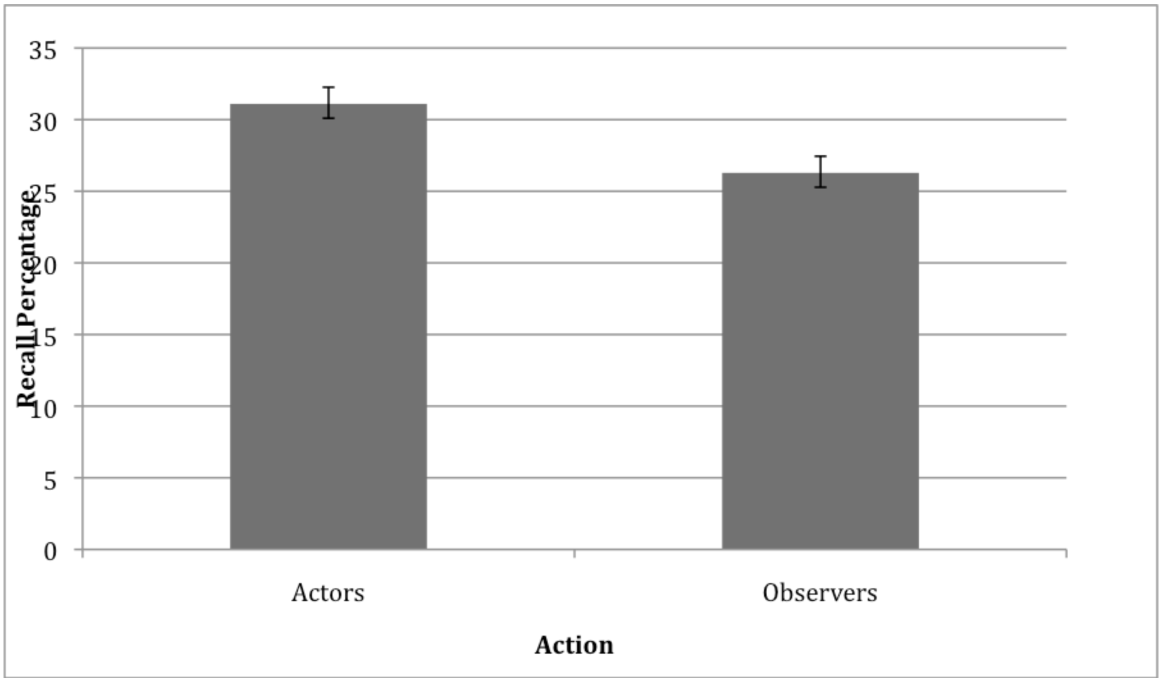

Figure 2. Mean differences in total free recall percentage between actors and observers in Study 2. Standard errors are represented in the figure by the errors bars attached to each column.

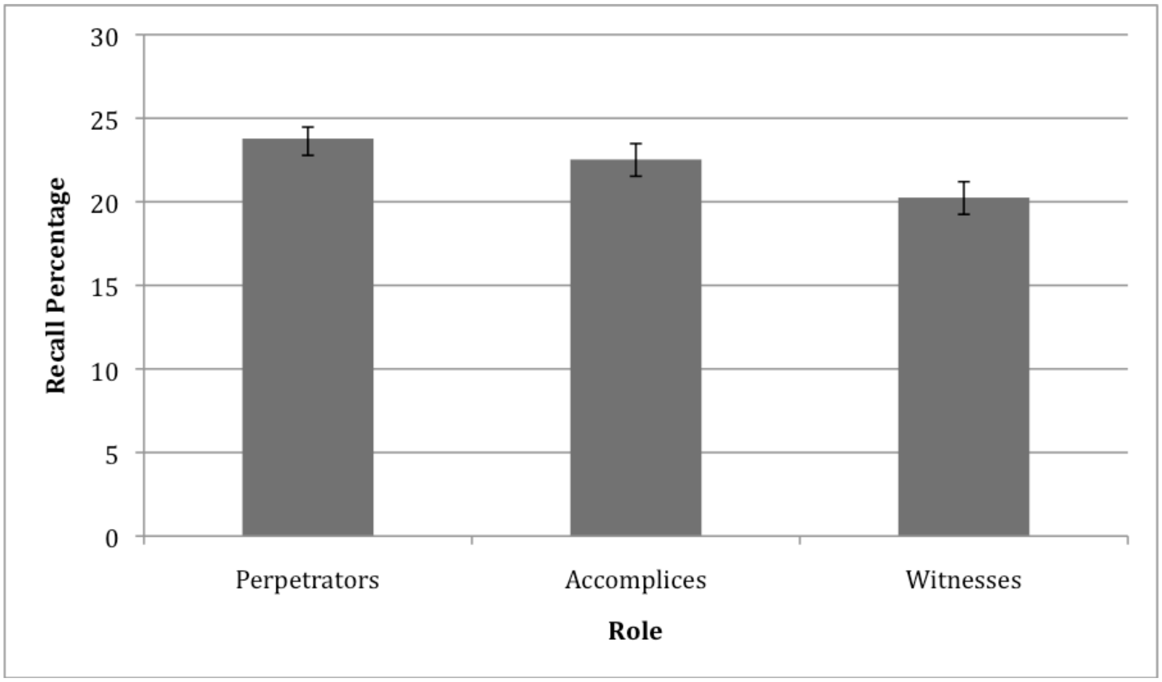

Figure 3. Mean differences in total free recall percentage between perpetrators, accomplices, and witnesses in Study 3. Standard errors are represented in the figure by the errors bars attached to each column.

Appendix A

Informed Consent

You are invited to participate in a two-part study investigating perceptions about crime.

If you agree to be in this study, you will be asked to locate an item in a room or watch it being located. For the second part, you will then be asked to complete a brief questionnaire and possibly a short interview about the experience. In order to ensure the validity of psychological experiments, we cannot disclose everything about the study at this time, but afterward you will be fully debriefed. The total time required to complete the experiment should be about **45** minutes: **15** minutes for the first day and 30 minutes for the second day. We expect to enroll approximately 180 participants in this study.

Participation in this study will provide you with an opportunity to learn more about the commission of crime and psychology. You will receive $5 for your participation on the first day. If you return for your second experimental session, you receive an additional $15 in compensation. There is minimal risk to participating in this study.

Any information obtained in connection with this study will be strictly confidential. In any written reports or publications, no one participant will be identified or identifiable and only aggregate data will be presented. Research records will be kept in a locked file; only the researchers will have access to these records. Informed consents will be kept separate from any data collected to ensure anonymity.

Your participation in this study is completely voluntary. You have a right to refuse to participate without consequences. If you decide not to participate your decision will not affect your relationship with John Jay College or any of the researchers involved. If you decide to participate you may discontinue participation at any time. You may refuse to answer any specific questions or refuse to engage in any task at any time during the study. Withdrawal or refusing to answer specific questions or engage in specific tasks will not result in any consequences to you and will not affect your relationship with John Jay College or any of the researchers involved.

The researcher conducting this study is Jennifer Perillo. You may ask any questions you have now. If you have questions later, you may contact the project director, Dr. Saul Kassin, at (646) 557-4505. If you have any questions regarding your rights as a research participant, please feel free to contact the John Jay Institutional Review Board Office at jj-irb@jjay.cuny.edu, or (212) 237-8961.

At your request, you will be given a copy of this form to keep. You are making a decision on whether or not to participate. Your signature indicates that you have read the information in this form and have agreed to participate. You may withdraw at any time without prejudice, even after signing this form, should you choose to stop.

______________________________ ____

Participant's Printed Name Signature Date

______________________________ ____

Experimenter's Printed Name Signature Date

Appendix B

Actor

Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item in a scavenger hunt type task. You will follow a series of clues around the room to locate the potentially valuable object. Each clue will lead you to an item that has a tape attached to it with the next clue. There is a tape recorder located centrally in the room where you can play each tape. Make sure you play each tape on the 'A' side. **Follow the tapes in order around the room. Do not skip ahead if you find another tape, and do not randomly search the room for tapes even if you have trouble with a clue. They must be followed IN ORDER.**

Along the way you will also find a set of keys may or may not help you access this potentially valuable object. If you are able to find this object, steal it and hide it on your person. As soon as you do so, you need to leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. If you complete this theft successfully, you will get to keep the proceeds.

You will have **five minutes to complete the task.** There is a timer that will start as soon as you open the door to the study room. It can only be shut off when you open the door again to leave. If you do not leave in time, an alarm will be set off that you will be able to hear, I'll be able to hear out here, really half the building will be able to hear the thing, to let me know you failed.

There will be someone observing you complete this task. They are part of the study. But please do not talk or interact with this person in any way. Nothing verbal, nothing nonverbal. No interaction whatsoever.

Observer

Inside the next room is an object that is potentially worth a great deal of money. Your job is to observe a thief. The thief will try to find and steal this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

You can root for the thief in your mind, but you cannot speak, interact with, or help in any way. Even if the thief completes the theft successfully, you will NOT get to keep the proceeds.

Your partner will have **five minutes to complete the task.**

Solo Actor
Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item in a scavenger hunt type task. You will follow a series of clues around the room to locate the potentially valuable object. Each clue will lead you to an item that has a tape attached to it with the next clue. There is a tape recorder located centrally in the room where you can play each tape. **Make sure you play each tape on the 'B' side.** Follow the tapes in order around the room. Do not skip ahead if you find another tape, and do not randomly search the room for tapes even if you have trouble with a clue. They must be followed IN ORDER.

Along the way you will also find a set of keys that will allow you to access this potentially valuable object. If you are able to find this object, steal it and hide it on your person. As soon as you do so, you need to leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. Even if you complete this theft successfully, you will **NOT** get to keep the proceeds.

You will have **five minutes to complete the task.** There is a timer that will start as soon as you open the door to the study room. It can only be shut off when you open the door again to leave.

Appendix C

1. Find the object that tells time – Clock
2. Find the object that holds writing utensils – Pencil Cup
3. Find the object that keeps you warm – Blanket
4. Find the object that keeps you cool – Fan
5. Find the object that connects to a computer – Printer
6. Find the object that you sit on – Chair
7. Find the object that you use to play poker (Study 2: use to play games) – Playing Cards Box
8. Find the object that you use to communicate with others – Phone
9. Find the object that you use to see your own reflection – Mirror
10. Find the object were you put things you no longer want – Trash Can

Appendix D

Actor Questionnaire

We are interested in assessing which factors are most important in the task you just completed. Please answer the questions completely.

1. Were you able to complete the task successfully? (circle one)

YES NO

2. How difficult was the task for you?

1 2 3 4 5 6 7

Not at all Very

3. How important was the presence of an observer to whether you were successful or not? (redacted for solo actors)

1 2 3 4 5 6 7

Not at all Very

4. How much did your ability to concentrate affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

5. How clear were the tapes?

1 2 3 4 5 6 7

Not at all Very

6a. How much did the time limit affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

b. How stressed did you feel by the time limit?

1 2 3 4 5 6 7

Not at all Very

c. How stressed did your partner seem by the time limit? (redacted for solo actors)

1 2 3 4 5 6 7

Not at all Very

7. How much did your level of attention to detail affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

8a. How much did your level of motivation affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

b. How important was it to you to be successful?

1	2	3	4	5	6	7
Not at all						Very

c. How important did it seem to your partner for you to be successful?
(redacted for solo authors)

1	2	3	4	5	6	7
Not at all						Very

Demographic Questions

10. Age___________

11. Gender (circle one) MALE FEMALE

12. What is your race/ethnic background? (check one)
______ A. African American/Black
______ B. Asian/Pacific Islander
______ C. Caucasian/White
______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern
______ F. Mixed
______ G. Other

Observer Questionnaire

We are interested in your perceptions of the task you just observed. Please answer the questions completely.

1. Was your partner able to complete the task successfully? (circle one)
YES NO

2. How difficult did the task seem for your partner?

1	2	3	4	5	6	7
Not at all						Very

3. How important was your presence to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all						Very

4. How much did your partner's ability to concentrate affect your partner's performance on the task?

1	2	3	4	5	6	7
Not at all						Very

5. How clear were the tapes?

1	2	3	4	5	6	7
Not at all						Very

6a. How much did the time limit affect your partner's performance on the task?

1 2 3 4 5 6 7
Not at all Very

b. How stressed did your partner seem by the time limit?

1 2 3 4 5 6 7
Not at all Very

c. How stressed did you feel by the time limit?

1 2 3 4 5 6 7
Not at all Very

7. How much did your partner's level of attention to detail affect your partner's performance on the task?

1 2 3 4 5 6 7
Not at all Very

8a. How much did your partner's level of motivation affect your partner's performance on the task?

1 2 3 4 5 6 7
Not at all Very

b. How important did it seem to your partner to be successful?

1 2 3 4 5 6 7
Not at all Very

c. How important was it to you for your partner to be successful?

1 2 3 4 5 6 7
Not at all Very

Demographic Questions

10. Age___________

11. Gender (circle one) MALE FEMALE

12. What is your race/ethnic background? (check one)

______ A. African American/Black
______ B. Asian/Pacific Islander
______ C. Caucasian/White
______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern
______ F. Mixed
______ G. Other

Appendix E

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the most appropriate number to the right of the statement to indicate how you felt *in the study room, in the middle of the task.* There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your feelings at the time best.

	Not at all	**Somewhat**	**Moderately**	**Very Much**
1. I feel calm	1	2	3	4
2. I am tense	1	2	3	4
3. I feel upset	1	2	3	4
4. I am relaxed	1	2	3	4
5. I feel content	1	2	3	4
6. I am worried	1	2	3	4

Appendix F

Permission to Use Videotape Data

I understand that the experimental session I participated in was videotaped. The experimenter has explained to me why it was necessary to record the session in this way and that by signing this form, I give permission for researchers associated with this study to use my videotape for data analysis purposes. I also understand that this videotape will be kept in a locked file cabinet and that only the primary researchers will have access to it. I have been given an opportunity to view my tape, decline the use of my tape, and erase my tape before anyone else has the opportunity to view it.

I have read the above statement and give my permission for the researchers to use my videotape data for the research purposes outlined above.

______________________________ Print Name	________________ Date

____
Signature

Appendix G

Actor Questionnaire

How many items were you instructed to locate? __________________________

Please number and list, in order, the steps you followed around the room (include the objects included in the experimental task). *Please include as much detail about each item as possible (i.e., color, design, etc.)*

How many other items were in the room? __________________________

Please list the other objects that were in the room but you were not instructed to interact with (include objects such as furniture, items on the walls, floor, ceiling, etc.) *Please include as much detail about each item as possible (i.e., color, design, etc.)*

Observer Questionnaire

How many items was your partner instructed to locate? __________________________

Please number and list, in order, the steps your partner followed around the room (include the objects included in the experimental task). *Please include as much detail about each item as possible (i.e., color, design, etc.)*

How many other items were in the room? __________________________

Please list the other objects that were in the room but your partner was not instructed to interact with (include objects such as furniture, items on the walls, floor, ceiling, etc.) *Please include as much detail about each item as possible (i.e., color, design, etc.)*

Appendix H

Now we would like to test your memory for specific objects in the room. Some of the items in the following list are items that were in the room during the task. Others are not. For each item, please indicate "OLD" if you recognize the item as one that was in the room during the task and select "NEW" if you do not think the item was in the room.

Recognition memory is associated with two different kinds of awareness. Quite often recognition brings back to mind something you recollect about what it is that you recognize, as when, for example, you recognize someone's face, and perhaps *remember* talking to this person at a party the previous night. At other times recognition brings nothing back to mind about what it is you recognize, as when, for example, you are confident that you recognize someone, and you *know* you recognize them, because of strong feelings of familiarity, but you have no recollection of seeing this person before. You do not remember anything about them.

The same kinds of awareness are associated with recognizing the items you saw during the task. Sometimes when you recognize items as one you saw during the task last session, recognition will bring back to mind something you remember thinking about or doing when the item appeared then. You recollect something you consciously experienced at that time. But sometimes recognizing an item as one you saw last session will not bring back to mind anything you remember about seeing it then. Instead, the item will seem familiar, so that you feel confident it was one you saw last session, even though you don't recollect anything you experienced when you saw it then.

For each word that you recognize, after you have chosen "OLD", please then choose "REMEMBER" if recognition is accompanied by some recollective experience, or "KNOW" if recognition is accompanied by strong feelings of familiarity in the absence of any recollective experience. There will also be times when you do not remember the item, nor does it seem familiar, but you might want to guess that it was one of the items you saw during the task last session. Feel free to do this, but if your YES response is really just a guess, please choose "GUESS".

1. **Lamp**

   OLD NEW

   b. If you chose OLD, please indicate your memory for the item:

   REMEMBER KNOW GUESS

2. **Paper Shredder**

   OLD NEW

   b. If you chose OLD, please indicate your memory for the item:

   REMEMBER KNOW GUESS

3. **Trash Can**

   OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

4. Rocking Chair

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

5. Baseball

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

6. Plant

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

7. Fan

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

8. Calendar

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

9. Candles

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

10. Pencil Sharpener

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

11. Eraser

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

12. Hole Puncher

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

13. Pillow

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

14. Newspaper

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

15. Monopoly

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

16. Radio

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

17. Coat Rack

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

18. Computer

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

19. Wine Glass

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

20. Teddy Bear

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

21. Bookshelf

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

22. Deck of Cards

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

23. Mirror

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

24. Television

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

25. Post-its

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

26. Rain Boots

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

27. Hand Sanitizer

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

28. Chairs

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

29. Microwave

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

30. Chandelier

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

Appendix I

For each set of pictures, please circle which one depicts an item or set-up you saw in the study room and rate your confidence in that choice.

Set 1: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 2: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 3: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 4: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 5: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 6: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 7: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 8: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 9: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10

Not at all confident Very confident

Set 10: **Picture 1 (Left)** **Picture 2 (Right)**

1 2 3 4 5 6 7 8 9 10

Not at all confident Very confident

Appendix J

You are invited to participate in a two-part study investigating perceptions about crime.

If you agree to be in this study, you will be asked to locate an item in a room or watch it being located. For the second part, you will then be asked to complete a brief questionnaire and possibly a short interview about the experience. In order to ensure the validity of psychological experiments, we cannot disclose everything about the study at this time, but afterward you will be fully debriefed. The total time required to complete the experiment should be about 45 minutes: 15 minutes for the first day and 30 minutes for the second day. We expect to enroll approximately 100 participants in this study.

Participation in this study will provide you with an opportunity to learn more about the commission of crime and psychology. You will receive $5 for your participation on the first day. If you return for your second experimental session, you receive an additional $15 in compensation. There is minimal risk to participating in this study.

Any information obtained in connection with this study will be strictly confidential. In any written reports or publications, no one participant will be identified or identifiable and only aggregate data will be presented. Research records will be kept in a locked file; only the researchers will have access to these records. Informed consents will be kept separate from any data collected to ensure anonymity.

Your participation in this study is completely voluntary. You have a right to refuse to participate without consequences. If you decide not to participate your decision will not affect your relationship with John Jay College or any of the researchers involved. If you decide to participate you may discontinue participation at any time. You may refuse to answer any specific questions or refuse to engage in any task at any time during the study. Withdrawal or refusing to answer specific questions or engage in specific tasks will not result in any consequences to you and will not affect your relationship with John Jay College or any of the researchers involved.

The researcher conducting this study is Jennifer Perillo. You may ask any questions you have now. If you have questions later, you may contact the project director, Dr. Saul Kassin, at (646) 557-4505. If you have any questions regarding your rights as a research participant, please feel free to contact the John Jay Institutional Review Board Office at jj-irb@jjay.cuny.edu, or (212) 237-8961.

At your request, you will be given a copy of this form to keep. You are making a decision on whether or not to participate. Your signature indicates that you have read the information in this form and have agreed to participate. You may withdraw at any time without prejudice, even after signing this form, should you choose to stop.

______________________	______________________	
Participant's Printed Name	Signature	Date
______________________	______________________	
Experimenter's Printed Name	Signature	Date

Appendix K

Actor (Unmotivated)
Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item in a scavenger hunt type task. You will follow a series of clues around the room to locate the potentially valuable object. Each clue will lead you to an item that has a tape attached to it with the next clue. There is a tape recorder located centrally in the room where you can play each tape. **Make sure you play each tape on the 'A' side.**

Along the way you will also find a set of keys that will allow you to access this potentially valuable object. If you are able to find this object, steal it and hide it on your person. If anyone asks you about it, deny any knowledge or involvement in the theft. Even if you complete this theft successfully, you will **NOT** get to keep the proceeds.

You will have **five minutes to complete the task.** There is a timer that will start as soon as you open the door to the study room. It can only be shut off when you open the door again to leave.

There will be someone observing you complete this task. They are part of the study. But please do not talk or interact with this person in any way.

Observer (Unmotivated)

Inside the next room is an object that is potentially worth a great deal of money. Your job is to observe a thief. The thief will try to find and steal this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

You can root for the thief, but you cannot speak, interact with, or help in any way. Even if the thief completes the theft successfully, you will **NOT** get to keep the proceeds.

Your partner will have **five minutes to complete the task.**

Perpetrator (Motivated Actor)

Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item in a scavenger hunt type task. You will follow a series of clues around the room to locate the potentially valuable object. Each clue will lead you to an item that has a tape attached to it with the next clue. There is a tape recorder located centrally in the room where you can play each tape. **Make sure you play each tape on the 'A' side.**

Along the way you will also find a set of keys that will allow you to access this potentially valuable object. If you are able to find this object, steal it and hide it on your person. As soon as you do so, you need to leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. If you complete this theft successfully, you will get to keep the proceeds.

You will have **five minutes to complete the task.** There is a timer that will start as soon as you open the door to the study room. It can only be shut off when you open the door again to leave. If you do not leave in time, an alarm will be set off that you will be able to hear, I'll be able to hear out here, hell half the building will be able to hear the damn thing, to let me know you failed.

There will be someone observing you complete this task. They are part of the study--and on your side. But please do not talk or interact with this person in any way.

Accomplice (Motivated Observer)

Inside the next room is an object that is potentially worth a great deal of money. Your job is to act as the accomplice to a thief. Your partner in crime will try to find and steal this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

Do not speak or interact with your partner in any way. You are a team, however, so if your partner is able to complete the theft successfully, the two of you will *split* the proceeds.

Your partner will have **five minutes to complete the task.**

Appendix L

Actor Questionnaire

We are interested in assessing which factors are most important in the task you just completed. Below you will be asked to rate how your performance was affected by various factors. Please answer the questions completely.

1. Were you able to complete the task successfully? (circle one)
YES NO

2a. Do you think you were successful or unsuccessful because of how the room was laid out?
YES NO

b. How important was how the room was laid out to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important — Very important

3. How difficult was the task for you?
1 2 3 4 5 6 7
Not at all difficult — Very difficult

4a. Do you think you were successful or unsuccessful because of the task difficulty?
YES NO

b. How important was the difficulty of the task to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important — Very important

5a. Do you think you were successful or unsuccessful because an observer was present?
YES NO

b. How important was the presence of an observer to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important — Very important

c. Did the presence of an observer make the task easier?

1 2 3 4 5 6 7
Not at all easier — Much easier

d. Did the presence of an observer make the task more difficult?

1 2 3 4 5 6 7
Not at all more difficult — Much more difficult

6a. Do you think you were successful or not successful because of your ability to concentrate?
YES NO
b. How important was your ability to concentrate to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

7a. Do you think you were successful or unsuccessful because of your level of intelligence?
YES NO
b. How important was your intelligence to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

8a. Do you think you were successful or unsuccessful because of the level of clarity of the tapes?
YES NO
b. How important was the clarity of the tapes to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

c. How clear were the tapes?

1 2 3 4 5 6 7
Not at all clear
Very clear

9a. Do you think you were successful or unsuccessful because of your ability to analyze clues?
YES NO
b. How important was your ability to analyze clues to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

10a. Do you think you were successful or unsuccessful because of the time limit?
YES NO
b. How important was the time limit to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

c. How stressed did you feel by the time limit?
1 2 3 4 5 6 7
Not at all stressed
Very stressed

11a. Do you think you were successful or unsuccessful because of your level of attention to detail?

YES NO

b. How important was your level of attention to detail to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

12a. Do you think you were successful or unsuccessful because of your level of motivation?

YES NO

b. How important was your level of motivation to whether you were successful or not?

1 2 3 4 5 6 7
Not at all important
Very important

c. How important was it to you to be successful?

1 2 3 4 5 6 7
Not at all important
Very important

13. Please indicate the percentage to which the situation (e.g., aspects of the room and task) and your self (e.g., aspects of your personality, etc.) influenced your performance.
These two numbers should sum to 100%.

Situation ____________%

Self ____________%

Demographic Questions

13. What is your age? ___________

14. What is your gender? (circle one)

MALE FEMALE

15. What is your race/ethnicity? (check one)

______ A. African American/Black
______ B. Asian/Pacific Islander
______ C. Caucasian/White
______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern
______ F. Mixed
______ G. Other

Observer Questionnaire

We are interested in assessing which factors are most important in the task you just observed. Below you will be asked to rate how your partner's performance was affected by various factors. Please answer the questions completely.

1. Was your partner able to complete the task successfully? (circle one)
YES NO

2a. Do you think your partner was successful or unsuccessful because of how the room was laid out?
YES NO

b. How important was how the room was laid out to whether your partner was successful or not?

1 2 3 4 5 6 7
Not at all Very
important important

3. How difficult did the task seem for your partner?
1 2 3 4 5 6 7
Not at all Very
difficult difficult

4a. Do you think your partner was successful or unsuccessful because of the task difficulty?
YES NO

b. How important was the difficulty of the task to whether your partner was successful or not?

1 2 3 4 5 6 7
Not at all Very
important important

5a. Do you think your partner was successful or unsuccessful because of your presence?
YES NO

b. How important was your presence to whether your partner was successful or not?

1 2 3 4 5 6 7
Not at all Very
important important

c. Did your presence seem to make the task easier?

1 2 3 4 5 6 7
Not at all Much
easier easier

d. Did your presence seem to make the task more difficult?

1 2 3 4 5 6 7
Not at all Much
more difficult more difficult

6a.Do you think your partner was successful or not successful because of your partner's ability to concentrate?

YES NO

b. How important was your partner's ability to concentrate to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

7a. Do you think your partner was successful or unsuccessful because of your partner's level of intelligence?

YES NO

b. How important was your partner's intelligence to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

8a. Do you think your partner was successful or unsuccessful because of the level of clarity of the tapes?

YES NO

b. How important was the clarity of the tapes to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

c. How clear were the tapes?

1	2	3	4	5	6	7
Not at all clear						Very clear

9a. Do you think your partner was successful or unsuccessful because of your partner's ability to analyze clues?

YES NO

b. How important was your partner's ability to analyze clues to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

10a. Do you think your partner was successful or unsuccessful because of the time limit?

YES NO

b. How important was the time limit to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

c. How stressed did your partner seem by the time limit?

1	2	3	4	5	6	7
Not at all stressed						Very stressed

d. How stressed did you feel by the time limit?

1	2	3	4	5	6	7
Not at all stressed						Very stressed

11a. Do you think your partner was successful or unsuccessful because of your partner's level of attention to detail?

YES NO

b. How important was your partner's level of attention to detail to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

12a. Do you think your partner was successful or unsuccessful because of your partner's level of motivation?

YES NO

b. How important was your partner's level of motivation to whether your partner was successful or not?

1	2	3	4	5	6	7
Not at all important						Very important

c. How important did it seem to your partner to be successful?

1	2	3	4	5	6	7
Not at all important						Very important

d. How important was it to you for your partner to be successful?

1	2	3	4	5	6	7
Not at all important						Very important

13. Please indicate the percentage to which the situation (e.g., aspects of the room and task) and your partner's characteristics (e.g., aspects of your partner's personality, etc.) influenced your partner's performance. *These two numbers should sum to 100%.*

Situation ____________%

Partner ____________%

Demographic Questions

13. What is your age? ___________

14. What is your gender? (circle one)

MALE FEMALE

15. What is your race/ethnicity? (check one)

______ A. African American/Black
______ B. Asian/Pacific Islander
______ C. Caucasian/White
______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern
______ F. Mixed
______ G. Other

Appendix M

Now we would like to test your memory for specific objects in the room. For each item, please rate whether it was in the room or not. If you remember the item being in the room, check "Remember". If you feel an item was in the room, but you do not specifically recall its presence, check "Know". If you do not recall the item being in the room, check "New".

Item	Remember	Know	New
1. Lamp			
2. Paper Shredder			
3. Trash Can			
4. Rocking Chair			
5. Baseball			
6. Plant			
7. Fan			
8. Calendar			
9. Candles			
10. Pencil Sharpener			
11. Eraser			
12. Hole Puncher			
13. Pillow			
14. Newspaper			
15. Monopoly			
16. Radio			
17. Coat Rack			
18. Computer			
19. Wine Glass			
20. Teddy Bear			
21. Bookshelf			
22. Deck of Cards			
23. Mirror			
24. Television			
25. Post-its			
26. Rain Boots			
27. Hand Sanitizer			
28. Chairs			
29. Microwave			
30. Chandelier			

Appendix N

You are invited to participate in a two-part study investigating perceptions about crime.

If you agree to be in this study, you will be asked to locate an item in a room or watch it being located. For the second part, you will then be asked to complete a brief questionnaire and possibly a short interview about the experience. In order to ensure the validity of psychological experiments, we cannot disclose everything about the study at this time, but afterward you will be fully debriefed. The total time required to complete the experiment should be about 75 minutes: 30 minutes for the first day and 45 minutes for the second day. We expect to enroll approximately 160 participants in this study.

Participation in this study will provide you with an opportunity to learn more about the commission of crime and psychology. You will receive $10 for your participation on the first day. If you return for your second experimental session, you receive an additional $15 in compensation. There is minimal risk to participating in this study.

Any information obtained in connection with this study will be strictly confidential. In any written reports or publications, no one participant will be identified or identifiable and only aggregate data will be presented. Research records will be kept in a locked file; only the researchers will have access to these records. Informed consents will be kept separate from any data collected to ensure anonymity.

Your participation in this study is completely voluntary. You have a right to refuse to participate without consequences. If you decide not to participate your decision will not affect your relationship with John Jay College or any of the researchers involved. If you decide to participate you may discontinue participation at any time. You may refuse to answer any specific questions or refuse to engage in any task at any time during the study. Withdrawal or refusing to answer specific questions or engage in specific tasks will not result in any consequences to you and will not affect your relationship with John Jay College or any of the researchers involved.

The researcher conducting this study is Jennifer Perillo. You may ask any questions you have now. If you have questions later, you may contact the project director, Dr. Saul Kassin, at (646) 557-4505. If you have any questions regarding your rights as a research participant, please feel free to contact the John Jay Institutional Review Board Office at jj-irb@jjay.cuny.edu, or (212) 237-8961.

At your request, you will be given a copy of this form to keep. You are making a decision on whether or not to participate. Your signature indicates that you have read the information in this form and have agreed to participate. You may withdraw at any time without prejudice, even after signing this form, should you choose to stop.

_____________________________ ____

Participant’s Printed Name Signature Date

_____________________________ ____

Experimenter’s Printed Name Signature Date

Appendix O:

Low Pressure Perpetrator (Motivated Actor)

Imagine yourself as a burglar trying to steal something that does not belong to you. Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item hidden in this box -> *show picture of Tiffany Box.*

You will also need to find a key that helps you access this potentially valuable object. The key is also located somewhere in the room. If you are able to find the object, steal it and hide it on your person. As soon as you do, leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. If you complete this theft successfully, you will get to *keep* the proceeds.

You will have TEN minutes to complete the task. There is a timer that will start as soon as you open the door to the study room. It will shut off when you open the door again to leave. If you do not leave in time, an alarm will ring that you will hear, I'll be able to hear it out here, really half the building will be able to hear it, to let me know you failed. Here, I'll give you a little preview (show alarm). It takes people an average of *7-8* minutes to complete the task, so *you should have plenty of time to steal the object.*

There will be someone observing you doing this task. They are part of the study. Please do not talk or interact with this person in any way. Nothing verbal, nothing nonverbal. No interaction whatsoever.

High Pressure Perpetrator

Imagine yourself as a burglar trying to steal something that does not belong to you. Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item hidden in this box -> *show picture of Tiffany Box.*

You will also need to find a key that helps you access this potentially valuable object. The key is also located somewhere in the room. If you are able to find the object, steal it and hide it on your person. As soon as you do, leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. If you complete this theft successfully, you will get to *keep* the proceeds.

You will have FIVE minutes to complete the task. There is a timer that will start as soon as you open the door to the study room. It will shut off when you open the door again to leave. If you do not leave in time, an alarm will ring that you will hear, I'll be able to hear it out here, really half the building will be able to hear it, to let me know you failed. Here, I'll give you a little preview (show alarm). It takes people an average of *7-8* minutes to complete the task, so *you will need to work quickly.*

There will be someone observing you doing this task. They are part of the study. Please do not talk or interact with this person in any way. Nothing verbal, nothing nonverbal. No interaction whatsoever.

Low Pressure Observer

Inside the next room is an object that is potentially worth a great deal of money. Your job is to observe someone trying to steal it. The thief will try to find this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

You can root for the thief in your mind if you want to, but you cannot speak with him/her, interact with him/her, or help in any way. Even if this person completes the theft successfully, you will NOT get to keep any part of the proceeds.

Again, TEN minutes to complete the task.

High Pressure Observer

Inside the next room is an object that is potentially worth a great deal of money. Your job is to observe someone trying to steal it. The thief will try to find this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

You can root for the thief in your mind if you want to, but you cannot speak with him/her, interact with him/her, or help in any way. Even if this person completes the theft successfully, you will NOT get to keep any part of the proceeds.

Again, FIVE minutes to complete the task.

Low Pressure Accomplice (Motivated Observer)

Inside the next room is an object that is potentially worth a great deal of money. Your job is to act as an accomplice to the thief. Your partner in crime will try to find this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

You can root for the thief in your mind if you want to, but you cannot speak with him/her, interact with him/her, or help in any way. You are a team, however, so if your partner completes the theft successfully, the two of you will *split* the proceeds.

Again, TEN minutes to complete the task.

High Pressure Accomplice

Inside the next room is an object that is potentially worth a great deal of money. Your job is to act as an accomplice to the thief. Your partner in crime will try to find this potentially valuable object. You are to stand on the marked spot just inside the doorway of the study room and observe what is happening.

You can root for the thief in your mind if you want to, but you cannot speak with him/her, interact with him/her, or help in any way. You are a team, however, so if your partner completes the theft successfully, the two of you will *split* the proceeds.

Again, FIVE minutes to complete the task.

Unmotivated Imaginer

In a few minutes, I'm going to lead you into the next room. In that room is an object worth a great deal of money. Your task is going to be to IMAGINE yourself as a burglar trying to steal that valuable object that does not belong to you.

In a moment I am going to read you a set of instructions. When I take you into the next room, your task will be to look around, and then imagine how you would go about following my instructions. Do you have any questions so far?

OK here are the instructions. . .
Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item hidden in this box -> show picture of Tiffany Box.

You will also need to find a key that helps you access this potentially valuable object. The key is also located somewhere in the room. If you are able to find the object, steal it and hide it on your person. As soon as you do, leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. Even if you complete this theft successfully, you will NOT get to keep the proceeds.

You will have FIVE minutes to complete the task. There is a timer that will start as soon as you open the door to the study room. It will shut off when you open the door again to leave. It takes people an average of 7-8 minutes to complete the task, so you will need to work quickly.

So, I'll take you next door now. You will stand on the marked spot just inside the doorway of the study room while you imagine yourself being the burglar. Do not move from that spot.

Motivated Imaginer

In a few minutes, I'm going to lead you into the next room. In that room is an object worth a great deal of money. Your task is going to be to IMAGINE yourself as a burglar trying to steal that valuable object that does not belong to you.

In a moment I am going to read you a set of instructions. When I take you into the next room, your task will be to look around, and then imagine how you would go about following my instructions. Do you have any questions so far?

OK here are the instructions. . .

Inside the next room is an object potentially worth a great deal of money. Your job is to locate and steal the item hidden in this box -> show picture of Tiffany Box.
You will also need to find a key that helps you access this potentially valuable object. The key is also located somewhere in the room. If you are able to find the object, steal it and hide it on your person. As soon as you do, leave the study room. If anyone asks you about it, deny any knowledge or involvement in the theft. If you complete this theft successfully, you will get to keep the proceeds.

You will have FIVE minutes to complete the task. There is a timer that will start as soon as you open the door to the study room. It will shut off when you open the door again to leave. If you do not leave in time, an alarm will ring that you will hear, I'll be able to hear it out here, hell half the building will be able to hear it, to let me know you failed. Here, I'll give you a little preview (show alarm). It takes people an average of 7-8 minutes to complete the task, so you will need to work quickly.

So, I'll take you next door now. You will stand on the marked spot just inside the doorway of the study room while you imagine yourself being the burglar. Do not move from that spot.

Appendix P

Actor Questionnaire

We are interested in assessing which factors are most important in the task you just completed. Please answer the questions completely.

1. Were you able to complete the task successfully? (circle one)
YES NO

2. How difficult was the task for you?
1 2 3 4 5 6 7
Not at all Very

3. How important was the presence of an observer to whether you were successful or not?
1 2 3 4 5 6 7
Not at all Very

4. How much did your ability to concentrate affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

5a. How much did the time limit affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How stressed did you feel by the time limit?
1 2 3 4 5 6 7
Not at all Very

c. How stressed did your partner seem by the time limit?
1 2 3 4 5 6 7
Not at all Very

6. How much did your level of attention to detail affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

7a. How much did your level of motivation affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How important was it to you to be successful?
1 2 3 4 5 6 7
Not at all Very

c. How important did it seem to your partner for you to be successful?
1 2 3 4 5 6 7
Not at all Very

8. How much did the alarm affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How stressed did you feel by the alarm?
1 2 3 4 5 6 7
Not at all Very

c. How stressed did your partner seem by the alarm?
1 2 3 4 5 6 7
Not at all Very

Demographic Questions

10. Age___________

11. Gender (circle one) MALE FEMALE

12. What is your race/ethnic background? (check one)
______ A. African American/Black ______ B. Asian/Pacific Islander
______ C. Caucasian/White ______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern ______ F. Mixed
______ G. Other

Observer Questionnaire

We are interested in your perceptions of the task you just observed. Please answer the questions completely.

1. Was your partner able to complete the task successfully? (circle one)
YES NO

2. How difficult did the task seem for your partner?
1 2 3 4 5 6 7
Not at all Very

3. How important was your presence to whether your partner was successful or not?
1 2 3 4 5 6 7
Not at all Very

4. How much did your partner's ability to concentrate affect your partner's performance on the task?
1 2 3 4 5 6 7
Not at all Very

5a. How much did the time limit affect your partner's performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How stressed did your partner seem by the time limit?
1 2 3 4 5 6 7
Not at all Very

c. How stressed did you feel by the time limit?
1 2 3 4 5 6 7
Not at all Very

6. How much did your partner's level of attention to detail affect your partner's performance on the task?
1 2 3 4 5 6 7
Not at all Very

7a. How much did your partner's level of motivation affect your partner's performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How important did it seem to your partner to be successful?
1 2 3 4 5 6 7
Not at all Very

c. How important was it to you for your partner to be successful?
1 2 3 4 5 6 7
Not at all Very

8. How much did the alarm affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How stressed did you feel by the alarm?
1 2 3 4 5 6 7
Not at all Very

c. How stressed did your partner seem by the alarm?
1 2 3 4 5 6 7
Not at all Very

Demographic Questions

10. Age___________

11. Gender (circle one) MALE FEMALE

12. What is your race/ethnic background? (check one)
______ A. African American/Black ______ B. Asian/Pacific Islander
______ C. Caucasian/White ______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern ______ F. Mixed
______ G. Other

Unmotivated Imaginer Questionnaire

We are interested in assessing which factors are most important in the task you just completed. Please answer the questions completely.

1. Were you able to complete the task successfully? (circle one)
YES NO

2. How difficult was the task for you?
1 2 3 4 5 6 7
Not at all Very

3. How much did your ability to concentrate affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

4a. How much did the time limit affect your performance on the task?

1 2 3 4 5 6 7
Not at all Very

b. How stressed did you feel by the time limit?
1 2 3 4 5 6 7
Not at all Very

5. How much did your level of attention to detail affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

6a. How much did your level of motivation affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How important was it to you to be successful?
1 2 3 4 5 6 7
Not at all Very

Demographic Questions

8. Age___________

9. Gender (circle one) MALE FEMALE

10. What is your race/ethnic background? (check one)
______ A. African American/Black ______ B. Asian/Pacific Islander
______ C. Caucasian/White ______ D. Hispanic (Latino/Latina)
______ E. Middle-Eastern ______ F. Mixed
______ G. Other

Motivated Imaginer Questionnaire

We are interested in assessing which factors are most important in the task you just completed. Please answer the questions completely.

1. Were you able to complete the task successfully? (circle one)
YES NO

2. How difficult was the task for you?
1 2 3 4 5 6 7
Not at all Very

3. How much did your ability to concentrate affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

4a. How much did the time limit affect your performance on the task?
1 2 3 4 5 6 7
Not at all Very

b. How stressed did you feel by the time limit?

1 2 3 4 5 6 7

Not at all Very

5. How much did your level of attention to detail affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

6a. How much did your level of motivation affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

b. How important was it to you to be successful?

1 2 3 4 5 6 7

Not at all Very

7. How much did the alarm affect your performance on the task?

1 2 3 4 5 6 7

Not at all Very

b. How stressed did you feel by the alarm?

1 2 3 4 5 6 7

Not at all Very

Demographic Questions

9. Age___________

10. Gender (circle one) MALE FEMALE

11. What is your race/ethnic background? (check one)

______ A. African American/Black ______ B. Asian/Pacific Islander
______ C. Caucasian/White ______ D. Hispanic
(Latino/Latina)
______ E. Middle-Eastern ______ F. Mixed
______ G. Other

Appendix Q

Actor/Imaginer Questionnaire

I would like you to retrace in your mind the steps you took when searching for the gift box. Please number and list, in order, every object you interacted with (i.e., physically touched) during your search for the box. *Please include as much detail about each object as possible (i.e., color, design, etc.)*

How many objects in total were in the room? ________________________

Please list all of the remaining objects that were in the room. List *everything* you can remember. *Please include as much detail*

Observer Questionnaire

I would like you to retrace in your mind the steps your partner took when searching for the gift box. Please number and list, in order, every object your partner interacted with (i.e., physically touched) during your partner's search for the box. *Please include as much detail about each object as possible (i.e., color, design, etc.)*

How many objects in total were in the room? ________________________

Please list all of the remaining objects that were in the room. List *everything* you can remember. *Please include as much detail about each object as possible (i.e., color, design, etc.)*

Appendix R

Now we would like to test your memory for specific objects in the room. Some of the items in the following list are items that were in the room during the task. Others are not. For each item, please indicate "OLD" if you recognize the item as one that was in the room during the task and select "NEW" if you do not think the item was in the room.
Recognition memory is associated with two different kinds of awareness. Quite often recognition brings back to mind something you recollect about what it is that you recognize, as when, for example, you recognize someone's face, and perhaps *remember* talking to this person at a party the previous night. At other times recognition brings nothing back to mind about what it is you recognize, as when, for example, you are confident that you recognize someone, and you *know* you recognize them, because of strong feelings of familiarity, but you have no recollection of seeing this person before. You do not remember anything about them.

The same kinds of awareness are associated with recognizing the items you saw during the task. Sometimes when you recognize items as one you saw during the task last session, recognition will bring back to mind something you remember thinking about or doing when the item appeared then. You recollect something you consciously experienced at that time. But sometimes recognizing an item as one you saw last session will not bring back to mind anything you remember about seeing it then. Instead, the item will seem familiar, so that you feel confident it was one you saw last session, even though you don't recollect anything you experienced when you saw it then.

For each word that you recognize, after you have chosen "OLD", please then choose "REMEMBER" if recognition is accompanied by some recollective experience, or "KNOW" if recognition is accompanied by strong feelings of familiarity in the absence of any recollective experience. There will also be times when you do not remember the item, nor does it seem familiar, but you might want to guess that it was one of the items you saw during the task last session. Feel free to do this, but if your YES response is really just a guess, please choose "GUESS".

1. **Lamp**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

2. **Fax Machine**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

3. **Trash Can**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

4. **Rocking Chair**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

5. **Baseball**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

6. **Plant**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

7. **Fan**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

8. **Calendar**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

9. **Candles**

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

10. Pencil Sharpener

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

11. Eraser

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

12. Emergency Exit Sign

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

13. Hole Puncher

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

14. Pillow

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

15. Newspaper

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

16. Monopoly

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

17. Radio

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

18. Coat Rack

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

19. Computer

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

20. Tripod

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

21. Wine Glass

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

22. Teddy Bear

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

23. Bookshelf

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

24. Deck of Cards

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

25. Mirror

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

26. Television

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

27. Stapler

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

28. Post-its

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

29. Rain Boots

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

30. Cowboy Boots

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

31. Hand Sanitizer

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

32. Chairs

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

33. Microwave

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

34. Chandelier

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

35. File Folders

OLD NEW

b. If you chose OLD, please indicate your memory for the item:

REMEMBER KNOW GUESS

Appendix S

For each set of pictures, please circle which one depicts an item or set-up you saw in the study room and rate your confidence in that choice.

Set 1: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 2: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 3: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 4: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 5: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 6: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 7: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 8: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 9: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 10: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 11: **Picture 1 (Left)** **Picture 2 (Right)**

1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 12: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 13: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 14: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

Set 15: **Picture 1 (Left)** **Picture 2 (Right)**
1 2 3 4 5 6 7 8 9 10
Not at all confident Very confident

References

Appleby, S.C., Hasel, L.E., & Kassin S.M. (2013). Police-induced confessions: An empirical analysis of their content and impact. *Psychology, Crime, & Law, 19,* 111-128. doi:10.1080/1068316X.2011.613389

Areh, I. (2011). Gender-related differences in eyewitness testimony. *Personality and Individual Differences, 50*, 559-563. doi:10.1016/j.paid.2010.11.027

Arkin, R. M., Duval, S., & Duval, V. H. (1978). Observer attribution: Effects of dynamic qualities of the actor. *Social Behavior and Personality, 6,* 105-108. doi: 10.2224/sbp.1978.6.1.105

Bäckman, L. and Nilsson, L. (1985). Prerequisites for lack of age differences in memory performance. *Experimental Aging Research, 11,* 67-73.

Balcetis, E., & Dunning, D. (2006). See what you want to see: Motivational influences on visual perception. *Journal of Personality and Social Psychology, 91,* 612-625. doi: 10.1037/0022-3514.91.4.612

Balcetis, E., & Dunning, D. (2010). Wishful seeing: More desired objects are seen as closer. *Psychological Science, 21,* 147-152. doi: 10.1177/0956797609356283

Barnier, A. J., Sutton, J., Harris, C. B., & Wilson, R. A. (2008). A conceptual and empirical framework for the social distribution of cognition: The case of memory. *Cognitive Systems Research, 9,* 33-51. doi: 10.1016/j.cogsys.2007.07.002

Baron, R. S. (1986). Distraction-conflict theory: Progress and problems. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 1-40). Orlando, FL: Academic Press. doi: 10.1016/S0065-2601(08)60211-7

Baumeister, R. F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology, 46,* 610-620. doi: 10.1037/0022-3514.46.3.610

Baumeister, R. F., & Showers, C. J. (1986) A review of paradoxical performance effects: Choking under pressure in sports and mental tests. *European Journal of Social Psychology, 16,* 361-383. doi: 10.1002/ejsp.2420160405

Behrman, B. W. & Davey, S. L. (2001). Eyewitness identification in actual criminal cases: An archival analysis. *Law and Human Behavior, 25,* 475-491. doi: 10.1023/A:1012840831846

Bell, B. E., & Loftus, E. F. (1985). Vivid persuasion in the courtroom. *Journal of Personality Assessment, 49,* 659-664. doi: 10.1207/s15327752jpa4906_16

Bell, B. E., & Loftus, E. F. (1988). Degree of detail of eyewitness testimony and mock juror judgments. *Journal of Applied Social Psychology, 18,* 1171-1192. doi: 10.1111/j.1559-1816.1988.tb01200.x

Bell, B. E., & Loftus, E. F. (1989). Trivial persuasion in the courtroom: The power of a (few) minor details. *Journal of Personality and Social Psychology, 56,* 669-679. doi: 10.1037/0022-3514.56.5.669

Block, L. G., & Keller, P. A. (1997). Effects of self-efficacy and vividness on the persuasiveness of health communications. *Journal of Consumer Psychology, 6,* 31-54. doi: 10.1207/s15327663jcp0601_02

Booth, R. & Sharma, D. (2009). Stress reduces attention to irrelevant information: Evidence from the Stroop task. *Motivation and Emotion, 33,* 412-418. doi: 10.1007/s11031-009-9141-5

Bothwell, R. K., Brigham, J. C., & Malpass, R. S. (1989). Cross-racial identification. *Personality and Social Bulletin, 15,* 19-25. doi: 10.1177/0146167289151002

Bradley, M. T., Malik, F. J., & Cullen, M. C. (2011) Memory instructions, vocalization, mock crimes, and concealed information tests with a polygraph. *Perceptual and Motor Skills, 113,* 840-858.

Brehm, S. S., & Aderman, D. (1977). On the relationship between empathy and the actor versus observer hypothesis. *Journal of Research in Personality, 11,* 340-346. doi: 10.1016/0092-6566(77)90042-3

Brigham, J. C., & Malpass, R. S. (1985). The role of experience and contact in the recognition of faces of own- and other-race persons. *Journal of Social Issues, 41,* 139-155. doi: 10.1111/j.1540-4560.1985.tb01133.x

Brown, J. M. (2003). Eyewitness memory for arousing events: Putting things into context. *Applied Cognitive Psychology, 17,* 93-106. doi: 10.1002/acp.848

Chen, H., Yates, B. T., & McGinnies, E. (1988). Effects of involvement on observers' estimates on consensus, distinctiveness, and consistency. *Personality and Social Psychology Bulletin, 14,* 468-478. doi: 10.1177/0146167288143005

Chlan L, Savik K, & Weinert C. (2003). Development of a shortened state anxiety scale from the Speilberger State-Trait Anxiety Inventory (STAI) for patients receiving mechanical ventilatory support. *Journal of Nursing Measurement, 11,* 283–293. doi: 10.1891/106137403780954813

Christianson, S. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin, 112,* 284-309. doi: 10.1037/0033-2909.112.2.284

Christianson, S., & Bylin, S. (1999). Does simulating amnesia mediate genuine forgetting for a crime event? *Applied Cognitive Psychology, 13,* 495-511. doi: 10.1002/(SICI)1099-0720(199912)13:6<495::AID-ACP615>3.0.CO;2-0

Christianson, S., & Hübinette, B. (1993). Hands up: A study of witnesses' emotional reactions and memories associated with bank robberies. *Applied Cognitive Psychology, 7,* 365-379. doi: 10.1002/acp.2350070502

Cole, S., Balcetis, E., & Dunning, D. (2013). Affective signals of threat increase perceived proximity. *Psychological Science, 24,* 34 – 40. doi: 10.1177/0956797612446953

Cooper, B. S., & Yuille, J. C. (2007). An investigation of violent offenders' memories for instrumental and reactive violence. In S. A. Christianson (Ed.), *Offenders' Memories of Violent Crimes* (pp. 75-97). New York, NY: John Wiley & Sons Ltd. doi: 10.1002/9780470713082.ch3

Corwin, J. (1994). On measuring discrimination and response bias: Unequal numbers of targets and distractors and two classes of distractors. *Neuropsychology, 8,* 110-117. doi: 10.1037/0894-4105.8.1.110

Cunningham, J. D., Starr, P. A., & Kanouse, D. E. (1979). Self as actor, active observer, and passive observer: Implications for causal attributions. *Journal of Personality and Social Psychology, 37,* 1146-1152. doi: 10.1037/0022-3514.37.7.1146

Davey, S. L. (2001). Eyewitness identification in actual criminal cases: An archival analysis. *Law and Human Behavior, 25,* 475-491. doi: 10.1023/A:1012840831846

Davis, D., & Loftus, E. F. (2009). Expectancies, emotion, and memory reports for visual events. In J. R. Brockmole (Ed.), *The Visual World in Memory* (pp. 178-214). New York, NY: Psychology Press.

Deffenbacher, K. A. (1994). Effects of arousal on everyday memory. *Human Performance, 7,* 141-161. doi: 10.1207/s15327043hup0702_3

Deffenbacher, K. A. (2008). Estimating the impact of estimator variables on eyewitness identification: A fruitful marriage of practical problem solving and psychological theorizing. *Applied Cognitive Psychology, 22,* 815-826. doi: 10.1002/acp.1485

Deffenbacher, K. A., Bornstein, B. H., McGorty, E. K., & Penrod, S. D. (2008). Forgetting the once-seen face: Estimating the strength of an eyewitness's memory representation. *Journal of Experimental Psychology: Applied, 14,* 139-150. doi: 10.1037/1076-898X.14.2.139

Deffenbacher, K. A., Bornstein, B. H., Penrod, S. D., & McGorty, E. K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law and Human Behavior, 28,* 687-706. doi: 10.1007/s10979-004-0565-x

Derryberry, D., & Tucker, D. M. (1994). Motivating the focus of attention. In P. M. Niedenthal and S. Kitayama (Eds.), *The Heart's Eye: Emotional Influences in Perception and Attention* (pp. 167-196). New York: Academic Press.

Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organization of behavior. *Psychological Review, 66,* 183-201. doi: 10.1037/h0047707

Echterhoff, G., & Wolf, O. T. (2012). The stressed eyewitness: The interaction of thematic arousal and post-event stress in memory for central and peripheral event information. *Frontiers in Integrative Neuroscience, 6,* 1-12. doi: 10.3389/fnint.2012.00057

Elaad, E. (1990). Detection of guilty knowledge in real-life criminal investigations. Journal Of Applied Psychology, 75(5), 521-529. doi:10.1037/0021-9010.75.5.521

Ellis, H. D., Deregowski, J. B., & Shepherd, J. W. (1975). Description of white and black faces by white and black subjects. *International Journal of Psychology, 10,* 119-123. doi: 10.1080/00207597508247317

Engelkamp, J. (1998). *Memory for Actions.* Hove, England: Psychology Press/Taylor & Francis (UK).

Evans, C. (2006). What violent offenders remember of their crime: empirical explorations. *Australian and New Zealand Journal of Psychiatry, 40,* 508-518. doi: 10.1111/j.1440-1614.2006.01833.x

Feinberg, J. M., & Aiello, J. R. (2006). Social facilitation: A test of competing theories. *Journal of Applied Social Psychology, 36,* 1087-1109. doi: 10.1111/j.0021-9029.2006.00032.x

Fine, M. S., & Minnery, B. S. (2009). Visual salience affects performance in a working memory task. *The Journal of Neuroscience, 29,* 8016-8021. doi: 10.1523/JNEUROSCI.5503-08.2009

Fisher, R. P., & Geiselman, R. (1992). *Memory-enhancing techniques for investigative interviewing: The cognitive interview*. Springfield, IL England: Charles C Thomas, Publisher.

Fontaine, R. G. (2007). Disentangling the psychology and law of instrumental and reactive subtypes of aggression. *Psychology, Public Policy, and Law, 13,* 143-165. doi: 10.1037/1076-8971.13.2.143

Fontaine, R. G. (2008). Reactive cognition, reactive emotion: Toward a more psychologically-informed understanding of reactive homicide. *Psychology, Public Policy, and Law, 14,* 243-261. doi: 10.1037/a0013768

Galper, R. E. (1976). Turning observers into actors: Differential causal attributions as a function of empathy. *Journal of Research in Personality, 10,* 328-335. doi: 10.1016/0092-6566(76)90022-2

Gamer, M., Kosiol, D., & Vossel, G. (2010). Strength of memory encoding affects physiological responses in the Guilty Actions Test. *Biological Psychology, 83,* 101-107. doi:10.1016/j.biopsycho.2009.11.005

Gardiner, J. M., Richardson-Klavehn, A., & Ramponi, C. (1997). On reporting recollective experiences and "direct access to memory systems". *Psychological Science, 8,* 391-394. doi: 10.1111/j.1467-9280.1997.tb00431.x

Garrett, B. L. (2010). The substance of false confessions. *Stanford Law Review, 62,* 1051–1119.

Garry, M., Manning, C. G., Loftus, E. F. & Sherman, S. J. (1996). Imagination inflation: Imagining a childhood event inflates confidence that it occurred. *Psychonomic Bulletin & Review, 3,* 208-214. doi:10.3758/BF03212420

Geen, R. G. (1991). Social motivation. *Annual Review of Psychology, 42,* 377-399. doi: 10.1146/annurev.ps.42.020191.002113

Geen, R. G., & Gange, J. J. (1977). Drive theory of social facilitation: Twelve years of theory and research. *Psychological Bulletin, 84,* 1267-1288. doi: 10.1037/0033-2909.84.6.1267

Goff, L. M., & Roediger, H. L. (1998). Imagination inflation for action events: Repeated imaginings lead to illusory recollections. *Memory & Cognition, 26,* 20-33. doi: 10.3758/BF03211367

Goldstein, A. G. (1979). Race-related variation of facial features: Anthropometric data I. *Bulletin of the Psychonomic Society, 13,*187-190.

Green, S. K., Lightfoot, M. A., Bandy, C., & Buchanan, D. R. (1985). A general model of the attribution process. *Basic and Applied Social Psychology, 6,* 159-179. doi: 10.1207/s15324834basp0602_5

Greenberg, S. N., & MacGregor-Hannah, M. (2010). Disruptive effect of holistic bias on processing of other-race faces following face categorization. *Perceptual and Motor Skills, 110,* 567-579. doi: 10.2466/PMS.110.2.567-579

Guadagno, R. E., Rhoads, K. L., & Sagarin, B. J. (2011). Figural vividness and persuasion: Capturing the "elusive" vividness effect. *Personality and Social Psychology Bulletin, 37*, 626-638. doi:10.1177/0146167211399585

Guerin, B. (1999). Social behaviors as determined by different arrangements of social consequences: Social loafing, social facilitation, deindividuation, and a modified social loafing. *The Psychological Record, 49,* 565-578.

Hartwig, M., Granhag, P. A., Strömwall, L. A., & Kronkvist, O. (2006). Strategic use of evidence during police interviews: When training to detect deception. *Law and Human Behavior, 30,* 603-619. doi: 10.1007/s10979-006-9053-9

Hartwig, M., Granhag, P. A., Strömwall, L. A. & Vrij, A. (2005). Strategic disclosure of evidence to detect deception: Towards a new research agenda. In A. Czerederecka, T. Jaskiewicz-Obydzinska, R. Roesch, & J. Wójcikiewicz (Eds.), *Forensic Psychology and Law. Facing the Challenges of a Changing World* (pp. 219-232). Institute of Forensic Research Publishers, Crakow.

Harvey, J. H., Arkin, R. M., Gleason, J. M., & Johnston, S. (1974). Effects of expected and observed outcome of an action on the differential causal attributions of actor and observer. *Journal of Personality, 42,* 62-77. doi: 10.1111/j.1467-6494.1974.tb00557.x

Hastie, R. (1984). Causes and effects of causal attribution. *Journal of Personality and Social Psychology, 46,* 44-56. doi: 10.1037/0022-3514.46.1.44

Henderson, J. M., Malcolm, G. L., & Schandl, C. (2009). Searching in the dark: Cognitive relevance drives attention in real-world scenes. *Psychonomic Bulletin & Review, 16,* 850-856. doi: 10.3758/PBR.16.5.850

Herve, H., Cooper, B. S., & Yuille, J. C. (2007). Memory formation in Offenders: Perspectives from a biopsychosocial model of eyewitness memory. In S. A. Christianson (Ed.), *Offenders' Memories of Violent Crimes* (pp. 37-74). Chichester, England: John Wiley & Sons, Ltd. doi: 10.1002/9780470713082.ch2

Hester, R. & Garavan, H. (2005). Working memory and executive function: The influence of content and load on the control of attention. *Memory & Cognition, 33,* 221-233. doi: 10.3758/BF03195311

Hodgins, H. S. (2008). Motivation, threshold for threat, and quieting the ego. In H. A. Wayment, J. J. Bauer (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 117-124). Washington, DC US: American Psychological Association. doi:10.1037/11771-011

Holmberg, U., & Christianson, S. (2002). Murders' and sexual offenders' experience of police interviews and their inclination to admit or deny crimes. *Behavioral Sciences and the Law, 20,* 31-45. doi: 10.1002/bsl.470

Hope, L., & Wright, D. (2007). Beyond unusual? Examining the role of attention in the weapon focus effect. *Applied Cognitive Psychology, 21,* 951-961. doi: 10.1002/acp.1307

Hornstein, S. L., & Mulligan, N. W. (2001). Memory of action events: The role of objects in memory of self- and other-performed tasks. *The American Journal of Psychology, 114,* 199-217. doi: 10.2307/1423515

Hornstein, S. L., & Mulligan, N. W. (2004). Memory for actions: Enactment and source memory. *Psychonomic Bulletin & Review, 11,* 367-372. doi: 10.3758/BF03196584

Hosch, H. M., & Bothwell, R. K. (1990). Arousal, description, and identification accuracy of victims and bystanders. *Journal of Social Behavior & Personality, 5,* 481-488.

Huguet, P., Galvaing, M. P., Monteil, J. M., Dumas, F. (1999). Social presence effects in the Stroop task: Further evidence for an attentional view of social facilitation. *Journal of Personality and Social Psychology, 77,* 1011-1025. doi: 10.1037/0022-3514.77.5.1011

Inbau, F. E., Reid, J. E., Buckley, J. P., & Jayne, B. C. (2013).*Criminal interrogation and confessions* (5th ed.). Burlington, MA: Jones & Bartlett Learning.

Innocence Project. (2010). [Home page]. Retrieved January 13, 2010, from http://www.innocenceproject.org/

Jackson, R. C., Ashford, K. J., & Norsworthy, G. (2006). Attentional focus, dispositional reinvestment, and skilled motor performance under pressure. *Journal of Sport & Exercise Psychology, 28,* 49-68.

Jones, E. E., & Nisbett, R. E. (1972). The actor and the observer: Divergent perceptions of the causes of behavior. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. & B. Weiner (Eds.) *Attribution: Perceiving the Causes of Behavior* (pp. 79-94), Morristown, NJ: General Learning Press.

Jacoby, L. L. (1991). A process dissociation framework: Separating automatic from intentional uses of memory. *Journal of Memory and Language, 30,* 513-541. doi: 0749-596X/91

Kassin, S. M. (1984). Eyewitness identification: Victims versus bystanders. *Journal of Applied Social Psychology, 14,* 519-529. doi: 10.1111/j.1559-1816.1984.tb02257.x

Keller, P. A., & Block, L. G. (1997). Vividness effects: A resource-matching perspective. *Journal of Consumer Research, 24,* 295-304. doi: 10.1086/209511

Kelley, H. H., & Michela, J. L. (1980). Attribution theory and research. *Annual Review of Psychology, 31,* 457-501. doi: 10.1146/annurev.ps.31.020180.002325

Kleider, H. M., Pezdek, K., Goldinger, S. D., & Kirk, A. (2008). Schema-driven source misattribution errors: Remembering the expected from a witnessed event. *Applied Cognitive Psychology, 22,* 1-20. doi: 10.1002/acp.1361

Koriat, A., Ben-Zur, H., & Druch, A. (1991). The contextualization of input and output events in memory. *Psychological Research, 53,* 260-270. doi: 10.1007/BF00941396

Krizan, Z., & Windschitl, P. D. (2007). The influence of outcome desirability on optimism. *Psychological Bulletin, 133,* 95-121. doi: 10.1037/0033-2909.133.1.95

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108,* 480-498. doi: 10.1037/0033-2909.108.3.480

Lampinen, J. M., Odegard, T. N., & Bullington, J. L. (2003). Qualities of memories for performed and imagined actions. *Applied Cognitive Psychology, 17,* 881-893. doi: 10.1002/acp.916

Lane, S. M. (2006). Dividing attention during a witnessed event increases eyewitness suggestibility. *Applied Cognitive Psychology, 20,* 199-212. doi: 10.1002/acp.1177

Langer, E. (1978). Rethinking the role of thought in social interaction. In J. Harvey, W. Ickes, & R. Kidd (Eds.), *New directions in attribution research* (Vol. 2, pp. 35- 58). Hillsdale, NJ: Erlbaum.

Lassiter, G. D., Beers, M. J., Geers, A. L., Handley, I. M., Munhall, P. J., & Weiland, P. E. (2002a). Further evidence of a robust point-of-view bias in videotaped confessions. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 21,* 265-288. doi: 10.1007/s12144-002-1018-7

Lassiter, G. D., & Dudley, K. A. (1991). The a priori value of basic research: The case of videotaped confessions. *Journal of Social Behavior & Personality, 6,* 7-16.

Lassiter, G. D., & Geers, A. L., Handley, I. M., Weiland, P. E., & Munhall, P. J. (2002b). Videotaped interrogations and confessions: A simple change in camera perspective alters verdicts in simulated trials. *Journal of Applied Psychology, 87,* 867-874. doi: 10.1037//0021-9010.87.5.867

Lassiter, G. D., & Irvine, A. A. (1986). Videotaped confessions: The impact of camera point of view on judgments of coercion. *Journal of Applied Social Psychology, 16,* 268-276. doi: 10.1111/j.1559-1816.1986.tb01139.x

Lassiter, G. D., Munhall, P. J., Geers, A. L., Handley, I. M., & Weiland, P. E. (2001). Criminal confessions on videotape: Does camera perspective bias their perceived veracity? *Current Research in Social Psychology, 7,* 1-10.

Lavie, N. (2001). Capacity limits in selective attention: Behavioral evidence and implications for neural activity. In J. Braun, C. Koch, J. L. Davis (Eds.). *Visual Attention and Cortical Circuits* (pp. 49-68). Cambridge, MA: The MIT Press.

Leding, J. K. (2012). False memories and persuasion strategies. *Review of General Psychology, 16,* 256-268. DOI: 10.1037/a0027700

Leippe, M. R., Wells, G. L., & Ostrom, T. M. (1978). Crime seriousness as a determinant of accuracy in eyewitness identification. *Journal of Applied Psychology, 63,* 345-351. doi: 10.1037/0021-9010.63.3.345

Levine, L. J., & Edelstein, R. S. (2009). Emotion and memory narrowing: A review and goal relevance approach. *Cognition and Emotion, 23,* 833-875. doi: 10.1080/02699930902738863

Lewis, B. P., & Linder, D. E. (1997). Thinking about choking? Attentional processes and paradoxical performance. *Personality and Social Psychology Bulletin, 23,* 937-944. doi: 10.1177/0146167297239003

Lindholm, T., & Christianson, S. (1998). Gender effects in eyewitness accounts of a violent crime. *Psychology, Crime & Law, 4*, 323-339. doi:10.1080/10683169808401763

Lindsay, R. C. L., Ross, D. F., Read, J. D., & Toglia, M. P. (Eds.). (2007). *The handbook of eyewitness psychology.* Vol. 2, *Memory for people.* Mahwah, NJ: Erlbaum.

Loftus, E. F. (1996). *Eyewitness Testimony.* Cambridge: Harvard University Press (Original work published 1979).

Loftus, G. R., & Loftus, E. F. (1976). *Human Memory: The Processing of Information.* Oxford, England: Lawrence Erlbaum.

Loftus, E. F., Loftus, G. R., & Messo, J. (1987). Some facts about ‘weapon focus’. *Law and Human Behavior, 11,* 55-62. doi: 10.1007/BF01044839

Lu, S., & Han, S. (2009). Attentional capture is contingent on the interaction between task demand and stimulus salience. *Attention, Perception, & Psychophysics, 71,* 1015-1026. doi: 10.3758/APP.71.5.1015

Maclin, O. H., & Malpass, R. S. (2001). Racial categorization of faces: The ambiguous race effect. *Psychology, Public Policy, and Law, 7,* 98-118. doi: 10.1037/1076-8971.7.1.98

Macmillan, N. A., & Creelman, C. D. (2005). *Detection theory: A user's guide* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Malle, B. F., & Pearce, G. E. (2001). Attention to behavioral events during interaction: Two actor-observer gaps and three attempts to close them. *Journal of Personality and Social Psychology, 81,* 278-294. doi: 10.1037/0022-3514.81.2.278

Marteau, T. M., & Bekker, H. (1992). The development of a 6-item short-form of the state scale of the Spielberger State Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology, 31,* 301-306. doi: 10.1111/j.2044-8260.1992.tb00997.x

Mazzoni, G., & Memon, A. (2003). Imagination can create false autobiographical memories. *Psychological Science, 14,* 186-188. doi: 10.1046/j.1432-1327.2000.01821.x

Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law, 7,* 3-35. doi: 10.1037/1076-8971.7.1.3

Memon, A., Hope, L., & Bull, R. (2003). Exposure duration: Effects on eyewitness accuracy and confidence. *British Journal of Psychology, 94,* 339-354. doi: 10.1348/000712603767876262

Mitchell, K. J., Livosky, M., & Mather, M. (1998). The weapon focus effect revisited: The role of novelty. *Legal and Criminological Psychology, 3,* 287-303.

Morgan, C. A., Hazlett, G., Doran, A., Garrett, S., Hoyt, G., & Thomas, P., et al. (2004). Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress. *International Journal of Law and Psychiatry, 27,* 265–279. doi: 10.1016/j.ijlp.2004.03.004

Muller, D. & Butera, F. (2007). The focusing effect of self-evaluation threat in coaction and social comparison. *Journal of Personality and Social Psychology, 93,* 194-211. doi: 10.1037/0022-3514.93.2.194

Muller, D., Atzeni, T., & Butera, F. (2004). Coaction and upward social comparison reduce the illusory conjunction effect: Support for distraction-conflict theory. *Journal of Experimental Social Psychology, 40,* 659-665. doi: 10.1016/j.jesp.2003.12.003

Murphy, N. A., & Isaacowitz, D. M. (2008). Preferences for emotional information in older and younger adults: A meta-analysis of memory and attention tasks. *Psychology and Aging, 23,* 263-286. doi: 10.1037/0882-7974.23.2.263

Nahari, G., & Ben-Shakhar, G. (2011). Psychophysiological and behavioral measures for detecting concealed information: The role of memory for crime details. *Psychophysiology, 48,* 733-744. doi: 10.1111/j.1469-8986.2010.01148.x

Nash, R. A., Wade, K. A., & Lindsay, D. S. (2009). Digitally manipulating memory: Effects of doctored videos and imagination in distorting beliefs and memories. *Memory & Cognition, 37,* 414-424. doi:10.3758/MC.37.4.414

Nisbett, R. E., & Ross, L. D. (1980). *Human Inference: Strategies and Shortcomings of Social Judgment*. Englewood Cliffs, NJ: Prentice-Hall.

Noice, H., Noice, T., & Kennedy, C. (2000). Effects of enactment by professional actors at encoding and retrieval. *Memory, 8,* 353-363. doi: 10.1080/09658210050156813

Norman, D. A. (1969). *Memory and Attention: An Introduction to Human Information Processing.* New York: Wiley.

Ofshe, R. J., & Leo, R. A. (1997). The social psychology of police interrogation: The theory and classification of true and false confessions. *Studies in Law, Politics, and Society, 16,* 189-251.

Path, J., Vessel, G., & Gamer, M. (2012). Emotional arousal modulates the encoding of crime-related details and corresponding physiological responses in the Concealed Information Test. *Psychophysiology, 49,* 381-390. doi: 10.1111/j.1469-8986.2011.01313.x

Pickel, K. L. (1999). The influence of context on the 'weapon focus' effect. *Law and Human Behavior, 23,* 299-311. doi: 10.1023/A:1022356431375

Pickel, K. L. (2009). The weapon focus effect on memory for female versus male perpetrators. *Memory, 17,* 664-678. doi: 10.1080/09658210903029412

Pickel, K. L., Ross, S. J., & Truelove, R. S. (2006). Do weapons automatically capture attention? *Applied Cognitive Psychology, 20,* 871-893. doi: 10.1002/acp.1235

Piercey, M. D. (2009). Motivated reasoning and verbal v. numerical probability assessment: Evidence from an accounting context. *Organizational Behavior and Human Decision Processes, 108,* 330-341. doi: 10.1016/j.obhdp.2008.05.004

Porter, S., Woodworth, M., & Doucette, N. L. (2007). Memory for murder: The qualities and credibility of homicide narratives by perpetrators. In S. A. Christianson (Ed.), *Offenders' Memories of Violent Crimes* (pp. 115-134). New York, NY: John Wiley & Sons Ltd. doi: 10.1002/9780470713082.ch5

Price, H. L., Lee, Z., & Read, J. D. (2009). Memory for committing a crime: Effects of arousal, proximity, and gender. *American Journal of Psychology, 122,* 75-88.

Ratcliff, J. J., Lassiter, G. D., Schmidt, H. C., & Snyder, C. J. (2006). Camera perspective bias in videotaped confessions: Experimental evidence of its perceptual bias. *Journal of Experimental Psychology: Applied, 12,* 197-206. doi: 10.1037/1076-898X.12.4.197

Robins, R. W., Spranca, M. D., & Mendelsohn, G. A. (1996). The actor-observer effect revisited: Effects of individual differences and repeated social interactions on actor and observer attributions. *Journal of Personality and Social Psychology, 71,* 375-389. doi: 10.1037/0022-3514.71.2.375

Robinson, M. D., & Johnson, J. T. (1996). Recall memory, recognition memory, and the eyewitness confidence-accuracy correlation. *Journal of Applied Psychology, 81,* 587-594. doi: 10.1037/0021-9010.81.5.587

Robinson, M. D., Johnson, J. T., & Robertson, D. A. (2000). Process versus content in eyewitness metamemory monitoring. *Journal of Experimental Psychology: Applied, 6,* 207-221. doi: 10.1037/1076-898X.6.3.207

Sadeh, T., Maril, A., Goshen-Gottstein, Y. (2012). Encoding-related brain activity dissociates between the recollective processes underlying successful recall and recognition: A subsequent-memory study. *Neuropsychologia, 50,* 2317-2324. doi: 10.1016/j.neuropsychologia.2012.05.035

Schacter, D. L., Guerin, S. A., & St. Jacques, P. L. (2011). Memory distortion: An adaptive perspective. *Trends in Cognitive Sciences, 15,* 467-474. doi:10.1016/j.tics.2011.08.004

Seamon, J. G., Philbin, M. M., Harrison, L. G. (2006). Do you remember proposing marriage to the Pepsi machine? False recollections from a campus walk. *Psychonomic Bulletin & Review, 13,* 752-756. doi: 10.3758/BF03193992

Senkfor, A. J., Van Petten, C., & Kutas, M. (2002). Episodic action memory for real objects: An ERP investigation with perform, watch, and imagine action encoding tasks versus a non-action encoding task. *Journal of Cognitive Neuroscience, 14,* 402-419. doi: 10.1162/089892902317361921

Shapiro, P. N., & Penrod, S. (1986). Meta-analysis of facial identification studies. *Psychological Bulletin, 100,* 139-156. doi: 10.1037/0033-2909.100.2.139

Sharman, S. J., Garry, M., & Beuke, C. J. (2004). Imagination or exposure causes imagination inflation. *The American Journal of Psychology, 117,* 157-168. doi: 10.2307/4149020

Sharps, M. J., Janigian, J., Hess, A. B., & Hayward, B. (2009). Eyewitness memory in context: Toward a taxonomy of eyewitness errors. *Journal of Police and Criminal Psychology, 24,* 36-44. doi: 10.1007/s11896-008-9029-4

Shaw, J. I., & Skolnick, P. (1999). Weapon focus and gender differences in eyewitness accuracy: Arousal versus salience. *Journal of Applied Social Psychology, 29,* 2328-2341. doi: 10.1111/j.1559-1816.1999.tb00113.x

Shuman, D. W., & Smith, A. M. (2000). Remembrance of crimes past: Memory and truth finding in the prosecution of crimes. In D. W. Shuman & A. M. Smith (Eds.), *Justice and the Prosecution of Old Crimes: Balancing Legal, Psychological, and Moral Concerns* (pp. 87-100). Washington, DC: American Psychological Association. doi: 10.1037/10364-006

Smith, S. M., & Shaffer, D. R. (2000). Vividness can undermine or enhance message processing: The moderating role of vividness congruency. *Personality and Social Psychology Bulletin, 26,* 769-779. doi: 10.1177/0146167200269003

Sporer, S. L. (2001). The cross-race effect: Beyond recognition of faces in the laboratory. *Psychology, Public Policy, and Law, 7,* 170-200. doi: 10.1037/1076-8971.7.1.170

Stafford, L., Waldron, V. R., Infield, L. L. (1989). Actor-observer differences in conversational memory. *Human Communication Research, 15,* 590-611. doi: 10.1111/j.1468-2958.1989.tb00200.x

Stanislov, H., & Todorov, N. (1999). Calculation of signal detection theory measures. *Behavior Research Methods, Instruments, & Computers, 31,* 137-149.

Steblay, N. M. (1992). A meta-analytic review of the weapon focus effect. *Law and Human Behavior, 16,* 413-424. doi: 10.1007/BF02352267

Stroop, J. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18,* 653-662. doi: doi:10.1037/h0054651

Symes, E., Ottoboni, G., Tucker, M., Ellis, R., & Tessari, A. (2010). When motor attention improves selective attention: The dissociating role of saliency. *The Quarterly Journal of Experimental Psychology, 63,* 1387-1397. doi: 10.1080/17470210903380806

Taylor, S. E., & Fiske, S. T. (1975). Point of view and perceptions of causality. *Journal of Personality and Social Psychology, 32,* 439-445. doi: 10.1037/h0077095

Thomas, A. K., Bulevich, J. B., & Loftus, E. F. (2003). Exploring the role of repetition and sensory elaboration in the imagination inflation effect. *Memory & Cognition, 31,* 630-640. doi: 10.3758/BF03196103

Thomas, A. K., & Loftus, E. F. (2002). Creating bizarre false memories through imagination. *Memory & Cognition, 30,* 423-431. doi: 10.3758/BF03194942

Tluczek, A., Henriques, J. B., & Brown, R. L. (2009). Support for the reliability and validity of a six-item State Anxiety Scale derived from the State-Trait Anxiety Inventory. *Journal of Nursing Measurement, 17,* 19-28. doi: 10.1891/1061-3749.17.1.19

Toglia, M. P., Read, J. D., Ross, D. F., & Lindsay, R. C. L. (Eds.). (2007). *The handbook of eyewitness psychology.* Vol.1, *Memory for events.* Mahwah, NJ: Erlbaum.

Tuckey, M. R., & Brewer, N. (2003). The influence of schemas, stimulus ambiguity, and interview schedule on eyewitness memory over time. *Journal of Experimental Psychology: Applied, 9,* 101-118. doi: 10.1037/1076-898X.9.2.101

Tulving, E. (1985). Memory and consciousness. *Canadian Psychologist, 26*, 1–12. doi: 10.1037/h0080017

Valentine, T., & Mesout, J. (2009). Eyewitness identification under stress in the London Dungeon. *Applied Cognitive Psychology, 23,* 151-161. doi: 10.1002/acp.1463

van Oorsouw, K., & Giesbrecht, T. (2008). Minimizing culpability increases commission errors in a mock crime paradigm. *Legal and Criminological Psychology, 13,* 335-344. doi: 10.1348/135532507X228539

van Oorsouw, K., & Merckelbach, H. (2004). Feigning amnesia undermines memory for a mock crime. *Applied Cognitive Psychology, 18,* 505-518. doi: 10.1002/acp.999

van Oorsouw, K., & Merckelbach, H. (2006). Simulating amnesia and memories of a mock crime. *Psychology, Crime, & Law, 12,* 261-271. doi: 10.1080/10683160500224477

Vrij, A. (2005). Criteria-based content analysis: A qualitative review of the first 37 studies. *Psychology, Public Policy, and Law, 11,* 3-41. doi: 10.1037/1076-8971.11.1.3

Vrij, A., (2008). Nonverbal dominance versus verbal accuracy in lie detection: A plea to change police practice. *Criminal Justice and Behavior, 35,* 1323-1336. doi: 10.1177/0093854808321530

Vrij, A., & Mann, S. (2006). Criteria-based content analysis: An empirical test of its underlying processes. *Psychology, Crime & Law, 12,* 337-349. doi: 10.1080/10683160500129007

Ware, L. J., Lassiter, G. D., Patterson, S. M., & Ransom, M. R. (2008). Camera perspective bias in videotaped confessions: Evidence that visual attention is a mediator. *Journal of Experimental Psychology: Applied, 14,* 192-200. doi: 10.1037/1076-898X.14.2.192

Watson, D. (1982). The actor and the observer: How are their perceptions of causality divergent? *Psychological Bulletin, 92,* 682-700. doi: 10.1037/0033-2909.92.3.682

Wechsler, H., Lozano, E., Brown, D., Higgins, C., & Schlesinger, L. (2010). False assertions within true confessions. Paper presented at the Behavioral Science Unit – John Jay Inaugural Homicide and Violence Collaborative Research Conference, Baltimore.

Wegner, D. M., & Finstuen, K. (1977). Observers' focus of attention in the simulation of self-perception. *Journal of Personality and Social Psychology, 35,* 56-62. doi: 10.1037/0022-3514.35.1.56

Welford, A. T. (1986). Two comparisons of recognition and recall by signal detection measures. *British Journal of Psychology, 77,* 237-242.

Wells, G. L. (1978). Applied eyewitness-testimony research: System variables and estimator variables. *Journal of Personality and Social Psychology, 36,* 1546-1557. doi: 10.1037/0022-3514.36.12.1546

Wells, G. L., & Olson, E. A. (2001). The other-race effect in eyewitness identification: What do we do about it? *Psychology, Public Policy, and Law, 7,* 230-246. doi: 10.1037/1076-8971.7.1.230

Wells, G. L., Memon, A., & Penrod, S. D. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest, 7,* 45-75. doi: 10.1111/j.1529-1006.2006.00027.x

Wickelgren, W. A. (1974). Single-trace fragility theory of memory dynamics. *Memory & Cognition, 2,* 775-780. doi: 10.3758/BF03198154

Wicklund, R. A. (1975). Discrepancy reduction or attempted distraction? A reply to Liebling, Seiler, and Shaver. *Journal of Experimental Social Psychology, 11,* 78-81. doi: 10.1016/S0022-1031(75)80011-4

Wilson, M., Chattington, M., Marple-Horvat, D. E., & Smith, N. C. (2007). A comparison of self-focus versus attentional explanation of choking. *Journal of Sport & Exercise Psychology, 29,* 439-456.

Wolfson, M. R., & Salancik, G. R. (1977). Observer orientation and actor-observer differences in attributions for failure. *Journal of Experimental Social Psychology, 13,* 441-451. doi: 10.1016/0022-1031(77)90029-4

Woodworth, M., Porter, S., ten Brinke, L., Doucette, N. L., Peace, K., & Campbell, M. A. (2009). A comparison of memory for homicide, non-homicidal violence, and positive life experiences. *International Journal of Law and Psychiatry, 32,* 329-334. doi: 10.1016/j.ijlp.2009.06.008

Wright, D. B., & Schwartz, S. L. (2010). Conformity effects in memory for actions. *Memory & Cognition, 38,* 1077-1086. doi:10.3758/MC.38.8.1077

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurology and Psychology, 18,* 459–482. doi: 10.1002/cne.920180503

Young, S. G., Hugenberg, K., Bernstein, M. J., & Sacco, D. F. (2012). Perception and motivation in face recognition: A critical review of theories of the Cross-Race Effect. *Personality and Social Psychology Review, 16,* 116-142. doi: 10.1177/1088868311418987

Zajonc, R. B. (1965). Social facilitation. *Science*, *149,* 269-274. doi: 10.1126/science.149.3681.269

Zajonc, R. B., & Sales, S. M. (1966). Social facilitation of dominant and subordinate responses. *Journal of Experimental Social Psychology, 2,* 160-168. doi: 10.1016/0022-1031(66)90077-1

Zimmer, H. D., Helstrup, T., & Nilsson, L. (2007). Actions events in everyday memory and their remembering. In S. Magnussen & T. Helstrup (Eds.), *Everyday Memory* (pp. 57-91).