Florida International University

FIU Digital Commons

6-8-2022

The Influence of a Showup Identification on a Subsequent Witness Description

Kelsey Lynne Hess
Florida International University, khess004@fiu.edu

Follow this and additional works at: https://digitalcommons.fiu.edu/etd

Part of the Cognition and Perception Commons, Cognitive Psychology Commons, Criminal Procedure Commons, and the Other Psychology Commons

Recommended Citation

FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

THE INFLUENCE OF A SHOWUP IDENTIFICATION ON A SUBSEQUENT

WITNESS DESCRIPTION

A dissertation submitted in partial fulfillment of the

requirements for the degree of

DOCTOR OF PHILOSOPHY

in

PSYCHOLOGY

by

Kelsey Hess

2022

To: Dean Michael R. Heithaus
    College of Arts, Sciences and Education

This dissertation, written by Kelsey Hess, and entitled The Influence of a Showup Identification on a Subsequent Witness Description, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

_____
Bennett Schwartz

_____
Stephen Charman

_____
Amy Hyman-Gregory

_____
Ronald Fisher, Major Professor

Date of Defense: June 8, 2022

The dissertation of Kelsey Hess is approved.

_____
Dean Michael R. Heithaus
College of Arts, Sciences and Education

_____
Andrés G. Gil
Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2022

ii

DEDICATION

This dissertation is dedicated to my parents and to Kristie, whose faith in me sustained me in those moments when my own failed. Thank you for the person and the academic I am today.

ACKNOWLEDGMENTS

It takes a village. This project would have been impossible without the help and support of so many individuals. I wish to first thank my professors and committee members. Dr. Steve Charman, thank you for your humor and for cutting this dissertation down to a manageable number of conditions. Without you, I would likely be collecting data for another three years. Dr. Amy Hyman-Gregory, thank you for your expertise and outside perspective. Your advice helped me to clarify and simplify the conditions of this project. Dr. Bennett Schwartz and Dr. Leslie Frazier, thank you for your continued support of my research projects and your support of teaching and service endeavors. Thank you for welcoming me into your lab and supporting my interdisciplinary interest. Your fostering of such interest is invaluable to me. Dr. Ron Fisher, thank you for your care and your mentorship over the last five years. Though, in the beginning, I needed a glass of wine when I received your feedback on my writing, you have made me a better writer. Thank you for support of my teaching goals. I will carry your stories and your cognitive interview into many undergraduate classes to come. Thank you.

Thank you to Danielle. You always seemed to be extraordinarily adept at knowing what I was thinking or feeling at any given moment. It is so much of a comfort to have someone know me that well and care about me that much, especially amidst the stress of grad school. Thank you for all the breakfasts, outdoor adventures, and for my Wisconsin vacation spot. Thank you to Haley. Your passion for helping others inspired me more often than you realize. I cannot wait to see the

teacher and the leader you are already becoming. Thank you to all my legal friends, those graduated and those at FIU. You are what makes our program a kind of family.

Lastly, I would like to thank my research assistants: Kamila Karam, Ceila Perez, Jennifer Ortega, Kellie Peitersen Sullivan. Without your dedication, this project would have been impossible.

ABSTRACT OF THE DISSERTATION

THE INFLUENCE OF A SHOWUP IDENTIFICATION ON A SUBSEQUENT

WITNESS DESCRIPTION

by

Kelsey Hess

Florida International University, 2022

Miami, Florida

Professor Ronald Fisher, Major Professor

Showups account for 30%-77% of initial identification procedures conducted by police (Flowe et al., 2001; Gonzalez et al., 1993; McQuiston & Malpass, 2001). Unlike lineups, showups are typically administered within a few hours of the crime event. The administration of a showup, due to its timing, is likely to precede a more formal police interview. The showup may introduce new characteristics of the suspect's physical appearance to the witness. Any new characteristics inconsistent with the perpetrator's appearance at the crime can be considered misinformation, which has the potential to contaminate witness recall. Although the contaminating effects of a showup have been demonstrated on successive identification procedures (Memon et al., 2002), showup contamination of witness recall has not been investigated.

The current project investigated the extent to which misinformation displayed during a showup was incorporated into a later recall attempt and how a witness' identification decision influences the incorporation of misinformation into recall. Participants first viewed a mock crime video and afterward were administered a showup

that was either consistent in appearance with the perpetrator or inconsistent with the perpetrator (misinformation) in the crime. After participants made an identification decision, they were asked open and cued recall questions about the videoed event and the perpetrator. In the present study, exposure to a showup containing misinformation caused participant witnesses to recall that misinformation later when asked questions about the original perpetrator's appearance at the time of the crime. Further, participants' recall of misinformation was moderated by their identification decision. Committing to the showup (identifying the suspect as the perpetrator) increased the amount of misinformation participants recalled during later questioning. Results of the study suggest that mere exposure to misinformation increases the likelihood of a witness incorporating the misinformation into later recall. Further, if a witness makes a positive identification, even an erroneous identification, the misinformation effect is greater than if the witness rejects the showup. The present study results suggest that investigators should be mindful of the effects of an earlier showup identification on witness recall.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

Adjusted normalized resolution index	ANRI
Analysis of variance	ANOVA
Average over-under confidence	OU
Calibration	C
Confidence interval	CI
Identification	ID
Intraclass correlation	ICC
Mean	M
Post-event information	PEI
Standard error	SE

I.   INTRODUCTION

Eyewitnesses seldom have pristine memories for a crime. This can occur because of a variety of factors, a few of which are within the control of police investigators (system variables) (Wells, 1978). Whereas physical aspects of the viewing are constrained by time of occurrence, distance, and weather conditions, etc., system variables like suspect identification procedures and interviewing tactics used by police have the power to influence witness memory as well. Tactics employed by police to assess witnesses' memory after a crime has occurred, like identification procedures and interviews, have come under scrutiny in recent decades as they may distort memory. One practice frequently criticized by legal psychology researchers for its ability to taint eyewitness memory is a showup identification task (Neuschatz et al., 2016).

The Showup Identification Procedure

A typical show-up procedure consists of a few key elements of interest for memory research. First, showups present only a single suspect (sometimes shown in handcuffs or visibly detained), which is inherently suggestive (Neuschatz et al., 2016). Second, showups supply post-event visual information[1] that is similar in kind to information retained in the memory for the crime. Third, showups act as a recognition test of memory that triggers retrieval and, by default, a rehearsal of the original crime memory. Fourth, by presenting a second source of information about the same event, showups run the risk of creating a source-monitoring error in the witness such that information from the showup may be misattributed to the original crime event (Turtle et

---

[1] Post-event information (PEI) is defined within this manuscript purely as any event-related information which is presented to a witness after a critical event. PEI can be presented explicitly or implicitly.

al., 2008). Lastly, showups are typically conducted shortly after a witnessed crime event (often within minutes or hours), creating two closely linked memories temporally close together (Neuschatz et al., 2016). The implications of these key elements are explored below in greater detail.

Suggestiveness. The showup identification procedure is generally discouraged by eyewitness researchers because of its inherently suggestive nature and the superiority of lineups in terms of accuracy (Gronlund et al., 2012; Lawson & Dysart, 2012; Neuschatz et al., 2016; Steblay et al., 2003; Wetmore et al., 2015). In a traditional lineup a witness is shown several photographs or live persons (fillers) in order to identify the suspect or dismiss the lineup. However, a showup provides a witness with only one photograph or live person to make an identification decision but with no innocent fillers. Without known innocent fillers, all identifications are of the suspect and are either hits (correct choice) or false identifications (incorrect) (Neuschatz et al., 2016).

Utility. Showup identifications are common in the United States, accounting for 30%-77% of initial identification procedures conducted by police (Flowe et al., 2001; Gonzalez et al., 1993; McQuiston & Malpass, 2001). Despite inherent shortcomings, showups are often used by law enforcement because of their convenience, ease of administration, and for a quick test in the field, when time is of the essence. Show-ups also possess the benefit of allowing for the quick dismissal of a suspect when he or she is rejected by the witness, thereby avoiding unnecessary detention.

Example of a Showup Identification Procedure. For illustrative purposes, imagine the mugging of a couple of tourists. In the scuffle, the wife is shot, and the perpetrator flees on foot. The husband, a witness to the murder, immediately dials 9-1-1

and describes the perpetrator. Shortly thereafter, police apprehend a teenage suspect matching some aspects of the husband's description of the perpetrator in the surrounding neighborhood. Police bring the witness to the suspect for the purpose of making a quick identification decision. The husband identifies the suspect as the person who shot his wife, and the suspect is taken into custody and charged with murder in the first-degree.

The above example is representative of the typical leadup to a showup identification procedure. In truth, the example is not theoretical; it is the real case of Brenton Butler, a 15-year-old charged with the murder of a female tourist in Jacksonville, FL (Lestrade, 2001). A 2001 documentary entitled *Murder on a Sunday Morning* details Brenton's arrest, interrogation, subsequent false confession, and eventual release following a "not guilty" verdict.

Police Procedure After a Showup. In cases in which a suspect is quickly drawn from the area of the crime following an initial description, the police often have not had enough time to formally interview the witness(es) and gain a complete description of the perpetrator (Neuschatz et al., 2016). In other words, it is commonplace for a showup identification to precede a formal witness account of events and the gathering of a complete description of the perpetrator, both of which are necessary evidence-gathering activities for later legal proceedings. When participants engage in a preceding identification task prior to a formal interview it is possible for cross-contamination between the two memory sources (memory for the actual perpetrator and memory for the person in the identification task). Witnesses may forget the source of a memory (Jacoby et al., 1989), making them more susceptible to the unconscious influence of new information and/or misinformation. On the witness stand, the witness may deny or

discount the influence of the showup, which may be interpreted by jurors to mean that the earlier showup did not, in fact, influence the witness's later description (O'Neill Shermer et al., 2011). To understand how an initial showup identification can taint subsequent eyewitness recall, a background on relevant memory processes will be covered below.

The current study examined the influence of an initial identification procedure, in the form of a showup, on a subsequent witness description of the perpetrator. After participants viewed a critical event (commission of a crime), the initial identification task (showup) served to provide the witness with post-event information (PEI), either consistent or inconsistent[2] with a witnessed video event. Misinformation provided in the showup was expected to contaminate a witness' recollection for the original (target) event and perpetrator such that details would be misremembered, omitted, or added when the witness was asked to recall the target event later. Specifically, the present study design examined whether misinformation provided in the showup (person details of suspect) contaminated the original memory for the perpetrator and event, as assessed in a later written recall.

The following introduction describes how misinformation contaminates a witness' recollection through retroactive interference and source monitoring errors. To do so, the present research borrowed from the tenets of basic misinformation paradigms, which administer misinformation after a witness has seen a critical event. The use of the showup identification procedure and its potential contributions to creating memory errors is discussed in relation to its occurrence before a formal eyewitness interview. Typical

---

[2] "Consistency" within this manuscript refers to non-person appearance characteristics (i.e. clothing, jewelry, tattoos, etc.) and not the person themselves.

police interview procedure and chronology are briefly discussed, followed by
methodology for the current study, results, a discussion of findings, their theoretical
underpinnings, and their application to the criminal justice system.

Memory is Mutable

Witness memory does not resemble the permanence of a photograph or video
camera. Memory is malleable and has been shown to change over time or in the presence
of post-event information (Loftus, 2019; Reyna & Lloyd, 1997; Schacter, 1989). This fact
of memory as being changeable and susceptible to error in the presence of new
information is the crux of reconstructionist theories of human memory (Wells, 1982).
Memory records can become blended with one another when they are not distinct from
one another through partial encoding or forgetting mechanisms, creating a memory error.
Schacter (2001) describes memory "sins" (errors) as somewhat vestigial evolutionary
advantages and a function of necessary memory elasticity, though, he admits, they can
produce disastrous consequences in legal and social domains. The principle of cognitive
economy suggests that incoming information is organized for maximum efficiency; it
would therefore be inefficient and space-consuming for human memory to store multiple
and varied representations of the same event separately (Kusev & van Schaik, 2013).
When multiple pieces of information originate from different sources and at different
times, they can be combined into a single representation if they contain enough key
similarities. This process is otherwise known as semantic integration (Loftus, 1981). It is
widely accepted among cognitive researchers today that memories are altered or made
more or less accessible in the presence of semantically related incoming or preceding
information (Baddeley & Logie, 1999; Loftus, 2019; Sutherland et al., 2001).

Memory Alterations and the Legal System. Much applied eyewitness research investigates memory alterations that result in incorrect identifications or erroneous reporting of an event (Loftus, 2019). The attention is well-deserved as mistaken eyewitnesses are associated with 69% of wrongful convictions (Innocence Project, 2020). Between 15% and 34% of those mistaken identifications occurred when a showup was administered (Garrett, 2011; West & Meterko, 2016). Oftentimes these errors are made with no malintent; the witness trusts their memory abilities, which they have relied upon for information such as where they placed a set of keys or the name of the neighbor who lives down the street. Reminiscent of Schacter's (2001) approach to the vagaries of human memory, it is not surprising that the same mechanisms that bestow space-saving advantages to memory like cognitive economy are also responsible for errors. Repetition and rehearsal, mechanisms regarded to strengthen memory, do not discriminate between accurate (consistent with the critical event) and inaccurate (inconsistent or misleading) information (Pickel, 2004). There often is no such distinction between accurate and inaccurate, as objective truth is beyond the ken of the subjective witness.

Noticing Memory Errors. The effects of misinformation are difficult to overcome, even when information is revealed to be demonstrably false, as when an authority acknowledges a mistake (Ecker et al., 2011). Ecker and colleagues (2011) discovered that weak retractions of misinformation do little to decrease the influence of misinformation on memory, suggesting that misleading PEI is particularly potent in altering a witness' recollection. PEI administration is no longer constrained to written post-event narratives and leading questions as in the original studies by Loftus (1970s - 2018). PEI can be administered in a variety of different formats such as pictures, which,

6

ultimately, create the potential for distortion of memory for the critical event (Wade et al., 2002). PEI can derive socially from identification performance feedback given by investigators or originate in suggestive questioning during an interview or interrogation (Loftus, 2005; Steblay et al., 2014). Co-witnesses and news media can supply post-event narratives that may support or conflict with the witness' own memory for the critical event (Paterson & Kemp, 2006). Most relevant to the present investigation, PEI can occur in the form of a photograph (Wade et al., 2002).

Misinformation

Incoming post-event information has the potential to interfere with and alter a target memory, but not all "alterations" are detrimental (Hemmer & Styvers, 2009). Incoming information consistent with the event can strengthen a memory, whereas inconsistent information (misinformation) can weaken or harm memory for the original event. Interference occurs when activation of non-target memories (memories not sought after,) in place of or in concert with a target memory, influences the accuracy of recall for the target memory (Hemmer & Steyvers, 2009). Interference can occur in two primary ways: "Proactive" and "retroactive" interference (Postman, 1961). These terms pertain to the temporal location of the target and non-target (interfering) event. Proactive interference occurs when an earlier, non-target memory interferes with a later, target memory. Retroactive interference, the more well-studied of the two, and most applicable to the present study, occurs when a later, non-target memory interferes with an earlier, target memory. Though retroactive interference is generally perceived as a negative concept (as in blocking access to a correct memory trace), post-event experiences can

lead to positive changes in the memory record by strengthening the correct memory of the event (Koutstaal et al., 1998).

Post-event information that is consistent with the original event strengthens, but still, by definition, alters memory for that original event. Early research on repeated presentation of stimuli and subsequent memory accuracy and endurance reveals, not surprisingly, that memory is strengthened when the same stimuli are presented multiple times (Hintzman, 1976). For example, post-event information consistent with the critical event can render an earlier encoding more complete by providing a review of information (Robinson-Riegler & Robinson- Riegler, 2004). Post-event misinformation, on the other hand, can lead to memory errors and a weakening of memory for the original event. PEI inconsistent with the critical event has been shown consistently to corrupt recall when eyewitnesses are exposed to the misleading information (Chrobak & Zaragoza, 2013; Lindsay et al., 2004).

Incorporating Misinformation into Memory. Incorporating misinformation into memory for the critical event follows the same encoding and learning processes as for most new to-be-remembered information (Yang et al., 2018). Post-event information presents memory cues for the original event, potentially triggering recall of that original event in tandem with new related information. The process of repeatedly retrieving a memory can strengthen learning of subsequent related material and establish stronger linkages between the PEI and the related critical event (Chan et al., 2018; Yang et al., 2018). Each new presentation of related post-event information allows for a potential retrieval of the critical event through associated cues. These repeated retrievals and

8

stronger linkages between the crucial event and subsequent PEI allow for the strengthening or distortion of a memory depending upon the consistency of the post-event information with the critical event (Chan et al., 2018; Yang et al., 2018).

PEI can come in many different forms, both verbal and pictorial. Misleading photographs can alter recollections or even create new false memories (Wade et al., 2002). Wade and colleagues (2002) demonstrated that doctored photographs can be used to create false childhood memories in adults of being on a hot air balloon ride. When a police officer administers a showup, he or she supplies the witness with visual post-event information. The actual process of making an identification serves as a recognition test of memory and a retrieval attempt. The witness is being asked to compare their original memory of the perpetrator to the appearance of the individual being shown (Neuschatz et al., 2016). This preliminary retrieval attempt potentiates the learning of subsequent new information (PEI) irrespective of whether the showup photo is consistent with the original recollection or inconsistent (LaPaglia & Chan, 2019). Information contained in the showup that is inconsistent with the witness's memory of the perpetrator serves as misinformation and can interfere with their later recollection of the crime.

Researchers in eyewitness memory point to interference theory to account for mistaken eyewitness identifications following from previous mugshot exposure (Dysart et al., 2002; Memon et al., 2002). Interference theory posits that incoming information has the potential to interfere with older memories and vice versa (Blank, 2005). The classic misinformation paradigm, introduced by Loftus and colleagues (1978), capitalizes on the phenomenon of retroactive interference. Researchers allow witnesses to experience the target event and then subsequently introduce new, event-related

information, either in the form of a narrative, or through questions asked (Loftus et al., 1978). This PEI has the potential to alter a witness' recollection of the original event causing additions (new details not previously remembered), deletions (details from original memory omitted), and alterations (changes to details of the original memory). Across retroactive interference experiments, post-event information consistent with the original event improves memory for the original (target/critical) event, resulting in more accurate recall (Wylie et al., 2014). Misinformation, conversely, impairs memory for the original event and results in an inaccurate recollection of the target event (Loftus, 1979).

It is unknown to what extent misinformation affects the original memory for an event (Saunders & MacLeod, 2002). Some experimental paradigms and stimuli seem to result in an absolute alteration of the memory in which a memory is "updated" with inaccurate information (Loftus et al., 1978; Loftus, 1979). Still other studies explain the misinformation effect as a competition of memory traces wherein the original and subsequent traces are confused in the witness' memory, but the original memory trace remains intact (Morton et al., 1985). The distinction between the erasure hypothesis (absolute alteration) and the coexistence hypothesis (competition of traces) is often determined with a source monitoring task, to see if the participant can parse the original memory from later events (McCloskey & Zaragoza, 1985). McCloskey and Zaragoza (1985) disagreed with Loftus' early erasure hypothesis and stated instead that the memory traces coexist. Other researchers demonstrated that the misinformation effect was indeed a coexistence of memories as opposed to an overwriting of the original source memory (Bekerian & Bowers, 1983; Christiaansen & Ochalek, 1983; Loftus & Hoffman, 1989; Pirolli & Mitterer, 1984; Shaughnessy & Mand, 1982; Wagenaar & Boer, 1987).

Given that witnesses are theoretically capable of differentiating between different memory traces according to source, why do witnesses seem to meld together post-event information and the original memory?

A source monitoring explanation, as opposed to an interference explanation, may better account for erroneous recollections that incorporate misinformation while the original memory for a critical event remains intact (Ayers et al., 1998). As an exploratory measure in the present study design, participants were given a source monitoring task in which they parsed between information presented after the critical event and the critical event itself. This task is not unlike what may happen during a cross examination scenario or deposition when opposing counsel challenges eyewitness evidence by suggesting that the witness is combining or confusing two or more memory records. For instance, opposing council might bring up the fact that the witness made a showup identification and suggest that their current memory for the original perpetrator has been tainted by the appearance of the suspect police had detained for the identification task. If participants are able to effectively parse information between two sources (the identification test and the original crime), it may indicate support for the coexistence hypothesis of misinformation. If witnesses do, in fact, possess two or more distinct memories of the event and/or perpetrator, parsing between those memory records may help interviewers, witnesses, and jurors account for the various sources in witness' memory reports, allowing for more accurate testimony. In an interview context, to obtain as much information as possible, interviewers should provide witnesses with memory aids or mnemonics (Memon & Higham, 1999). A simple direction given to the witness by police

to monitor for source may be useful for encouraging accurate reporting and for generating follow-up investigations.

A Source Monitoring Account of the Misinformation Effect

Memory errors, such as those caused by misleading post-event information, are often regarded as stemming from a failure to bind information with its appropriate source (Torres-Trejo & Cansino, 2016). In the process of semantic integration, in which memories with similar key elements are seemingly fused together, some pieces of information are lost because of weak encoding or perceived lack of utility (Loftus, 1981). The result is a memory that is contaminated with information from a different, and potentially inaccurate source. Source monitoring errors can prove dangerous in an investigative interview or on the witness stand when a familiar face from another memory is confused with that of the true perpetrator (Read et al., 1990).

Before delving into errors of source monitoring, one must understand the framework by which the sources of memories are differentiated from one another. The origin of a memory is vital to subjective judgments of veracity and trustworthiness that a witness makes when evaluating a particular recollection. Source information does not typically manifest in a particular tag or label (Johnson et al., 1993). "Source" should be conceptualized as a compilation of different contextual aspects or characteristics present during the encoding of a particular memory (spatial, temporal, and social contexts, speaker, modality, etc.). Source monitoring occurs when a person makes "attributions about the origins of [his or her] memory, knowledge, and beliefs" (Johnson et al., 1993 pg. 3). The source monitoring framework is concerned with monitoring of external and internal sources and making judgments as to which source a memory belongs.

Source monitoring, unlike its predecessor reality monitoring (internal vs. external sources), allows for a framework distinguishing between external sources, such as a witnessed crime and a viewed photograph of a suspect (Johnson et al., 1993). Many source monitoring decisions do not undergo conscious deliberation. These decisions tend to be quick and heuristic in nature. Systematic and slower source monitoring judgments occur when a perceiver is conscious of the importance of source or is skeptical of its accuracy. Memory for source is vulnerable to disruption and partial encoding (Johnson et al., 1993).

Eyewitness contexts lend themselves well to impaired source encoding. Many crimes happen quickly, within a few seconds. Crime events tend to be stressful and may occur at night when viewing conditions are less than desirable. This combination of factors provides for weak encoding of available stimuli, including source, and thus increasing errors like source misattribution (Johnson et al., 1993). Witnesses have little time and resources to process source at the moment a crime is occurring. Their thoughts are typically directed toward their own safety and potential for victimization as opposed to remembering the event for purposes of reporting later. It is no surprise, given the aforementioned restriction on time and resources, that eyewitnesses often have difficulty recalling a source or that they misremember a source (Johnson et al., 1993). Memories that have similar contextual information, but different sources, can be combined with one another when the witness attempts to recall the target memory (Mitchell & Johnson, 2000).

Source confusion is likely to occur when (A) the context of the target event is not well encoded (e.g., due to poor viewing conditions or little time to process an event), (B)

13

when another memory possesses similar characteristics to the target memory (i.e. a suspect in a showup resembling the perpetrator) and (C) when the target memory is reactivated around the same time as encoding of the similar non-target memory (i.e. the identification decision task activates a memory of the perpetrator simultaneous with the witness viewing a suspect) (Mitchell & Zaragoza, 2001). Mitchell and Zaragoza (2001) theorized that this temporal proximity of encoding one memory and reactivating an older target memory increases the functional similarity between the target memory and the other, newer, memory. Their study utilized post-event suggestive questions to supply post-event misinformation and reactivate the initial memory. A showup identification often meets these same prerequisites of poor contextual encoding, perceptual and contextual similarity, and reactivation of the original memory. A showup identification task closely follows a witnessed crime, the suspect shown in the showup bears similarity to the perpetrator (or is the perpetrator), and there exists an inherent recognition task in the identification decision which forces a recollection of the original event.

Delay

Aside from source confusion resulting from exposure to PEI contributing to the malleability of eyewitness memory, delay can also exacerbate the effects of misinformation (Gabbert et al., 2003; Paterson et al., 2009; Paz-Alanzo & Goodman, 2008). In real-world eyewitness contexts, police report that there is often a delay between the occurrence of the crime and a subsequent formal interview due to pressures of time and resources (Wright & Holliday, 2006). In fact, it is not unusual that this delay can span weeks after the critical event (Brown et al., 2008).

Metamemory Assessment

Failures of source monitoring and resultant memory errors tend to evade

conscious perception. Witnesses seem to be unaware of the influence of various sources

on their own memory. Even if a witness does realize that they experienced post-event

information from a source separate from the critical event, they may discount its

influence on their recollection of the original event (Steblay et al., 2014). As evidenced in

various feedback studies conducted by Gary Wells and others (Wells & Bradfield, 1998),

witnesses are often unaware of post-event influences on their memories (Steblay et al.,

2014). Some participants in these studies even forget that the administrator of the lineup

had spoken to them at all (Brown et al., 1977). Further still, some witnesses may forget

the identification procedure altogether, actually making it more influential in the

incorporation of PEI (Jacoby et al., 1989). Witnesses can be questioned in court as to

whether they believe their memory of the event to be influenced by "other" sources of

information, like news media, co-witnesses, lineup procedure, etc. Many witnesses assert

that this "outside" information did not taint their memory for the original event (observed

by Ronald Fisher in court). Juries and judges have a tendency to believe witnesses on this

point if they seem sincere, and interpret that the witness is telling the truth, to the best of

their knowledge (Friedland, 1989).

Misinformation from Photographs of People

Misinformation can originate in many different formats, including photographs,

and result in source confusion (Wade et al., 2002). The topic of the photographs,

however, may have important implications for memory. Memory for events and objects

has been well-studied within typical misinformation paradigms in which the participant is

asked to verbally recall a critical event. Memory for people, on the other hand, has received less attention as potential PEI in an interviewing context, though unconscious transference effects have been observed in studies in which a witness makes an identification after being exposed to a mugshot book or previous identification procedure (Deffenbacher et al., 2006). According to some researchers, memory for people and, in particular faces, tends to be more durable than memory for events, resisting the influence of delay between stimulus and testing (Clifford & Bull, 2017). Davies and colleagues (1979) suggest that memory for faces was "special" and not susceptible to the incorporation of misleading PEI. Loftus and Greene (1980) found that their participants incorporated erroneous post-event details ostensibly volunteered by another witness into their own memory for the perpetrator's face, suggesting that faces are susceptible to incorporation of PEI. Loftus and Greene's series of three studies concluded that memory for faces is not special with regards to the effects of misinformation, making it a viable mode of PEI administration.

Suggestiveness of a Showup

Presenting misinformation in the form of a showup may be particularly dangerous because of the inherent suggestiveness of the procedure. The circumstances in which a showup is presented convey additional information that seems to confirm the misinformation presented in the showup (Goodsell et al., 2013). The police have found a person in the area matching the witness's description of the suspect and the suspect appears detained (in handcuffs or otherwise escorted by police) before the witness. These "confirmatory messages" can enmesh the misinformation with the original memory, making it difficult to parse apart the two sources (information from the showup and

information from the original perpetrator). This difficulty separating sources of information appears to be particularly strong in instances in which a person is motivated to believe the information is accurate (Pena et al., 2017).

The Interplay Between Identifications and Interviews

Showups present a unique forum by which to study the effect of pictorially presented misinformation (as opposed to a post-event verbal narrative). A showup identification often precedes a formal interview, allowing for the possibility that the showup can influence the later interview. The showup identification procedure also typically takes place relatively soon after the crime event. Close temporal proximity of the misinformation to the to-be-remembered event and similar contextual information increase the likelihood that the critical event will be confused with later PEI, leading to potential source misattribution errors and retroactive interference (Ecker et al., 2014). The influence of a prior exposure to a suspect (through a showup or mugshot) on a subsequent identification decision has been shown to taint the later identification when the suspect is not the true perpetrator (Memon et al., 2002). Research has yet to examine the influence of exposure to a suspect on a subsequent description of the event and perpetrator given by a witness.

Person Description

Law enforcement officers often lament the trend that witness descriptions of perpetrators contain so few details relative to their descriptions of the crime itself (Fisher & Geiselman, 2010). Obtaining person descriptors is a critical stage both in catching a criminal perpetrator and collecting evidence for trial (Sporer et al., 1996). In fact, even after an identification has been made and the suspect is apprehended, it is likely that

police will query the witness for person descriptors to strengthen the case for court and defend the apprehension and identification procedures used (Meissner et al., 2007; Sporer et al., 1996). Person descriptors of the perpetrator are consistently presented at trial to show the jury how well the suspect/defendant aligns with the description from the witness' memory, which according to the Bigger's Criteria is an indicator of eyewitness accuracy (Meissner et al., 2007; *Neil v. Biggers*, 1972).

Quantity and Accuracy of Descriptors. Like memory for an event, memory for a person can be affected by a variety of factors including stress, substance-use, lighting, distance, gender, race, and post-event information from other witnesses, the media, or from investigators (Kuehn, 1974; Sporer et al., 1996). In real-world police investigations, person descriptors (details) tend to be minimal in number and can be vague, with an average of only 7.2 details in a typical report (Kuehn, 1974; Sporer et al., 1996). Witnesses tend to notice more global appearance characteristics like gender, race, age, and build. Minute details like hair and eye-color are reported less frequently. Studies that interviewed witnesses in laboratory settings were able to extract more person descriptors, though these discrepancies are thought to be influenced by interview technique employed and the witness' experience with being interviewed about that particular crime, with many witnesses having already been interviewed multiple times (Yuille and Cutshall, 1986). Of relevance, the person details reported by witnesses were not always accurate. Yuille and Cutshall uncovered that 23% of the person descriptors were inaccurate in relation to all other descriptor types (actions, setting, etc.) (as judged beyond an acceptable range of values by the researchers). When narrowed to facial descriptors, like those describing eyes, nose and mouth, eyewitnesses do not perform much better in terms

of number of details or accuracy. Van Koppen and Lochun (1997) found that inner facial features (like nose, mouth, and eyes) accounted for 5% or less of person descriptors volunteered in real-world perpetrator descriptions of 431 robbery cases in the Netherlands. Most of those descriptors, when compared to the apprehended suspects, were wrong. In the Van Koppen and Lochun study an unanticipated negative correlation was found between the number of details reported and accuracy. As the number of person descriptors increased, the proportion of accurate to inaccurate details decreased. This finding has yet to be replicated within laboratory research. A majority of the literature demonstrates that witnesses tend to focus on the upper half of the face, most notably the hair (Demarchi et al., 2009). Unfortunately for police officers, hair is one of the most changeable aspects of a person and, as a result, offers little help in ascertaining a suspect (Meissner et al., 2007; Satin & Fisher, 2019). Witness difficulties in generating helpful physical details of the perpetrator may, in part, stem from a crossing of modality between the visual presentation of a suspect and the verbal description task. A witness must take a *visual* memory record for the stimulus and describe it *verbally*, a more difficult task than making an identification in which a *visual* memory record is compared to a *visual* stimulus (Sporer et al., 1996; Van Koppen & Lochun; 1997).

Clothing Bias. Aside from descriptions of the perpetrator's body type and face, witnesses most often report the clothing of a suspect (Lindsay et al., 1994). Like hair style, this aspect is readily changeable, but may be of some use when a suspect is still in the immediate area and can be apprehended soon after the commission of the crime. Lindsay and colleagues (1994) noticed that 99% of participant-witnesses to a staged crime reported on the perpetrator's clothing details. Further, almost 50% of descriptors

given by witnesses to a crime consisted of information about the perpetrator's clothing. A match between suspect and perpetrator clothing has also been shown to lead to false identifications of innocence suspects (Dysart et al., 2006; Yarmey et al., 1996). This occurred only in instances in which the innocent suspect bore similarity to the perpetrator and was not an "implausible filler" (Dysart et al., 2006). Attending to clothing, unfortunately, does not increase correct identifications (Dysart et al., 2006). In the present study design, physical appearance of the suspect (including clothing) in the showup represents the bulk of the misinformation manipulation and provided the basis for the eyewitness' description of the perpetrator, along with the original video crime event.

Current Study

The design of the present study was modified since its original conception and proposal to accommodate pandemic-related challenges including low research participation rates by undergraduate students, high attrition rates, and a protracted collection of the necessary sample. The above introduction and literature review serves to record original aspects of the study design, some of which are no longer included in the present design but serve as a guide to future research in the area. The original design included a week delay between showup and recall, initial witness description, and a no-showup control condition. These additional variables were removed to allow for a simpler design and a smaller sample size at a time when data collection was proving difficult. The final study design was an extension of the original Loftus misinformation paradigms. In the current research design a showup (photograph of a person) contained either appearance details (clothing, markings on skin, etc.) consistent with the original perpetrator or inconsistent with the original perpetrator (misinformation). Witnesses were

expected to incorporate any misinformation gleaned from the showup in a subsequent description of the original perpetrator. Currently, research on showups is limited to their suggestibility and influence on a subsequent line-up identification. The impact of a showup identification on a later witness description of the perpetrator has not yet been examined and there is limited research on witness awareness of how a showup influences their memory. The current research project examined the incorporation of misinformation (appearance details inconsistent with the original crime event) on a witness' description of the original event (applicable to an interview or in court setting). Should memory contamination occur, it is important to know if witnesses are able to distinguish between various details presented in the original crime event and information presented in a showup (source monitoring). If a witness is able to correctly differentiate between details of each source, it would suggest that the original memory for the event is preserved separately from the memory for the showup.

Participants in the present study played the role of an eyewitness and viewed a video of a laptop theft. After completing a distractor task, a showup identification was administered showing the suspect apprehended by police. The showup was either target absent (innocent suspect) or target present (perpetrator) and contained visual information (in the form of suspect appearance) that was either consistent or inconsistent with the original perpetrator. After viewing the crime video and showup, participants were asked to generate a description of the perpetrator as he appeared at the time of the crime. Participants typed their descriptors of the perpetrator and event for ease of coding and administering in an online format. The typed descriptions were coded for quantity of

detail, accuracy of details, and source. Details that inaccurately described the original perpetrator were coded as being either consistent or inconsistent with the showup.

Hypotheses in the present study were composed of both causal and correlational predictions. Causal hypotheses are presented first, followed by a correlational hypothesis based on participants' showup identification decision. Causal hypotheses are as follows. Participants exposed to target-present showups will describe the perpetrator more accurately than those exposed to a target absent showup. Secondly, if participants were exposed to a showup in which the suspect's physical appearance is different from the perpetrator, participants will incorporate more inconsistent PEI into their account relative to those who receive a showup with the suspect's appearance unchanged.

The correlational hypothesis examines the outcomes of identification decisions as they theoretically influence witness recall. First, participants who commit to the showup, (make a hit or false alarm) will incorporate more misinformation into memory than those who reject the showup (make a miss or correct rejection). This hypothesis will be tested against a competing explanation of good encoding as evidenced by identification accuracy. In other words, it may be that a good encoding of the perpetrator results in a more accurate identification and a more accurate verbal description. Lastly, an exploratory analysis on the source monitoring task was conducted to determine if witnesses can effectively parse between the two memory sources (original perpetrator and showup).

<center>II.   METHOD</center>

Participants

      The current study recruited 377 students from a large Florida university. An a priori power analysis was conducted using G*Power version 3.1.9.7 (Faul et al., 2007) for sample size estimation using a dependent variable of units of information. With a significance criterion of $\alpha = .05$ and power $= .80$, the minimum sample size necessary for a small to medium effect size (set at .30) is $N = 279$. Anticipating a false alarm rate of .30 (Charman & Kavetski, 2016) in target-absent showups, the sample size was adjusted to 363 participants. Participants received course credit through SONA online systems for completing the study. Participants' ages ranged from 18 to 55 years with a mean of 22.96 years. Most participants identified as female (88%). Eleven percent identified as male, 1 % as non-binary, and < 1% preferred not to disclose. The ethnicity of participants mirrored closely that of the surrounding university community with 66% identifying as Hispanic, 18% as White, 12% as Black, 2% as Asian/Pacific Islander and 2% as Other. Recruiting of participants took place online through SONA and through advertisements in classes. Participants completed the study in one session that lasted between 45 min to one hour.

Design

      The final study design was a simple moderation design. The independent variables were Consistency (suspect appearance consistent with perpetrator vs. suspect appearance inconsistent with perpetrator) and Target Presence (target present vs. target absent). The moderator was Identification Decision (hit vs. miss vs. false alarm vs. correct rejection). The primary dependent variable was the number of misinformation

<center>23</center>

units recalled (memory contamination). See Figure 1 for the conceptual model. Additional dependent measures include overall incorrect units of information (errors), the proportion of accurate units of information relative to total units of information (descriptors), accuracy rates in monitoring for source, the confidence-accuracy correlation for recall and identification decision, accuracy of the identification decision, and a manipulation check. Coding schemes are provided below.
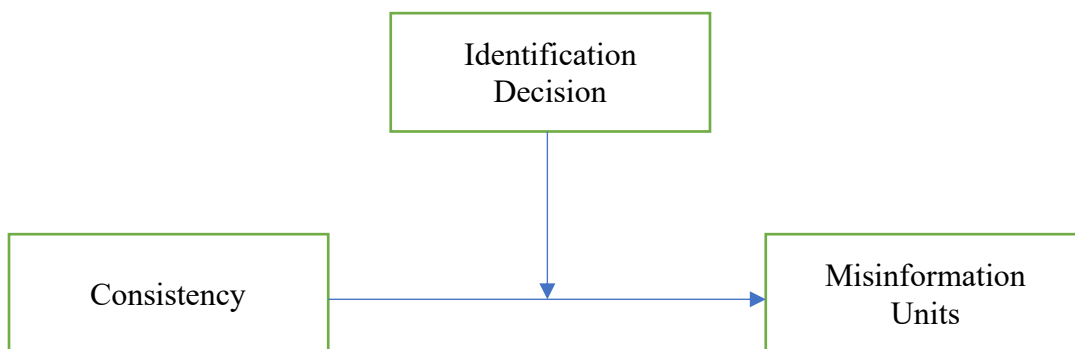
Figure 1. Conceptual Moderation Model

Materials

      Mock Crime Videos. Each participant was shown one of two mock crime videos in which only the perpetrator (target) differed and then given a showup of one of the two targets. Each target served as an innocent suspect for a target absent condition. For example, if Target A was shown in the mock crime video to the participant, a showup of Target A would be a target-present showup, and a showup of Target B would be a target absent showup. The reverse was true if Target B was the subject of the mock crime video shown to the participant. Both targets were generally similar in build, were both young

adult Hispanic males with no facial hair, tattoos, jewelry, or scars and had short dark hair. The targets in the videos were both wearing identical black t-shirts and blue jeans (see first photos in appendices A and B). Both mock crime videos featured a laptop theft from a car. The videos were shot on Florida International University's MMC campus in one of the overflow parking lots. The videos showed a single target (Target A or B) looking into various car windows and checking the door locks. Upon trying the third car door, the target realized the car was unlocked and stole the laptop on the passenger side of the car. Both videos were shot from the perspective of a witness filming the theft from inside a nearby car. The only aspect that differed between the two mock crime videos was the target (Target A or B). Each video was approximately 40 seconds.

Target Photos. One of four target photos, representing varying physical appearances of the suspect, was shown to each participant through a Qualtrics survey. The photo was of either Target A or Target B in either a black t-shirt and jeans (consistent with mock crime videos) or in a green t-shirt with a logo, black jeans, a cross necklace, an eyebrow scar, a tattoo, and slight facial hair (five o'clock shadow) (inconsistent with mock crime videos). In the photos, the target was centered, hands behind his back with two police officers on either side facing the target and a police car behind them. In the photographs, the full body of the target was visible from head to shoes and the target was directly facing the camera, which was located about ten feet away. One of the four photographs (sized 10 cm by 7 cm) was displayed to participants. See Appendix A for the photos of Target A (physical appearance: similar clothing and features to perpetrator vs. different clothing and features from perpetrator) and view Appendix B for photos of Target B. In the photographs the suspect was shown standing

between two police officers in front of a squad car with his hands behind his back. Photographs were informally piloted on 14 research assistants to encourage an ample proportion (above 20%) of false alarms (innocent suspect identifications).

Attention Check. To verify that participants had paid sufficient attention to the mock crime video, they had to correctly answer three easy multiple-choice questions about the crime displayed in the video. Participants who did not answer the three multiple choice questions correctly were excluded from the study. Participants were queried on the object stolen, the location it was stolen from, and the number of people involved in the theft (see Appendix C).

Filler Task. After viewing the mock crime video, but before being given the showup, participants were directed to complete a visual search task. Two complex visual arrays were shown to participants about which they had to answer three extended answer questions (Appendix D). These materials had been pre-made and used previously to act as filler tasks in studies that employ online methods of administration (Mook, 2021). The questions were timed at one minute apiece to standardize the time spent on the task. This amounted to a total of six minutes spent on the task (three minutes for each visual array and questions).

Cover Story. To add to the ecological validity of the study, participants were made to believe that they were involved in piloting a new identification procedure Miami-Dade Police was testing in conjunction with the university's Psychology Department. Participants were informed that they were witnessing an actual video of a theft submitted to Miami-Dade Crime Stoppers from an anonymous source. This new identification policy required police to take photographs of all people in the immediate

vicinity of the crime in order to crowd source the later identification. Participants were

instructed to watch the video closely as they would be asked questions about the crime

(see Appendix E).

Recall Task. The recall task was a series of open-ended prompts which directed

the participant to first describe the crime in as much detail as possible. The next prompt

instructed the participant to recall as many details as they can of the perpetrator's

appearance. Participants were also given a slider scale of 0-100 to indicate their

confidence in the details they provided for each prompt. A confidence slider scale was

provided after each follow-up prompt. See Appendix G for a list of the prompts.

Source Monitoring Task. Participants were shown a copy of the details of the

perpetrator they had provided during a recall task about the mock crime video they were

shown. They were asked to indicate whether each detail they had written was

remembered from the crime video, from the showup, or from both by placing the details

into bins (text boxes) for *video-only*, *showup-only*, or *both*.

Procedure

For ease of participation and due to coronavirus safety restrictions, the entire

study was conducted in an online format using a Qualtrics survey. The study consisted of

a single survey session, which participants completed in approximately 45 minutes to one

hour. All methodology was approved by the Institutional Review Board for Florida

International University. Enrollment for the study utilized SONA systems to recruit

students and administer credit.

Upon signing up for the study, participants were informed that the study would be

conducted in a single session, and that they should expect to dedicate at least 40 minutes

27

to the survey in order to receive full credit. All participants were asked to sign an online consent form using Qualtrics. Participants who consented to the research proceeded with the survey, whereas those who did not were taken to the ending screen of the survey.

After signing the consent form, participants were taken to a survey page containing the cover story (Appendix E). After reading the cover story, participants were shown one of the two mock crime videos of either Target A or Target B. Participants were instructed, prior to viewing, that they would not have the option to pause or replay the video so they must play close attention. The video was time restricted and the survey advanced automatically after the video had finished playing. Participants could not go back to view the video a second time, nor could they pause or rewind.

Following the video and brief description, participants were directed to the attention check questions to make sure they had a basic understanding of what transpired in the video (Appendix C). If any of the three attention check questions were answered incorrectly, that participant's data were excluded from the study results. After participants filled out the attention check questions, they completed the visual search (filler) task for a period of six minutes. Participants then proceeded to the showup identification task in which they were shown one of four photographs. Participants were reminded of the new Miami-Dade crowdsourcing identification policy and that the man being shown to them was one of the people photographed for being in the area of the crime. In order to increase the likelihood of some participants making false identifications and incorporating misinformation from the showup, all participants were told additionally that police noticed the suspect behaving suspiciously and that evidence seemed to point to him. This instruction was tested previously and has been shown to

increase false ID rate by altering the witness' belief in the suspect's guilt (Mook, 2021).

Participants viewed the showup for a set time of two minutes in order to take in the

details thoroughly. Participants were then asked if the man in the photograph was the

same man from the Crime Stoppers video that they saw stealing a laptop. Participants

were given the option to respond either "Yes" or "No." Beneath their identification

decision, participants were asked to rate their confidence in their decision on a 0-100 per

cent scale.

After participants indicated their confidence rating, they then filled out a

demographic survey asking for the participant's ethnicity, age, and gender. Additionally,

participants were asked for their class year (freshman, sophomore, junior, senior,

graduate, non-traditional) and were probed in a series of multiple-choice questions for

their familiarity with the United States criminal justice system (see Appendix F).

Participants were told that they were about to be asked a series of open-ended questions

about the crime video they watched and that they are would be tested for how well they

retained details of the crime video. Participants were asked to close their eyes and

visualize the crime before they answered the open-ended questions and to be as thorough

as possible in their answers. See Appendix G for a list of the prompts.

After participants' responses to the open-ended questions were recorded,

participants were asked if they remembered seeing a picture of a suspect being shown to

them from their last session. They had the option to respond: "Yes, I remember it

vividly," "Yes, I remember it vaguely," or "No, I do not recall being shown a picture of

the suspect" via multiple- choice options (see Appendix H). Having completed that

question, participants were shown a new screen displaying their earlier responses to the

interview questions but locked in and unable to be altered. Participants were then asked to review each detail as written and decide whether the detail came from viewing the crime video only, the showup identification only, or both by retyping the detail in one of three labeled boxes (see Appendix I). This task concluded the survey. Participants were debriefed on a final survey page and were thanked for their participation.

Coding

Participants' responses to the open-ended questions were divided into units of information. For the purposes of this study, a unit of information (descriptor) was defined as the smallest phrase containing a subject and predicate for which accuracy could be determined against the original mock crime video. Each adjective conveying new information was also counted as a separate predicate. For example, "The Hispanic male perpetrator checked the first car he came to and found it locked and checked the next car" was divided into five distinct units: (1) the perpetrator was Hispanic (2) the perpetrator was male (3) [the perpetrator] checked the first car he came to (4) [the perpetrator] found it locked (5) [the perpetrator] checked the next car. Every unit that was parsed in this manner was then scored as being either (A) showup-only, (B) video-only, (C) both, (D) neither, or (E) ambiguous. *Showup-only* were those responses objectively consistent with what was shown in the showup photograph only and not the crime video; *video-only* were objectively consistent with the crime video only and not the showup. *Both* responses were those were conveyed in both the crime video and the showup. *Neither* responses were those not objectively in either the crime video nor the showup. *Ambiguous* were responses that seemed like opinions or feelings and could not be verified, for example:

"he was acting suspicious." Lastly, repeated information was not scored within the present scheme and was omitted from analysis.

The two mock crime videos and four showup photographs served as guides to coders for *video-only*, *showup-only*, *both*, and *neither* units of information. Six coders coded participants responses. As a result of a slower than anticipated data collection and loss of early coders, the coder overlap was not as high or randomly-assigned as desired. At least two independent coders overlapped on 20% of the responses. Intraclass correlation coefficients (ICC) were calculated between all overlapping coders for the aforementioned information unit categories. Moderate to excellent interrater reliability was found ranging from .79 to .96.

Responses to the source monitoring task, where participants bin their previously given details into "*video-only*," "*showup-only*," or "*both*" categories, were coded as consistent with source or inconsistent with source within each category/bin. Total number of informational units was also gleaned from the perpetrator details provided by the witness.

III. RESULTS

The Results section is organized as follows: Descriptions of the data and participants, checks on the stimulus sampling procedure, analyses of recall and capability to source monitor details recalled, and, lastly, analyses regarding participants' initial identification decision. Though participants rendered an initial identification decision before recalling details of the crime video, the identification results will be presented last as they are secondary to the core hypotheses of the study, which pertain to the recall (interview) portion. For convenience, a reminder of the original hypotheses is included in the introduction to the recall analyses.

Data Exclusion Procedure.

Three-hundred seventy-seven participants originally completed the survey. Of these, 34 participants were removed from analysis and were not included in the final sample. Six participants were excluded because they had mistakenly taken the survey previously (during pilot testing) and 28 participants were excluded for failing five attention check questions. The final sample for data analysis was 343 participants. Two participants completed only the first half of the study; their data were included in the identification decision but were not included in the analyses of recall.

Familiarity with Criminal Justice System

Most participants were moderately to extremely familiar with the U.S. criminal justice system (55% of sample). Of those personally familiar with the criminal justice system, seven participants reported being a suspect in a police investigation. Twenty participants reported assisting a police investigation as a witness and 20 reported being a victim in an investigation. Thirteen participants reported serving within the criminal

justice system in a professional capacity (intern, attorney, law enforcement, etc.). Only 6% were not familiar at all with the U.S. criminal justice system. Some participants had been interviewed by law enforcement officers in the past. Seven participants had been interviewed as a suspect, 42 as a witness, and 44 for other reasons. Most participants (68%) had never been interviewed by a law enforcement officer. Approximately 68% of participants stated that they find police officers to be moderately to extremely trustworthy and 5% rated police officers as not trustworthy at all. Most participants had not taken a Forensic or Legal Psychology course (68% of sample).

Stimulus Sampling Checks

A Pearson chi-square test was conducted to ensure that variability in the two sets of showup stimuli (Target A and Target B) did not result in differential rates of hits, misses, false alarms, and correct rejections. There were no significant differences in identification decision with respect to which target (A or B) was shown in the video crime or which suspect was shown in the showup (A or B), $\chi2(3) = 1.482$, $p = .687$.

To ensure successful stimulus sampling, a 2 x 2 factorial ANOVA was conducted with Perpetrator Displayed in Video (Target A or B) and Suspect Displayed (Target A or B) in Showup as independent variables, and total units of information in the initial open-ended prompt as a dependent variable. There were no significant main effects or interactions between perpetrator displayed in the crime video and suspect displayed in the showup, $F(3, 338) = .277$, $p = .842$. Therefore, showup and video conditions containing Target A and those containing Target B were collapsed in the following analyses.

Results for units of information (descriptors) recalled are presented first. Units of information are further broken down into those units that are consistent with the "video

only," "showup only," and those consistent with "both," "neither," and "ambiguous" categories. See Table 1 for an example breakdown of category coding for a condition containing a showup with an appearance inconsistent from the perpetrator in the video.

In the appearance consistent conditions, the suspect (showup) and perpetrator (video) were both wearing black t-shirts, blue jeans, and black sneakers. Neither had any physical markings (tattoos, etc.) and both were clean-shaven and had short black hair. In the appearance inconsistent conditions, the video perpetrator remained in the same black t-shirt and blue jeans (videos were the same across consistent and inconsistent conditions), but the showup suspect wore a green t-shirt with a logo on it, black jeans, black shoes, had a tattoo on his arm, an eyebrow scar over the left eye, and had some facial hair (stubble). For an example of a participant response, if a participant stated that the perpetrator was wearing a black shirt, blue jeans and black shoes, the two units for "black shirt," two units for "blue jeans" and two units for "black shoes" would all be coded as "both" as these details appeared in both the video and in the showup (in appearance consistent conditions). If a participant stated instead that the perpetrator was wearing a green shirt, "green shirt" would be classified as two units for the "showup-only" category (participant in this condition received a showup in which the showup was inconsistent with the appearance of the video perpetrator). Likewise, in the latter condition (appearance mismatch), if the participant stated the perpetrator was in a black shirt, "black shirt" would be coded as "video-only." Lastly, if the participant mentioned something like "the perpetrator was wearing a yellow hat," "yellow hat" would be coded as two units in the "neither" category, as there was no yellow hat in any of the stimuli shown to participants. In the given context of this study units of information that fall into

either the "showup only" or "neither" categories were considered inaccurate or commission errors because participants were directed to recall only information from the video. The final analyses are exploratory and focus on participants' ability to ascertain the source of details they provided.

Units of Information Recalled

Target Presence and Exposure to Misinformation on Overall Errors in Recall

A 2 (Target Presence: target present vs. target absent) x 2 (Consistency: showup's appearance consistent with video vs. inconsistent with video) factorial ANOVA was conducted to determine the effect of Target Presence and Consistency (the term 'inconsistent' is equivalent to misinformation) on overall errors across all recall prompts. There was a statistically significant main effect of Consistency on overall number of incorrect units recalled, $F(1, 337) = 15.6$, $p < .001$, $\eta_p^2 = .044$, observed power = .977: Participants who received a showup inconsistent with the video (misinformation) ($M = 19.66$, $SD = 18.45$) recalled more incorrect units than participants who received a showup that was consistent with the video ($M = 12.90$, $SD = 13.93$). There was no significant main effect of Target Presence on overall incorrect units $F(1, 337) = .858$, $p = .355$, $\eta_p^2 = .003$, observed power = .152. There was also a significant interaction between Target Presence and Consistency, $F(1, 337) = 5.216$, $p = .023$, $\eta_p^2 = .015$, observed power = .625. Simple effects comparisons reveal that among target-absent showups, the effect of Consistency was not significant, $p = .202$, but among target-present showups, those participants who were exposed to a showup inconsistent with the video recalled more incorrect units ($M = 22.56$, $SD = 20.17$) than those who were exposed to a showup

consistent with the video ($M = 11.58$, $SD = 12.86$), $p < .001$. See Table 2 for the full ANOVA table.

Accuracy and Confidence Correlations for Recall

The confidence-accuracy relationship for recall was probed first overall and then broken down into conditions that contained showups that were consistent and inconsistent with the video.

Overall Confidence Accuracy Correlation. A Pearson bivariate correlation was run to determine the relationship between overall accuracy (correct units / total units) and average confidence for participant recall across all prompts. Accuracy and confidence were not correlated, $r_{pb} = .072$, $n = 341$, $p = .183$. Separate bivariate correlations were run to determine if confidence was more diagnostic of accuracy when the showup was consistent with the video.

Confidence and Accuracy in Inconsistent Showup Condition. A Pearson bivariate correlation was run to determine the relationship between overall accuracy (correct units / total units) and average confidence for participant recall across all recall prompts for participants who were exposed to inconsistent showups (misinformation). Accuracy and confidence were not correlated, $r_{pb} = -.058$, $n = 165$, $p = .457$.

Confidence and Accuracy in Consistent Showup Condition. A Pearson bivariate correlation was run to determine the relationship between overall accuracy (correct units / total units) and average confidence for participant recall across all recall prompts for participants who were exposed to a consistent showup. Accuracy and confidence were positively correlated for participants who had been exposed to a consistent showup, $r_{pb} = .171$, n $= 176$, $p = .023$.

Misinformation Contamination on Recall

The written interview portion of the survey contained eight prompts in total. The first prompt was a general open-ended prompt, "Describe the event in the video in as much detail as possible." The prompts to follow probed specific aspects of the perpetrator's appearance (body, head, face, clothing, identifiable markings, jewelry, and other features). To avoid underpowered moderation analyses, prompts two through eight are collapsed in terms of (mis)informational units as they pertain specifically to perpetrator description.

For the initial open-ended response, participants recalled an average of 38.76 (SD = 17.66) total units of information. Of that recall, participants averaged 1.97 (SD = 5.31) incorrect units or commission errors. Approximately half (M = .98, SD = 4.57) of those incorrect units were misinformation units (deriving from the showup only), and the other half (M = .99, SD = 2.56) were errors invented by participants that did not derive from either the video or the showup (e.g., stating the perpetrator was wearing a hat). For prompts two through eight, participants recalled an average of 67.00 (SD = 30.02) units of information. Of that recall, they averaged 14.23 (SD = 14.53) incorrect units or commission errors. Among these incorrect units, participants averaged 7.96 (SD = 10.05) units of misinformation, and the other half (M = 6.27, SD = 8.78) were errors invented by participants that did not derive from either the video or the showup. To more thoroughly explore the mechanisms behind the incorporation of misinformation into recall, moderation analyses are conducted.

Simple moderation analyses are conducted to test two competing hypotheses and theoretical frameworks to account for the contaminating effect of misinformation on

recall for the original event. The first model and moderation analysis tested whether committing to the showup (hit or false alarm) would increase misinformation contamination. The second model and moderation analysis tested whether poor encoding results in a weak memory trace that drives inaccurate identification decisions and increases the contaminating effect of misinformation on recall. Moderation analyses were selected as they assess the strength and direction of the relationship between variables and are robust to collinearity when explanatory variables are mean-centered. The Consistency of suspect (showup) and perpetrator (video) appearance (independent variable) and identification decision (moderator) variables in the following analyses present as collinear and therefore an ANOVA analysis would be inappropriate.

If the commitment hypothesis is correct, results should demonstrate that committing to the showup (hit or false alarm) served as a significant moderator of the relationship between Consistency and misinformation errors recalled. That is, committing to the showup (making a hit or false alarm) increases the amount of misinformation contamination relative to rejecting the showup. Alternatively, participants may be more susceptible to misinformation not because they are committing to the showup, but because they had a weak encoding of the original event. If this were the case, results would demonstrate that making an accurate identification decision (hit or correct rejection) served as a significant moderator of the relationship between Consistency and misinformation errors recalled. Thus making an incorrect identification (evidence of weak encoding) increases the amount of misinformation contamination relative to making a correct identification decision (evidence of strong encoding). Further, estimations of model-fit, i.e., how much of the variance each model accounts for in the data, will serve

to highlight the better of the two theoretical models in terms of explaining the patterns in the data. To review, two separate moderation analyses were conducted for the initial open-ended prompt and later (combined) prompts. This was done due to the content of the recall and the phrasing of the prompts. The first prompt asked participants to describe the crime event and, therefore, participants described primarily actions. Prompts two through eight asked for various aspects of the perpetrator's appearance. Because misinformation pertained to the perpetrator's appearance and not to the actions of the perpetrator, it was expected that contamination by misinformation would primarily be seen in response to those prompts that specifically probed perpetrator appearance.

Initial Open-Ended Prompt. The effect of Consistency on misinformation errors (errors referencing the information coming only from the showup and not from the video) was not significant, $b = .4342$, 95% CI [-.590, 1.458], $p = .405$. The effect of Commitment (committing to the showup as a hit or false alarm decision) was also not significant, $b = -.396$, 95% CI [-1.422, .630], $p = .448$. Lastly, the interaction between Consistency and Commitment was not significant, $b = -.423$, 95% CI [-2.473, 1.628], $p = .686$. Overall model fit for the open-ended prompt was relatively poor with the complete model accounting for only 8% of the total variance; the overall model was also not significant at $p = .564$. See Figure 2 for statistical model and Table 3 for additional values.

Figure 2. Commitment Mediation Model Initial Open-Ended Prompt

The effect of Consistency on misinformation errors (errors referencing the information coming only from the showup and not from the video) was not significant, b = .559, 95% CI [-.413, 1.531], p = .259. The effect of Identification Accuracy (good encoding evidenced by correct identification decisions: hit and correct rejection) was also not significant, b = -.793, 95% CI [-1.799, .214], p = .122. Lastly, the interaction between Consistency and Identification Accuracy was not significant, b = -.346, 95% CI [-2.361, 1.668], p = .736. Overall model fit for this prompt was relatively poor with the complete model accounting for only 11% of the total variance; the overall model did not achieve statistical significance at p = .285. See Figure 3 for statistical model and Table 4 for additional values.

Figure 3. ID Accuracy Mediation Model Initial Open-Ended Prompt

Perpetrator Description Prompts Composite. The effect of Consistency on misinformation errors (errors referencing the information coming only from the showup and not from the video) was significant, $b = 7.707$, 95% CI [7.328, 9.412], $p < .001$, such that an appearance change between crime and showup was associated with more misinformation units recalled ($M = 11.564$, $SD = 11.226$) relative to the consistent condition (no appearance change) ($M = 4.600$, $SD = 7.404$). The effect of Commitment (committing to the showup as a hit or false alarm decision) was also significant, $b = 2.219$, 95% CI [.1299, 4.308], $p = .037$, such that participants who committed to the showup (made a hit or false alarm) recalled more misinformation units ($M = 9.594$, $SD = 9.713$) relative to those who rejected the showup ($M = 7.282$, $SD = 9.219$). Lastly, the interaction between Consistency and Commitment was also significant, $b = -5.343$, 95% CI [1.167, 9.518], $p = .012$, such that when misinformation was present, those who committed to the showup incorporated more misinformation ($M = 14.705$, $SD = 12.536$) than those who rejected the showup ($M = 9.721$, $SD = 9.992$). Overall model fit for this prompt was moderate with the complete model accounting for 39% of the total variance; the overall model was also significant at $p < .001$. See Figure 4 for statistical model and Table 5 for additional values.
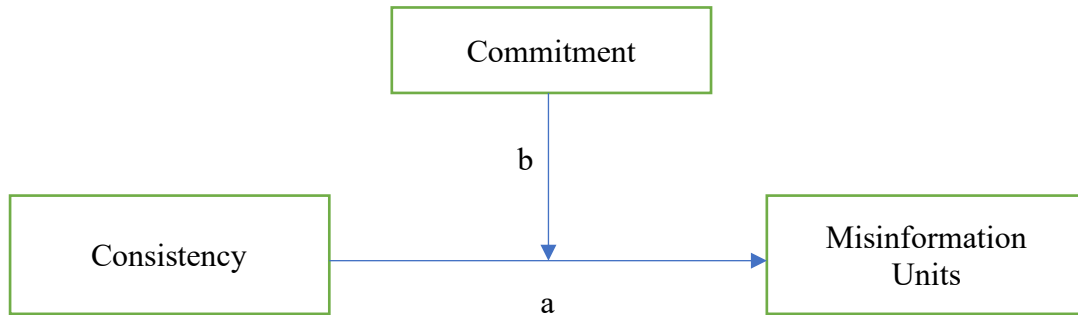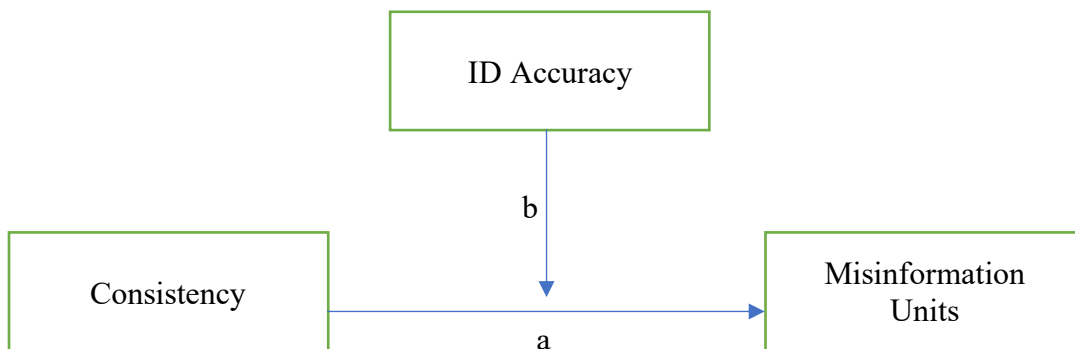
Figure 4. Commitment Mediation Model Perpetrator Description Prompts

The effect of Consistency on misinformation errors (errors referencing the information coming only from the showup and not from the video) was significant, $b =$ 6.965, 95% CI [4.949, 8.9801], $p < .001$. Participants who received an inconsistent showup recalled more units of misinformation ($M = 11.564$, $SD = 11.226$) than participants who received a consistent showup ($M = 4.599$, $SD = 7.404$). However, the influence of Identification Accuracy (as evidenced by hit and correct rejection decisions) was not significant, $b = -.122$, 95% CI [-2.210, 1.966], $p = .908$. Lastly, the interaction between Consistency and Identification Accuracy was not significant, $b = .557$, 95% CI [-3.622, 4.735], $p = .793$. Overall model fit for this prompt was moderate with the complete model accounting for 35% of the total variance; the overall model was also significant at $p < .001$. See Figure 5 for statistical model and Table 6 for additional values.
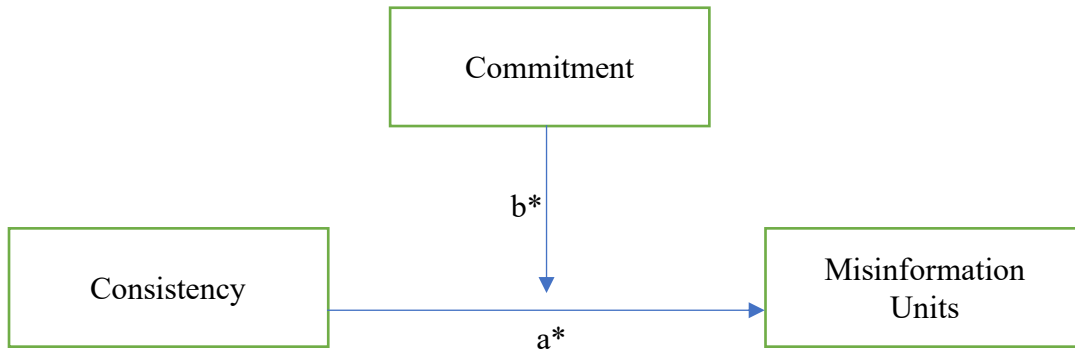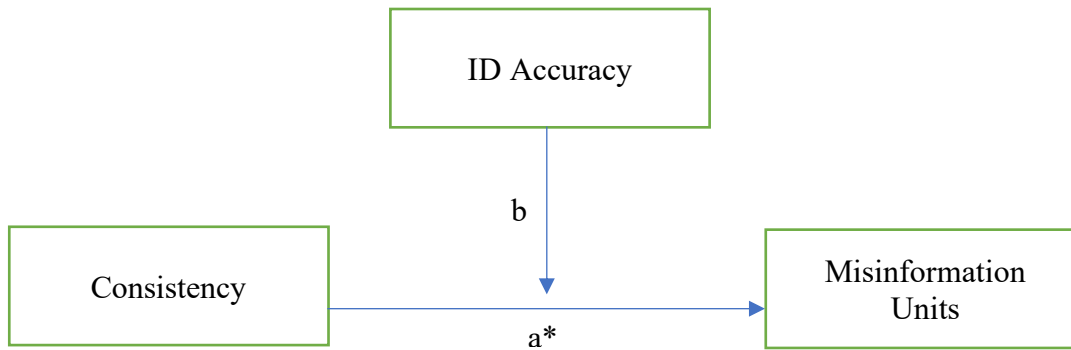
Figure 5. ID Accuracy Mediation Model Perpetrator Description Prompts

The commitment model accounts better for the variance in the data relative to the identification accuracy model (by a margin of approximately 4%) and also depicts commitment as a significant moderator of the relationship between Consistency and number of misinformation units recalled. The identification accuracy (encoding quality) model, with the accuracy of the identification decision theoretically evidencing good encoding, does not show identification accuracy significantly moderating the relationship between Consistency and number of misinformation units recalled.

Exploratory Analyses

Type of Information Mentioned in Initial Open-Ended Prompt

The following are the relative frequencies at which participants mentioned the suspect's clothing, other physical characteristics, the setting of the crime, and the actions of the crime in response to the initial open-ended prompt to describe the event. When tasked with describing the crime event in the video, 60% of participants ($n = 209$) mentioned some aspect of the perpetrator's clothing. Eighty-two percent ($n = 281$) participants mentioned some other feature of the perpetrator's appearance in their initial description like race, hair color, or skin tone. Ninety-nine percent of participants ($n =$

340) mentioned the perpetrator's actions during the crime. Only 37% of participants ($n =$ 127) mentioned the setting in which the crime took place.

Source Monitoring Capability

Many participants did not follow survey instructions for the source monitoring component at the end of the survey. Fifteen of the initial 30 participants omitted previously recalled details from the source monitoring task. For example, a participant may have mentioned originally the perpetrator wore a necklace but omitted that detail from the binning task. Also, 15 of the initial 30 participants reworded their original responses or added in additional details. For example, a participant may have originally written that the "perpetrator was wearing blue jeans and black shoes" and then later reworded the sentence and added details like "I believe he had on dark-colored baggy jeans and his shoes were black in color." Lastly, 13 of the initial 30 double-binned details (if a detail was in both the video and showup, the participants binned it in all three boxes: "both," "showup-*only*," and "video-*only*") or otherwise misunderstood the directions of the task. For example, a participant wrote "wearing black shoes" in all three bins. Although these participant actions are interesting in and of themselves, they betray analysis for the source monitoring task. Therefore, coding and further analysis of these results were terminated.

Analyses of Showup Identifications

Consistency Manipulation on Identification Accuracy

The suspect's appearance in the showup was manipulated to appear consistent with his appearance (clothing, tattoos, jewelry, facial hair were consistent) or to appear inconsistent (clothing, tattoos, jewelry, facial hair inconsistent) with his appearance at the

time of the crime. Two Pearson chi-square tests of independence were performed separately for target-absent and target-present showups to examine the relationship between Consistency and Identification Decision Accuracy. The relationship between Consistency and Identification Decision Accuracy was significant in the target-absent showup condition, $\chi2(1) = 16.823$, $p < .001$. The effect size for this finding, Cramer's V, was moderate, .304 (Cohen, 1988). Participants who were exposed to a showup in which the suspect's (showup) and perpetrator's (video) appearance was consistent were more likely to make a false alarm than those who were exposed to a showup in which the suspect's and perpetrator's appearance was inconsistent. Table 7 shows the crosstabulation for false alarm and correct rejection rates for target-absent showups containing a consistent or inconsistent appearance with the crime video.

The relationship between Consistency and Identification Decision Accuracy was also significant among those who received target-present showups, $\chi2(1) = 22.660$, $p < .001$. The effect size for this finding, Cramer's V, was moderate, .376 (Cohen, 1998). Participants exposed to a showup suspect inconsistent with the video perpetrator were more likely to miss or incorrectly reject the showup compared to participants who received an appearance consistent showup. Table 8 shows the crosstabulation for hit and miss rates for target-present showups containing a consistent or inconsistent appearance with the crime video.

Confidence and Identification Accuracy

The relationship between identification confidence and identification accuracy were analyzed separately for choosers (hits and false alarms) and non-choosers (misses and correct rejections). First, a point-biserial correlation was run to determine the

relationship between confidence in identification decision and accuracy of the decision for non-choosers. There was no correlation between confidence and accuracy, (r_{pb} = .21, n = 162, p = .792). Among non-choosers, there was little to no relationship between confidence and accuracy.

Results of the point-biserial correlation for choosers identification confidence and identification accuracy was also not statistically significant, r_{pb} = .119, n = 181, p = .110; among target-absent showups, there was little to no relationship between confidence and accuracy.

Following the recommendations by Wixted and Wells (2017) surrounding the analysis of confidence and accuracy, confidence accuracy calibrations were also included. Due to the current sample size, these calibrations are likely underpowered at lower confidence ratings. Additionally, because of sample size constraints and having to separate data by choosers and non-choosers, Consistency conditions (consistent and inconsistent perpetrator and suspect appearance) were collapsed for a calibration analysis. Table 9 contains values for calibration (C), average over-under confidence (OU), and the adjusted normalized resolution index (ANRI) for choosers and non-choosers, respectively. A graphical depiction of the calibration curve is included in Figure 6.
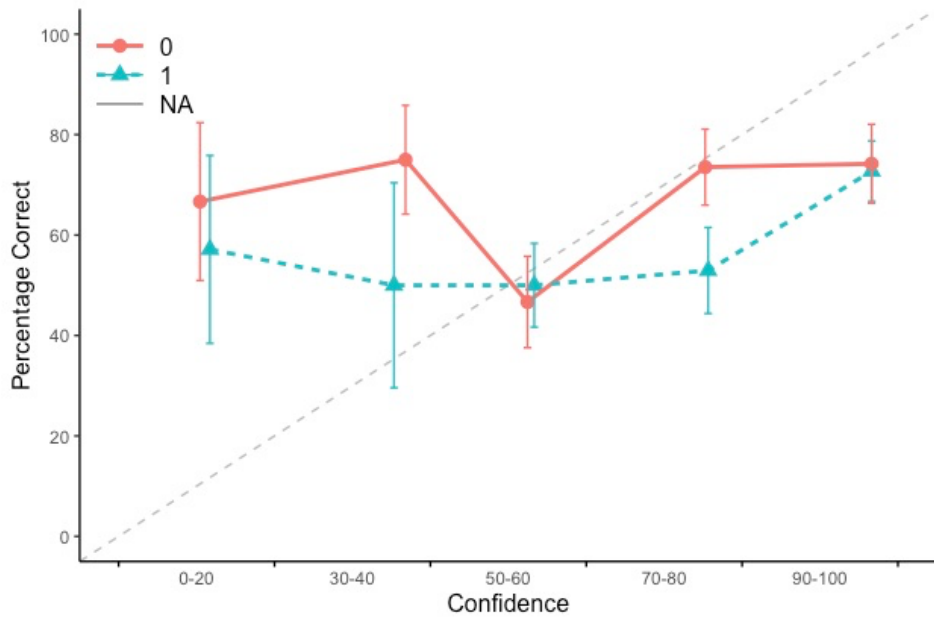
Figure 6. Confidence-Accuracy Calibration for Choosers (1) and Non-Choosers (0)

Consistency Manipulation on Confidence

The relationship between the Consistency manipulation and identification
confidence was analyzed separately for target-present and target-absent showups. First, a
simple between-subjects *t*-test was performed to determine the effect of suspect and
perpetrator appearance consistency on identification confidence for target-absent
showups. There was no significant difference in mean confidence between those who
were given showups that were inconsistent with the crime video and those who were
given showups with a consistent appearance ($t(180) = 1.029$, $p = .305$, *CI* [-3.355,
10.666]).

A second between-subjects *t*-test was performed on Consistency and
Identification Confidence for target-present showups. This test also revealed no
significant difference in average confidence between those who were given showups

inconsistent with the crime video and those who were given showups with a consistent

appearance ($t(158) = 1.029$, $p = .180$, *CI* [-2.37302, 12.544]).

IV. DISCUSSION

The primary goal of the current study was to determine if misinformation, presented in the form of a showup, could contaminate later recall, and further, if the act of committing to the showup, as opposed to rejecting the showup, would moderate the incorporation of misinformation. Given the relatively robust misinformation effect within the available literature (Chrobak & Zaragoza, 2013), it is not surprising that participants who were exposed to an appearance-inconsistent showup (misinformation) incorporated the showup information into their later recall of the original crime event. Showups are uniquely positioned, not just as a test of recognition memory, in which a witness is asked to commit to or reject the suspect, but also a potential font for visually delivered misinformation. The present investigation found that the act of committing to the showup moderated the amount of misinformation participants later incorporated into recall. These results suggest that a showup identification can potentially contaminate witness memory, and even more so when the witness identifies the suspect.

Showups are quite common in police investigations, accounting for 30%-77% of all initial identifications (Flowe et al., 2001; Gonzalez et al., 1993; McQuiston & Malpass, 2001). Unlike lineups, which are typically constructed after an initial formal interview with a witness, showups are usually carried out in less than 24 hours after a crime event takes place, but there have been longer retention intervals (Milde, 2019). This does not leave much time to formally interview the witness. Though police may obtain a brief description from the 9-1-1 dispatcher or a description from the witness on the scene, a more formal, thorough interview usually occurs later at the police station. These formal interviews can take place anywhere from a few hours to days or even weeks after a crime

depending on the investigation and the condition of the witness (from conversation with police officers). When a showup is used, most witnesses make an identification decision in the interval between the crime event and their first formal interview. This real-world situation is analogous to what transpires in a standard misinformation paradigm in which post-event information, some consistent and some inconsistent with the original event, is given to a witness between the original stimulus event and a testing phase. Unlike a standard misinformation study, however, the witness must make a decision to accept or reject the suspect shown in the photograph. This decision has the power to more firmly cement accompanying misinformation into a witness' memory. Findings from the present study reveal that police investigators and other decision-makers like judges, jurors and attorneys should be cautious of eyewitness recall when the information is being volunteered after a showup identification has taken place.

Showups, because of their utility and ease of administration, are likely to persist as a common police practice. In fact, even states containing the most aggressive eyewitness reforms still allow showups as long as they are administered within two hours of the crime (*New Jersey v. Pressley,* 2018). Police should make efforts to thoroughly interview the witness as soon as possible after the crime has transpired, conscious that any potential contaminates to memory (including a showup) are rendered more potent with a longer retention interval (Johnson et al., 1993; Pratkanis et al., 1988). Source monitoring errors, like confusing the clothing the suspect was wearing in the showup with the clothing worn by the perpetrator at the scene of the crime, tend to increase with a delay (Johnson et al., 1993). Memory for source tends to decay faster than other types of memory, especially when there is high similarity between the original event and the

subsequent misleading episode (Johnson et al., 1993). This may cause witnesses to

assimilate memory for the crime event with the later showup, especially when the suspect

bears more similarity to the true perpetrator (Johnson et al., 1993; Zaragoza et al., 1997;

Zaragoza & Lane, 1994).

Police and attorneys should engage with witnesses to separate the memory for the

crime event from the memory for the showup as soon as possible. This may even be

possible at the time of the identification. Directly after an identification is made, the

administrator should record a confidence statement and additionally ask the witness if it

is apparent to him or her if any aspect of the suspect's appearance has changed since the

time of the crime. The purpose of this question is two-fold: The recorded answer

preserves a more reliable memory account than what may be possible in an interview

conducted days later and this attention to discrepancies can aid the witness to preserve

two distinct memories and avoid assimilating the two events. Research has demonstrated

that retrospective source monitoring warnings and explicit directions to pay attention to

source have been shown to reduce the misinformation effect (Karanian et al., 2020; Blank

& Launay, 2014; Chambers & Zaragoza, 2001; Eakin et al., 2003).

Misinformation not only affects police interviews, but also can have an impact at

trial. Jurors and laypersons are likely not as cognizant of potential contaminants on

memory as are memory researchers. Instead, jurors and laypersons tend to approximate

memory strength and accuracy by witnesses' expressed level of detail and by their

confidence (Cutler & Penrod, 1989). Defense attorneys should point out to juries the

timing of the showup in relation to a formal interview and describe the risk of memory

contamination. A witness, having now two encodings of the alleged perpetrator, includes

a greater level of detail in their account and their testimony about physical appearance may include specific characteristics shown in the showup that were not visible in the original crime event. Juries are likely to be persuaded by and assign greater credibility to a testifying witness whose verbal description of the perpetrator during a police interview closely matches the appearance of the suspect in the showup and the defendant in court relative to a witness whose testimony conflicts with the appearance of the suspect/defendant. Jurors, likely unfamiliar with the usual timing of a showup in relation to a police station interview, may not realize the potential contaminating effects of viewing a showup before being interviewed.

Commitment Moderates Misinformation Recall

The present study utilized stimuli that altered the format of the traditional misinformation paradigm. In a traditional misinformation paradigm, misinformation is usually encountered in a verbal or text-based format and recalled verbally or through a recognition test (Loftus, 2005). In the present design the original event was not a verbal narrative, but rather a videoed event, and the misinformation was also visual (a photograph). The primary dependent variable was not performance on a recognition task, but open-ended recall. In this framework, misinformation was encountered visually and not verbally, thus a mismatch between encoding and retrieval formats exists. The present study is not the first to display misinformation in the form of a photograph (see Wade et al., 2002). The present study does extend previous research on visually encountered misinformation into an applied eyewitness context utilizing a crime video as the original stimulus, a showup identification as a presentation of misinformation, and interview-style questions as a recall test.

In order to better investigate the influence of the showup identification decision on later recall of misinformation, two theoretical models were created: Commitment and Identification Accuracy. Both models involve the identification decision as a moderator and differentially evaluate two competing mechanisms for moderation. The Commitment model examines the moderating effect of committing to the showup as opposed to rejecting the showup on the relationship between consistency (of the showup suspect and the video perpetrator) and misinformation recalled. In the Commitment model, making a hit or a false alarm is classified as committing to the showup. The witness has decided that the photograph meets his or her criterion for similarity with the perpetrator and commits to the showup, effectively stating, these two persons are a match. When a witness commits to the showup, they are also expected to commit to the physical characteristics presented in the showup, making those characteristics more likely to be recalled later. The decision to declare a match between showup suspect and criminal perpetrator is not unlike an absolute-identification task in fundamental perception research where the witness declares a one-to-one mapping of the suspect (stimuli) with the perpetrator (label). When the stimuli and the label representations are close enough for the witness to declare a match, the suspect and perpetrator characteristics are more likely to be assimilated in memory (Purks et al., 1980; Ward & Lockhead, 1970,1971; Zotov et al., 2011). The showup characteristics (misinformation) then having been assimilated into memory are more likely to be recalled in connection with the perpetrator when the witness is queried for a perpetrator description.

The alternative model, Identification Accuracy, postulates a competing mechanism by which identification decision moderates the relationship between

consistency and misinformation recalled. In the Identification Accuracy model, identification decision as correct or incorrect moderates the relationship between consistency and misinformation recalled. In this model, making a false alarm or miss (incorrect decisions) evidences a weak encoding of the original crime event. A weak encoding, in addition to fomenting an incorrect identification decision, also renders the witness more susceptible to presented misinformation. Weaker encoding makes a witness more susceptible to the effects of misinformation (Malpass & Goodman-Delahunty, 2004). This effect of rendering misinformation more potent in the presence of weak encoding can be explained by both fuzzy trace theory (Reyna & Brainerd, 1995) by a source-monitoring framework (Johnson, et al., 1993). Poorly encoded memories are thought to possess fewer phenomenological details and are thus remembered in a more gist-like manner (Wright & Loftus, 1998). Gist traces are more susceptible to the misinformation effect because they contain no strong reality cues by which to detect discrepancies between previously encoded information and incoming information. From a source-monitoring perspective, source misattribution errors are more likely when a source is not encoded and incoming information is attributed to an incorrect but similar source, as when a witness mistakenly attributes a showup characteristic to the appearance of the original perpetrator (Belli et al., 1994).

The Commitment and Identification Accuracy theoretical moderation models were tested to understand the relationship between identification decision made and the incorporation of misinformation into recall. Both models predicted that consistency would have a direct effect on the incorporation of misinformation: When the suspect's appearance in the showup differs from to the perpetrator's appearance in the crime,

participants incorporate the showup properties into recall. The Commitment model predicts that identification decision moderates the relationship between identification decision and the incorporation of misinformation into recall such that committing to the showup (making a hit or false alarm) would result in more incorporation of misinformation relative to those who rejected the showup (making a miss or correct rejection). A competing theoretical explanation for identification decision as a moderator is the Identification Accuracy model: An initial good encoding of the perpetrator could result in witnesses making accurate identification decisions (hit or correct rejection) which would protect against the misinformation effect when witnesses recall details from the original crime event (see Figure 1 for a conceptual depiction of both models). The Commitment model overall was able to explain a higher proportion of the variance (~ 38%), demonstrating a superior model fit compared to the Identification Accuracy model (~ 34%), though both overall models were significant at $p < .001$. The Commitment model also showed identification to be a significant moderator of the relationship between appearance change and recall of misinformation ($p = .037$). By comparison, identification decision as a moderator did not significantly influence the relationship between appearance change and misinformation recall in the Identification Accuracy model ($p = .908$). Stated more plainly, it matters little or not at all whether participants were accurate or inaccurate in their identification as to how much misinformation was incorporated into recall, but it does matter whether participants committed to the showup. Participants who committed to the showup and made a hit or false alarm tended to be more susceptible to the misinformation effect than participants who rejected the showup and made a miss or correct rejection.

Incorporating misinformation into recall in the present study is consistent with previous research on the role of commitment in eyewitness memory (McCloskey & Zaragoza, 1985; Moore & Lampinen, 2016; Schreiber & Sergent, 1998; Smith & Ellsworth, 1987). The act of committing to a target image seems to better cement misinformation in memory. Rendering a correct identification decision, thought to evidence a good encoding of the perpetrator, does not seem to confer any protection against the effects of misinformation. Features typically encoded like hair, eye, and skin color were highly similar across Targets A and B and thus would not have benefited discrimination between targets. Due to high similarity between showup targets employed in this study, good encoding may have been less beneficial for achieving recognition accuracy than it was for recall accuracy in the current paradigm, resulting in lack of a moderation effect. A participant may have remembered specific features of the perpetrator well enough (good encoding), but if these remembered features were shared among the showup suspect and the video perpetrator, they were not viable cues by which to distinguish between two person recollections. The 'quality' of the encoding is not a proxy for the 'utility' of the encoding. Future research should investigate how encoding quality and commitment affect recognition and recall memory for highly similar targets in an eyewitness paradigm. Future research should also endeavor to explore the social component in committing to an in-person showup. Because of COVID precautions, this study had to be conducted in an online survey format and thus the commitment effect had minimal to no social component. A public act of committing to a belief has been shown to encourage subsequent behaviors that are consistent with that belief to avoid cognitive dissonance and perceived hypocrisy (Dickerson et al., 1992; Harmon-Jones & Harmon-

Jones, 2008). The results of the present study may underestimate the influence of committing to a showup on misinformation incorporation in recall in a real-world investigation. In a real-world investigation, the identification is a public statement made in the presence of a police officer. The present study did not capture this social dimension.

Consistency and Misinformation Recall

Irrespective of identification decision, the relationship between consistency and incorporation of misinformation affected later memory. When misinformation was presented, it was likely to be recalled during the later questioning phase. This finding is not surprising and is well-substantiated within the previous misinformation literature (Chrobak & Zaragoza, 2013; Pickrell et al., 2016). In the current study, participants were mostly accurate in their responses to the open-ended questions, incorporating very little misinformation. Misinformation tended to occur frequently in recall only when the participant was probed through the cued-recall questions for the appearance of the perpetrator but did not occur for the first open-ended question. This is consistent with previous research on precision-accuracy tradeoffs (Evans, 2008). When a witness is pushed for more precise or detailed answers, as is the case with the cued recall questions, they are more likely to sacrifice accuracy and produce more errors of commission (Evans, 2008).

A Focus on Clothing During Recall

Fifty-five percent of respondents mentioned some article of the perpetrator's clothing whereas 92% of participants mentioned the perpetrator's actions. This pattern is likely a function of the direction to describe the event as opposed to describing the

perpetrator. When witnesses were asked specifically to describe different aspects of the perpetrator as he appeared at the time of the crime (interview prompts two through eight), participants who were exposed to an inconsistent suspect appearance in the showup recalled more misinformation relative to those who saw the suspect with a consistent suspect appearance in the showup. These findings may be explained by a precision-accuracy tradeoff (Evans, 2008). In the current study, participants were directed in prompts two through eight to describe the video perpetrator in as much detail as possible. This emphasis on detail could be interpreted as a request for participants to be precise in their responses and to avoid short, vague descriptions, which were conceivably more acceptable in the first open-ended prompt to describe the crime event. When witnesses are encouraged to be precise, at request or because of conversational norms, they may sacrifice accuracy in order to provide more precise responses and meet the "detail" demands of the interview question (Ackerman & Goldsmith, 2008; Bar-Hillel & Neter, 1993; Grice, 1975; Yaniv & Foster, 1997). Increasing precision at the cost of accuracy may explain why a misinformation effect was seen in responses to specific prompts two through eight, but not in the first open-ended recall prompt. Future research should explore the precision-accuracy tradeoff under conditions of misinformation in eyewitness contexts. Alternatively, participants in the present study may have been more apt to describe actions in the first, open-ended prompt because actions were deemed more salient than other perpetrator characteristics and distinguished the event as a crime event. If participants elected to mainly describe actions and not perpetrator appearance, then it makes sense that there would be less influence of misinformation from the showup on the first open-ended recall.

Confidence and Accuracy During Recall

The overall relationship between confidence and accuracy was assessed first across Consistency conditions and then individually for those participants who saw a consistent or inconsistent showup. When assessed across study conditions the relationship between confidence and accuracy was non-existent. Many studies report very poor discrimination between the original memory and presented misinformation (Bonham & Gonzalez-Vallejo, 2009; Cann & Katz, 2005, Tomes & Katz, 2000), but still others report moderate or even high levels of discriminability (Higham et al., 2011). Horry and colleagues (2014) found that when participants were tested shortly after exposure to misinformation, the confidence-accuracy relationship was strongest. Despite having a very small delay (only a few minutes) between misinformation exposure and recall in the current study, misinformation did seem to disrupt the confidence and accuracy relationship, rendering confidence an ineffectual predictor of recall accuracy.

Confidence was, in fact, diagnostic of accuracy only among participants who had been given a consistent showup appearance. In the consistent-appearance condition there was a relatively small, but positive correlation between confidence and accuracy. Note that participants across conditions exhibited relatively high rates of accuracy overall (as few misinformation units were recalled in total). The present data necessitated the use of Pearson bivariate correlations as opposed to calibration and confidence-accuracy characteristics because of its smaller sample size. The present study measured accuracy and confidence collapsed across recall for each prompt. Due to the online construction of the study, confidence was not given individually for each descriptor that participants volunteered. Participants instead gave a confidence rating for their response to each

prompt. Accuracy in the present study was continuous and a ratio variable, as opposed to

being dichotomous. Special care should be taken when attempting to generalize the

results of the present study to the existing literature. Future studies with larger sample

sizes can more effectively assess the confidence-accuracy relationship when

misinformation is present in a showup-context.

Ability to Monitor for Source

Participants made mistakes when attempting to parse their earlier responses

according to sources (showup, video, or both). In this task, participants received a copy of

their earlier responses to the cued recall questions (prompts 2-6). They were then asked to

copy and paste the details they had provided earlier into separate "bins" (text boxes in

Qualtrics) according to whether they appeared "only in the showup," "only in the video,"

or in "both the video and the showup." While a small early pilot sample consisting of

research assistants did not reveal any confusion with the stated directions, participants in

the current study committed a variety of unexpected errors which prevented the planned

analyses. Some participants seemed to omit those details that came from only the showup

and not the video (misinformation) and did not bin them, though previously recalled, in

any of the text boxes. This may be because participants forgot the source of the

descriptors as coming from the showup or the video or were uncertain of the source and

thus opted not to bin specific details from the task. Unlike the earlier recall task in which

participants were directed to provide thorough and somewhat lengthy descriptions of the

perpetrator's physical characteristics, participants were now examining source. It may be

that participants, once made aware that their accuracy for source was being called into

question, were wary of making an incorrect response and omitted those details of which they were unsure.

Other participants added new details that they had not recalled initially, suggesting they were attempting further retrieval from memories of the videoed crime and the showup. Details newly mentioned included some details that were given only in the showup, suggesting that some participants had two separate memories (one for the showup and one for the video) and were able to revisit both memories to recall various aspects that differed between the two sources.

These errors were noticed early in the coding process and coding was terminated once it was apparent the results would not be conducive to quantitative analysis. The binning task was designed within the limitations of Qualtrics software in which details entered by a participant could not automatically be parsed according to content via a preset algorithm, leaving participants responsible for both dividing and sorting their earlier responses. For example, a participant volunteered "he was wearing a green shirt and blue jeans." "Green shirt" would then be binned in the showup-only bin and "blue jeans" in the video-only bin. In other words, participants had to decide for themselves which detail came from one of two sources (video or showup). To avoid misunderstandings of the task and corresponding participant errors in the future, a source monitoring task of similar composition should be attempted with more explicit directions and display an example unrelated to the crime event.

Clothing Bias and Showup Decisions

Participants exposed to an inconsistent appearance showup were more likely to miss the target in a target-present showup relative to participants who were given a

consistent appearance showup. Also, participants who received a consistent showup were more likely to make a false alarm and identify an innocent suspect in a target-absent showup compared to those who received an inconsistent showup. These findings are in agreement with a well-known bias in identification procedures, clothing bias (Dysart, 2006). Clothing bias occurs when a witness mistakenly selects an innocent suspect in place of the true culprit because of an over-reliance on clothing as opposed to other physical attributes of the perpetrator (Steblay et al., 2003). Two reasons to account for witnesses' over-reliance on clothing are the visual angle clothing occupies and the ease with which a witness can verbalize a description of clothing. Clothing does generally account for a greater visual angle than other physical attributes. Additionally, participants may have easier access to verbal labels for clothing as compared to facial or body descriptors (Sporer, 1996). Clothing bias has been shown to occur across a variety of identification procedures including various kinds of lineup and showup (Dysart et al., 2006; Lindsay et al., 1987).

In contrast with previous research on clothing bias (Steblay et al., 2003), which demonstrates no effect on correct identification rates, the present study found that participants were more likely to miss the suspect as the perpetrator in the showup when he was in clothing that was different from what he was wearing at the time of the crime. This heavy reliance on clothing to make an identification decision may, in part, be a function of the video and showup materials as being filmed or shot at a distance from the suspect or perpetrator. Participants were viewing a video shot approximately 15-20 ft. away from the perpetrator and seeing a showup photograph that was taken about 10ft. away from the suspect. This allowed participants full view of the clothing and a smaller

angle of vision for details of the perpetrator's face. If participants viewed the stimuli from a phone screen (as they were instructed to avoid), this would make the features of the face even smaller in the visual field. It was expected that, despite researcher instruction, some participants would participate in the study from a phone as opposed to a computer, limiting what conclusions can be drawn about how participants' utilize other physical features in combination with clothing when both are equally salient.

Showup Accuracy and Confidence

The current study found no significant relationship between accuracy and confidence for showup identification decisions. The literature on the confidence and accuracy relationship is largely mixed with some studies showing a strong positive relationship under pristine administration conditions (Sauerland et al., 2018) and others showing a weaker positive relationship or no relationship among confidence an accuracy for showup decisions (Mook, 2021). Other researchers have found that a confidence-accuracy relationship exists in field studies, but not in lab settings (Eisen et al., 2017). To explore this tenuous relationship between confidence and accuracy in identification decisions, Lucas and colleagues (2021) varied filler similarity in lineups. When fillers bore a high amount of similarity to the perpetrator this undermined the predictive value of high-confidence suspect identifications at longer retention intervals. Though the present study did not utilize a long retention interval between crime and showup, confidence was not diagnostic of accuracy and participations' calibration was poor. The stimuli (video and showups) utilized in the current study derive in large part from an earlier dissertation study (Mook, 2021), which also saw poor calibration for both choosers and nonchoosers. To ensure adequately powered incorrect identification conditions (miss and false alarm)

in the present study these showup stimuli were selected because they garnered more errors in an earlier study (Mook, 2021). False alarms were more likely due to high similarity between Suspect A and B who served as each other's foils in the showups. Both suspect A and B were Hispanic males with short black hair. Both were clean-shaven without tattoos or scars and were of approximately the same height and weight. A confluence of clothing bias and high similarity between targets may account for the lack of a relationship between confidence and accuracy in the present study. Further investigation into the confidence-accuracy relationship with showups is necessary to ascertain the conditions to obtain a strong positive relationship.

Limitations

For the primary dependent variables of interest, those pertaining to units recalled, the study was appropriately powered and constructed. For auxiliary dependent variables, such as the showup decisions and confidence-accuracy calibrations, the sample size was likely restrictive, limiting conclusions that can be drawn from underpowered analyses. Due to difficulties in collecting data during a global pandemic, the study was launched online and the design was cut back to allow for a smaller sample size. Online administration was necessary but may have resulted in poorer quality responses or confusion with the source monitoring directions. Participant confusion could have been readily discovered and remedied had the study been run in person. Additionally, the survey ran approximately 45 minutes to an hour for most participants; thus, some participants may have been fatigued by the time they approached the source monitoring task which ended the study.

Despite not having a delay condition in the present experiment, results revealed effects of misinformation and commitment to the showup. In the real world, with a longer delay between showup and recall (days or weeks), witnesses may even forget that a showup was administered. Forgetting may, conversely, render the presented misinformation more potent than if the witness had remembered the administration of the showup (Jacoby et al., 1989). If the witness forgets the original source of some information, it may be mistakenly attributed to another similar source. In other words, a source misattribution error is more likely when the original source has been forgotten. A longer delay may also allow for more time for commitment effects to take hold, strengthening misinformation held in memory.

Future Directions

The results of the present study serve as a foundation for future research into showups as a potential font of misinformation. The current study found that misinformation can be administered through a showup and that participants are likely to incorporate such misinformation into a later recall task. Also, committing to a showup containing misinformation as opposed to rejecting it only strengthens the misinformation effect. The present study primarily utilized an appearance change involving clothing. Although there were other physical differences between the video and the showup, the bulk of participants recalled misinformation that had to deal with the clothing the perpetrator was wearing. Future research should examine which kinds of misinformation (e.g., clothing, facial features, body markings) are more easily incorporated into a witness description.

Future research should also include a delay condition and an initial brief 911 description to determine if shorter delays and an initial, untainted recall attempt are protective against the later presentation of misinformation. A brief initial description may serve to inoculate a witness against incorporating later misinformation or, alternatively, it may enhance the misinformation effect through repeated retrieval attempts in the presence of misinformation (Chan et al., 2017).

Lastly, the present design failed to direct participants in a source-monitoring task. Technological restrictions as a function of the pandemic and the constraints of the Qualtrics software may have contributed in part to the confusion participants experienced in the source-monitoring task. Live in-person administration of the task, with a blind researcher actively directing participants to each detail the participant provided, one at a time, would solve the problems of participants omitting responses and likely cut back on participants inventing new responses. If the source-monitoring task is administered effectively and participants can parse their recollections by source, this may aid future police interviewers as they work with witnesses who were previously administered an identification task.

REFERENCES

Ackerman, R., & Goldsmith, M. (2008). Control over grain size in memory reporting—With and without satisficing knowledge. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *34*(5), 1224.

Ayers, M. S., & Reder, L. M. (1998). A theoretical review of the misinformation effect: Predictions from an activation-based memory model. *Psychonomic Bulletin & Review*, *5*(1), 1-21.

Baddeley, A. D., & Logie, R. H. (1999). *Working memory: The multiple-component model.* In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control* (p. 28–61). Cambridge University Press.

Bar-Hillel, M., & Neter, E. (1993). How alike is it versus how likely is it: A disjunction fallacy in probability judgments. *Journal of Personality and Social Psychology, 65*(6), 1119.

Bekerian, D. A., & Bowers, J. M. (1983). Eyewitness testimony: Were we misled? *Journal of Experimental Psychology: Learning, Memory, and Cognition, 9*(1), 139-145.

Belli, R. F., Lindsay, D. S., Gales, M. S., & McCarthy, T. T. (1994). Memory impairment and source misattribution in postevent misinformation experiments with short retention intervals. *Memory & Cognition, 22*(1), 40-54.

Bjork, R. A., & Allen, T. W. (1970). The spacing effect: Consolidation or differential encoding? *Journal of Verbal Learning and Verbal Behavior, 9*(5), 567-572.

Blank, H. (2005). Another look at retroactive and proactive interference: A quantitative analysis of conversion processes. *Memory*, *13*(2), 200-224.

Blank, H., & Launay, C. (2014). How to protect eyewitness memory against the misinformation effect: A meta-analysis of post-warning studies. *Journal of Applied Research in Memory and Cognition, 3*(2), 77-88.

Bonham, A. J., & González-Vallejo, C. (2009). Assessment of calibration for reconstructed eye-witness memories. *Acta psychologica, 131*(1), 34-52.

Brown, E., Deffenbacher, K., & Sturgill, W. (1977). Memory for faces and the circumstances of encounter. *Journal of Applied Psychology*, *62*, 311–318.

Brown, C., Lloyd-Jones, T. J., & Robinson, M. (2008). Eliciting person descriptions from eyewitnesses: A survey of police perceptions of eyewitness performance and reported use of interview techniques. *European Journal of Cognitive Psychology, 20*(3), 529-560.

Campos, L., & Alonso-Quecuty, M. L. (2006). Remembering a criminal conversation: Beyond eyewitness testimony. *Memory, 14*(1), 27–36.

Cann, D. R., & Katz, A. N. (2005). Habitual acceptance of misinformation: Examination of individual differences and source attributions. *Memory & Cognition, 33*(3), 405-417.

Chambers, K. L., & Zaragoza, M. S. (2001). Intended and unintended effects of explicit warnings on eyewitness suggestibility: Evidence from source identification tests. *Memory & Cognition, 29*(8), 1120-1129.

Chan, M. P. S., Jones, C. R., Hall Jamieson, K., & Albarracín, D. (2017). Debunking: A meta-analysis of the psychological efficacy of messages countering misinformation. *Psychological science, 28*(11), 1531-1546.

Chan, J. C. K., Meissner, C. A., & Davis, S. D. (2018). Retrieval potentiates new learning: A theoretical and meta-analytic review. *Psychological Bulletin, 144*(11), 1111–1146.

Charman, S.D. & Kavetski, M. (2016, March). The suggestiveness of showups. Paper presented at the American Psychology-Law Society, Atlanta, Georgia.

Christiaansen, R. E., Sweeney, J. D., & Ochalek, K. (1983). Influencing eyewitness descriptions. *Law and Human Behavior, 7*(1), 59–65.

Chrobak, Q. M., & Zaragoza, M. S. (2013). *The misinformation effect: Past research and recent advances.* In A. M. Ridley, F. Gabbert, & D. J. La Rooy (Eds.), *Wiley series in the psychology of crime, policing and law. Suggestibility in legal contexts: Psychological research and forensic implications* (p. 21–44). Wiley Blackwell.

Clifford, B. R., & Bull, R. (2017). Identification by Means of a Face. In *The Psychology of Person Identification*. London, UK: Routledge.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Cutler, B. L., Penrod, S. D., & Dexter, H. R. (1989). The eyewitness, the expert psychologist, and the jury. *Law and Human Behavior, 13*(3), 311-332.

Davies, G., Shepherd, J., & Ellis, H. (1979). Effects of interpolated mugshot exposure on accuracy of eyewitness identification. *Journal of Applied Psychology, 64*(2), 232-237.

Deffenbacher, K. A., Bornstein, B. H., & Penrod, S. D. (2006). Mugshot exposure effects: Retroactive interference, mugshot commitment, source confusion, and unconscious transference. *Law and Human Behavior*, *30*(3), 287-307.

Demarchi, S., & Py, J. (2009). A method to enhance person description: A field study. *R. Bull, T. Valentine, & T. Williamson (Eds.), Handbook of psychology of investigative interviewing: Current developments and future directions*, 241-256.

Dickerson, C. A., Thibodeau, R., Aronson, E., & Miller, D. (1992). Using cognitive dissonance to encourage water conservation. *Journal of Applied Social Psychology, 22*(11), 841–854.

Dysart, J. E., Lindsay, R. C., & Dupuis, P. R. (2006). Show-ups: The critical issue of clothing bias. *Applied Cognitive Psychology, 20*(8), 1009-1023.

Dysart, J. E., Lindsay, R. C., Macdonald, T. K., & Wicke, C. (2002). The intoxicated witness: Effects of alcohol on identification accuracy from showups. *Journal of Applied Psychology, 87*(1), 170-175.

Eakin, D. K., Schreiber, T. A., & Sergent-Marshall, S. (2003). Misinformation effects in eyewitness memory: the presence and absence of memory impairment as a function of warning and misinformation accessibility. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 29*(5), 813.

Ecker, U. K., Lewandowsky, S., Chang, E. P., & Pillai, R. (2014). The effects of subtle misinformation in news headlines. *Journal of Experimental Psychology: Applied, 20*(4), 323-335.

Ecker, U. K., Lewandowsky, S., Swire, B., & Chang, D. (2011). Correcting false information in memory: Manipulating the strength of misinformation encoding and its retraction. *Psychonomic Bulletin & Review, 18*(3), 570-578.

Eisen, M. L., Smith, A. M., Olaguez, A. P., & Skerritt-Perta, A. S. (2017). An examination of showups conducted by law enforcement using a field-simulation paradigm. *Psychology, Public Policy, and Law, 23*(1), 1.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, *39*(2), 175–191.

Fisher, R. P., & Geiselman, R. E. (2010). The cognitive interview method of conducting police interviews: Eliciting extensive information and promoting therapeutic jurisprudence. *International Journal of Law and Psychiatry*, *33*(5-6), 321–328.

Flowe, H., Ebbesen, E., Burke, C., and Chivabunditt, P. (2001, July). *At the scene of the crime: An examination of the external validity of published studies on line-up identification accuracy*. Paper presented at the American Psychological Society Conference, Toronto, Canada

Friedland, S. I. (1989). On common sense and the evaluation of witness credibility. *Case W. Res. L. Rev.*, *40*, 165.

Gabbert, F., Memon, A., & Allan, K. (2003). Memory conformity: Can eyewitnesses influence each other memories for an event? *Applied Cognitive Psychology, 17*(5), 533-543.

Garrett, B. L. (2011). *Convicting the innocent: Where criminal prosecutions go wrong.* Harvard University Press.

Goodsell, C. A., Wetmore, S. A., Neuschatz, J. S., & Gronlund, S. D. (2013). Showups. In B. L. Cutler (Ed.), *Reform of eyewitness identification procedures* (pp. 45–63). American Psychological Association.

Gonzalez, R., Ellsworth, P. C., & Pembroke, M. (1993). Response biases in lineups and showups. *Journal of Personality and Social Psychology, 64*(4), 525-537.

Grice, H. P. (1975). Logic and conversation. In *Speech acts* (pp. 41-58). Brill.

Gronlund, S., Carlson, C. A., Neuschatz, J., Goodsell, C. A., Wetmore, S., Wooten, A., & Graham, M. (2012). Showups versus lineups: An evaluation using roc analysis. *Journal of Applied Research in Memory and Cognition, 1*(4), 221-228.

Harmon-Jones, E., & Harmon-Jones, C. (2008). Cognitive dissonance theory: An update with a focus on the action-based model. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 71–83). The Guilford Press.

Hemmer, P., & Steyvers, M. (2009). A Bayesian account of reconstructive memory. *Topics in Cognitive Science, 1*(1), 189-202.

Higham, P. A., Luna, K., & Bloomfield, J. (2011). Trace-strength and source-monitoring accounts of accuracy and metacognitive resolution in the misinformation paradigm. *Applied Cognitive Psychology, 25*(2), 324-335.

Hintzman, D. L. (1976). Repetition and memory. In *Psychology of Learning and Motivation* (Vol. 10, pp. 47-91). Amsterdam, Netherlands: Elsevier.

Horry, R., Colton, L. M., & Williamson, P. (2014). Confidence–accuracy resolution in the misinformation paradigm is influenced by the availability of source cues. *Acta psychologica, 151*, 164-173.

Innocence Project. (2020, December 17). Eyewitness Identification Reform. Retrieved from https://innocenceproject.org/eyewitness-identification-reform/

Jacoby, L. L., Kelley, C., Brown, J., & Jasechko, J. (1989). Becoming famous overnight: Limits on the ability to avoid unconscious influences of the past. *Journal of Personality and Social Psychology, 56*(3), 326–338.

Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin*, *114*(1), 3–28.

Karanian, J. M., Rabb, N., Wulff, A. N., Torrance, M. G., Thomas, A. K., & Race, E. (2020). Protecting memory from misinformation: Warnings modulate cortical reinstatement during memory retrieval. *Proceedings of the National Academy of Sciences, 117*(37), 22771-22779.

Koutstaal, W., Schacter, D. L., Johnson, M. K., Angell, K. E., & Gross, M. S. (1998). Post-event review in older and younger adults: improving memory accessibility of complex everyday events. *Psychology and Aging*, *13*(2), 277.

Kuehn, L. L. (1974). Looking down a gun barrel: Person perception and violent crime. *Perceptual and Motor Skills, 39*(3), 1159-1164.

Kusev, P., & Schaik, P. V. (2013). The cognitive economy: The probabilistic turn in psychology and human cognition. *Behavioral and Brain Sciences, 36*(3), 294-295.

Lapaglia, J. A., & Chan, J. C. (2019). Telling a good story: The effects of memory retrieval and context processing on eyewitness suggestibility. *Plos One, 14*(2).

Lawson, V. Z., & Dysart, J. E. (2012). The showup identification procedure: An exploration of systematic biases. *Legal and Criminological Psychology, 19*(1), 54-68.

Lestrade, J. D. (Director), & Poncet, D. (Producer). (2001). *Murder on a Sunday morning* [Motion picture on DVD]. United States: Direct Cinema.

Lindsay, S. D., Allen, B. P., Chan, J. C., & Dahl, L. C. (2004). Eyewitness suggestibility and source similarity: Intrusions of details from one event into memory reports of another event. *Journal of Memory and Language, 50*(1), 96-111.

Lindsay, R. C., Martin, R., & Webber, L. (1994). Default values in eyewitness descriptions: A problem for the match-to-description lineup foil selection strategy. *Law and Human Behavior, 18*(5), 527

Lindsay, R. C., Wallbridge, H., & Drennan, D. (1987). Do the clothes make the man? An exploration of the effect of lineup attire on eyewitness identification accuracy. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 19*(4), 463.

Loftus, E. (1979). The Malleability of Human Memory: Information introduced after we view an incident can transform memory. *American Scientist, 67*(3), 312-320.

Loftus E.F. (1981) Reconstructive memory processes in eyewitness testimony. In: Sales B.D. (eds) *The Trial Process. Perspectives in Law & Psychology*, vol 2. Springer, Boston, MA.

Loftus, E. F. (2005). Planting misinformation in the human mind: A 30-year investigation of the malleability of memory. *Learning & Memory, 12*(4), 361-366.

Loftus, E. F. (2019). Eyewitness testimony. *Applied Cognitive Psychology, 33*(4), 498-503.

Loftus, E. F., & Greene, E. (1980). Warning: Even memory for faces may be contagious. *Law and Human Behavior, 4*(4), 323–334.

Loftus, E. F., & Hoffman, H. G. (1989). Misinformation and memory: The creation of new memories. *Journal of Experimental Psychology: General, 118*(1), 100–104.

Loftus, E. F., Miller, D. G., & Burns, H. J. (1978). Semantic integration of verbal information into a visual memory. *Journal of Experimental Psychology: Human Learning and Memory, 4*(1), 19-31.

Lucas, C. A., Brewer, N., & Palmer, M. A. (2021). Eyewitness identification: The complex issue of suspect-filler similarity. *Psychology, Public Policy, and Law, 27*(2), 151.

Malpass, R. S. & Goodman-Delahunty, J. (2004) Psychology and the Law, Overview. In C. D. Spielberg, (Ed.), *Encyclopedia of Applied Psychology, Vol 3*, 171-184. New York: Elsevier Academic Press.

McCloskey, M., & Zaragoza, M. (1985). Misleading postevent information and memory for events: Arguments and evidence against memory impairment hypotheses. *Journal of Experimental Psychology: General, 114*(1), 1–16.

McQuiston, D., & Malpass, R. (2001, June). *Eyewitness identifications in criminal cases: An archival study*. Paper presented at the fourth biennial meeting of the Society for Applied Research in Memory and Cognition, Kingston, ON.

Meissner, C. A., Sporer, S. L., & Schooler, J. (2007). Person descriptions as eyewitness evidence. In *Handbook of Eyewitness Psychology: Memory for People* (pp. 3-34). Mahwah, NJ: Lawrence Erlbaum & Associates.

Memon, A., Hope, L., Bartlett, J., & Bull, R. (2002). Eyewitness recognition errors: The effects of mugshot viewing and choosing in young and old adults. *Memory & Cognition, 30*(8), 1219-1227.

Milde, J. P. (2019). Bare Necessity: Simplifying the Standard for Admitting Showup Identifications. *BCL Rev.*, *60*, 1771.

Mitchell, K.J., & Johnson, M.K. (2000). Source monitoring: Attributing mental experiences. In E. Tulving & F.I.M. Craik (Eds.), The Oxford handbook of memory (pp. 179-195). New York: Oxford University Press.

Mitchell, K. J., & Zaragoza, M. S. (2001). Contextual overlap and eyewitness suggestibility. *Memory & Cognition, 29*(4), 616-626.

Mook, A. T. (2021). *Undermining Witnesses' Perceptions of Police Beliefs Improves Eyewitness Identification Accuracy in Showup Procedures* (Unpublished doctoral dissertation). Florida International University.

Moore, K. N., & Lampinen, J. M. (2016). The use of recollection rejection in the misinformation paradigm. *Applied Cognitive Psychology, 30*(6), 992-1004.

Morton, J. (1985). Headed records: A model for memory and its failures. *Cognition, 20*(1), 1-23.

Neil v. Biggers (United States Court of Appeals for the Sixth Circuit February 28, 1972) (Oyez, Dist. file).

Neuschatz, J. S., Wetmore, S. A., Key, K. N., Cash, D. K., Gronlund, S. D., & Goodsell, C. A. (2016). A comprehensive evaluation of showups. In *Advances in Psychology and Law Volume 1* (pp. 43-69). Switzerland: Springer International Publishing.

New Jersey v. Pressley, 229 N.J. 609, 164 A.3d 404 (2018).

O'Neill Shermer, L., Rose, K. C., & Hoffman, A. (2011). Perceptions and credibility: Understanding the nuances of eyewitness testimony. *Journal of Contemporary Criminal Justice*, *27*(2), 183-203.

Paterson, H. M., & Kemp, R. I. (2006). Comparing methods of encountering post-event Information: The power of co-witness suggestion. *Applied Cognitive Psychology, 20*(8), 1083–1099.

Paterson, H. M., Kemp, R. I., & Forgas, J. P. (2009). Co-witnesses, confederates, and conformity: Effects of discussion and delay on eyewitness memory. *Psychiatry, Psychology and Law, 16*(Sup1).

Paz-Alonso, P. M., & Goodman, G. S. (2008). Trauma and memory: Effects of post-event misinformation, retrieval order, and retention interval. *Memory, 16*(1), 58-75.

Pena, M. M., Klemfuss, J. Z., Loftus, E. F., & Mindthoff, A. (2017). The effects of exposure to differing amounts of misinformation and source credibility perception on source monitoring and memory accuracy. *Psychology of Consciousness: Theory, Research, and Practice, 4*(4), 337-347.

Pickel, K. (2004). When a lie becomes the truth: The effects of self-generated misinformation on eyewitness memory. *Memory*, *12*(1), 14-26.

Pirolli, P. L., & Mitterer, J. O. (1984). The effect of leading questions on prior memory: Evidence for the coexistence of inconsistent memory traces. *Canadian Journal of Psychology/Revue Canadienne de Psychologie, 38*(1), 135–141.

Postman, L. (1961). The present status of interference theory. In *Conference on Verbal Learning and Verbal Behavior, 1959*, US. McGraw-Hill Book Company.

Pratkanis, A. R., Greenwald, A. G., Leippe, M. R., & Baumgardner, M. H. (1988). In search of reliable persuasion effects: III. The sleeper effect is dead: Long live the sleeper effect. *Journal of personality and social psychology, 54*(2), 203.

Purks, S. R., Callahan, D. J., Braida, L. D., & Durlach, N. I. (1980). Intensity perception. X. Effect of preceding stimulus on identification performance. *The Journal of the Acoustical Society of America, 67*(2), 634-637.

Read, J. D., Tollestrup, P., Hammersley, R., McFadzen, E., & Christensen, A. (1990). The unconscious transference effect: Are innocent bystanders ever misidentified?. *Applied Cognitive Psychology*, *4*(1), 3-31.

Reyna, V. F., & Brainerd, C. J. (1995). Fuzzy-trace theory: An interim synthesis. *Learning and individual Differences*, *7*(1), 1-75.

Reyna, V. F., & Lloyd, F. (1997). Theories of false memory in children and adults. *Learning and Individual Differences, 9*(2), 95-123.

Robinson-Riegler, B., & Robinson-Riegler, G. (2004). *Cognitive Psychology: Applying the Science of the Mind*. Allyn & Bacon. p. 313.

Satin, G. E., & Fisher, R. P. (2019). Investigative utility of the cognitive interview: Describing and finding perpetrators. *Law and Human Behavior, 43*(5), 491–506.

Sauerland, M., Sagana, A., Sporer, S. L., & Wixted, J. T. (2018). Decision time and confidence predict choosers' identification performance in photographic showups. *PLoS One, 13*(1), e0190416.

Saunders, J., & MacLeod, M. D. (2002). New evidence on the suggestibility of memory: The role of retrieval-induced forgetting in misinformation effects. *Journal of Experimental Psychology: Applied, 8*(2), 127–142.

Schacter, D. L. (1989). *On the relation between memory and consciousness: Dissociable interactions and conscious experience.* In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honour of Endel Tulving* (p. 355–389). Lawrence Erlbaum Associates, Inc.

Schacter, D. L. (2001). *The seven sins of memory: How the mind forgets and remembers.* Houghton, Mifflin and Company.

Schreiber, T. A., & Sergent, S. D. (1998). The role of commitment in producing misinformation effects in eyewitness memory. *Psychonomic Bulletin & Review, 5*(3), 443-448.

Shaughnessy, J. J., & Mand, J. L. (1982). How permanent are memories for real life events? *The American Journal of Psychology, 95*(1), 51.

Smith, V. L., & Ellsworth, P. C. (1987). The social psychology of eyewitness accuracy: Misleading questions and communicator expertise. *Journal of Applied Psychology, 72*(2), 294.

Sporer, S. L. (1996). Psychological aspects of person descriptions. In *Psychological Issues in Person Identification* (pp. 53-86). Mahwah, NJ: Lawrence Erlbaum & Associates.

Steblay, N., Dysart, J., Fulero, S., & Lindsay, R. (2003). Eyewitness accuracy rates in police showup and lineup presentations: A meta-analytic comparison. *Law and Human Behavior, 27*(5), 523-540.

Steblay, N. K., Wells, G. L., & Douglass, A. B. (2014). The eyewitness post identification feedback effect 15 years later: Theoretical and policy implications. *Psychology, Public Policy, and Law, 20*(1), 1–18.

Sutherland, R., & Hayne, H. (2001). The effect of postevent information on adults' eyewitness reports. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, *15*(3), 249-263.

Tomes, J. L., & Katz, A. N. (2000). Confidence–accuracy relations for real and suggested events. *Memory, 8*(5), 273-283.

Torres-Trejo, F., & Cansino, S. (2016). The effects of the amount of information on episodic memory binding. *Advances in Cognitive Psychology, 12*(2), 79–87.

Turtle, J., Read, J. D., Lindsay, D. S., & Brimacombe, C. E. (2008). Toward a more informative psychological science of eyewitness evidence. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition, 22*(6), 769-778.

van Koppen, P. J., & Lochun, S. K. (1997). Portraying perpetrators: The validity of offender descriptions by witnesses. *Law and Human Behavior, 21*(6), 661-685.

Wade, K. A., Garry, M., Read, J. D., & Lindsay, D. S. (2002). A picture is worth a thousand lies: Using false photographs to create false childhood memories. *Psychonomic Bulletin & Review, 9*(3), 597-603.

Wagenaar, W. A., & Boer, J. P. (1987). Misleading postevent information: Testing parameterized models of integration in memory. *Acta Psychologica, 66*(3), 291–306.

Ward, L. M., & Lockhead, G. R. (1970). Sequential effects and memory in category judgments. *Journal of Experimental Psychology, 84*(1), 27.

Ward, L. M., & Lockhead, G. R. (1971). Response system processes in absolute judgment. *Perception & Psychophysics, 9*(1), 73-78.

Wells, G. L. (1978). Applied eyewitness-testimony research: System variables and estimator variables. *Journal of Personality and Social Psychology, 36*(12), 1546–1557.

Wells, Gary L. "Attribution and reconstructive memory." *Journal of Experimental Social Psychology* 18, no. 5 (1982): 447-463.

Wells, G. L., & Bradfield, A. L. (1998). "Good, you identified the suspect:" Feedback to eyewitnesses distorts their reports of the witnessing experience. *Journal of Applied Psychology*, *83*, 360–376

West, E., & Meterko, V. (2016). Innocence project: DNA exonerations, 1989-2014: Review of data and findings from the first 25 years. *Albany Law Review, 79*(3), 717-795.

Wetmore, S. A., Neuschatz, J. S., Gronlund, S. D., Wooten, A., Goodsell, C. A., & Carlson, C. A. (2015). Effect of retention interval on showup and lineup performance. *Journal of Applied Research in Memory and Cognition, 4*(1), 8-14.

Wright, A. M., & Holliday, R. E. (2006). Enhancing the recall of young, young–old and old–old adults with cognitive interviews. *Applied Cognitive Psychology, 21*(1), 19-43.

Wright, D. B., & Loftus, E. F. (1998). How misinformation alters memories. *Journal of Experimental Child Psychology, 71*(2), 155–164.

Wylie, L. E., Patihis, L., & McCuller, L. L. (2014). Misinformation effect in older versus younger adults: A meta-analysis and review. *The elderly eyewitness in court*, 52-80.

Yang, C., Potts, R., & Shanks, D. R. (2018). Enhancing learning and retrieval of new information: A review of the forward testing effect. *Npj Science of Learning, 3*(1).

Yaniv, I., & Foster, D. P. (1997). Precision and accuracy of judgmental estimation. *Journal of behavioral decision making, 10*(1), 21-32.

Yarmey, A. D., Yarmey, M. J., & Yarmey, A. L. (1996). Accuracy of eyewitness identifications in showups and lineups. *Law and Human Behavior, 20*(4), 459-477.

Yuille, J. C., & Cutshall, J. L. (1986). A case study of eyewitness memory of a crime. *Journal of Applied Psychology, 71*(2), 291–301.

Zaragoza, M. S., & Lane, S. M. (1994). Source misattributions and the suggestibility of eyewitness memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 20*(4), 934.

Zaragoza, M. S., Lane, S. M., Ackil, J. K., & Chambers, K. L. (1997). Confusing real and suggested memories: Source monitoring and eyewitness suggestibility. *Memory for everyday and emotional events*, 401-425.

Zotov, V., Jones, M. N., & Mewhort, D. J. K. (2011). Contrast and assimilation in categorization and exemplar production. *Attention, Perception, & Psychophysics, 73*(2), 621-639.

Table 1.

Original video details and participant description examples for each coding category with an inconsistent showup

Original Video	Video-Only	Showup-Only	Both	Neither	Ambiguous
Black t-shirt	Black t-shirt	Green t-shirt with Nike logo	Black short hair	Yellow hat	Angry-looking
Blue jeans	Blue jeans	Black jeans	Hispanic	Pierced ears/earrings	sketchy
Looking into cars	Looking into cars	Tattoo on arm	Black shoes	Hoodie sweatshirt	calm
Took laptop	Took laptop	Right eyebrow scar	Male	Red shirt	Approximately 5 ½' tall
Clean-shaven	Clean-shaven	Cross Necklace			

Note: Video-only elements are always the content of the original video and therefore correct. Showup-only elements are those only consistent with the showup and not with the video. If a consistent showup were shown to the participant, all correct physical characteristics of the perpetrator would appear in the "Both" category.

Table 2.

Target Fixed-Effects ANOVA results using total errors as criterion

Predictor	Sum of Squares	df	Mean Square	F	p	partial η^2	Observed Power
(Intercept)	89538.379	1	89538.379	341.950	.000	.504	1.000
Target Presence	224.740	1	224.740	.858	.355	.003	.152
Consistency	4107.607	1	4107.607	15.687	.000	.044	.977
Target Presence x Consistency	1365.749	1	1365.749	5.216	.023	.015	.625
Error	88242.233	337	261.846				

Table 3.

A moderator regression model of commitment moderating the relationship of consistency and misinformation units for the initial open-ended prompt

	Coefficients	Standard Error	*t*	*p*	95% CI
Misinformation Units					
Constant	.949	.260	3.651	.000	[.438, 1.462]
Consistency	.434	.521	.834	.405	[-.590, 1.459]
Commitment	-.396	.522	-.759	.448	[-1.422, .630]
Consistency x Commitment	-.423	1.042	-.405	.686	[-2.473, 1.628]

Table 4.

A moderator regression model of identification accuracy moderating the relationship of consistency and misinformation units for the initial open-ended prompt

	Coefficients	Standard Error	*t*	*p*	95% CI
Misinformation Units					
Constant	.982	.247	3.979	.000	[.497, 1.468]
Consistency	.559	.494	1.131	.259	[-.413, 1.531]
Identification Accuracy	-.793	.512	-1.549	.122	[-1.799, .214]
Consistency x Identification Accuracy	-.346	1.024	-.338	.736	[-2.361, 1.668]

Table 5.

A moderator regression model of commitment moderating the relationship of consistency and misinformation units for perpetrator appearance prompts

	Coefficients	Standard Error	*t*	*p*	95% CI
Misinformation Units					
Constant	8.370	.530	15.800	.000	[7.328, 9.412]
Consistency	7.707	1.060	7.268	.000	[5.621, 9.792]
Commitment	2.219	1.062	2.089	.037	[.130, 4.308]
Consistency x Commitment	5.343	2.123	2.517	.012	[1.167, 9.518]

Table 6.

A moderator regression model of identification accuracy moderating the relationship of consistency and misinformation units for perpetrator prompts

	Coefficients	Standard Error	t	p	95% CI
Misinformation Units					
Constant	7.959	.512	15.544	.000	[6.952, 8.967]
Consistency	6.965	1.025	6.797	.000	[4.949, 8.980]
Identification Accuracy	-.122	1.062	-.115	.908	[-2.210, .1.966]
Consistency x Identification Accuracy	.557	2.124	.262	.793	[-3.622, 4.735]

Table 7.

Target absent: Frequencies and percentages of identification accuracy by suspect appearance consistency

	False Alarm	Correct Rejection
Suspect Appearance Consistent with Appearance at Crime	54.6% (*n*= 53)	45.4% (*n*=44)
Inconsistent with Appearance at Crime	24.7% (*n* = 21)	75.3% (*n* = 64)

Table 8.

Target present: Frequencies and percentages of identification accuracy by suspect appearance consistency

	Hit	Miss
Suspect Appearance		
Consistent with Appearance at Crime	84.8% (*n*= 67)	15.2% (*n*=12)
Inconsistent with Appearance at Crime	49.4% (*n* = 40)	50.6% (*n* = 41)

Table 9.

Confidence-accuracy calibration by choosers and non-choosers

	C	OU	NRI	ANRI
Chooser Status				
Chooser (1)	.047 [.012, .083]	.131 [.045, .216]	.049 [-.033, .131]	.006 [-.078, .090]
Non-Chooser (0)	.057 [.013, .101]	-.016 [-.110, .078]	.062 [-.037, .161]	.013 [-.089, .115]

APPENDICES

APPENDIX C

Attention Check

Please recall the <u>Crime Report</u> you read prior to watching the crime and answer the questions to the best of your ability.

Answers that are inaccurate, incomplete or incomprehensible are potential qualifications to be excluded from data collection without payment.

1. What object was stolen in the video?
- A laptop
- A phone
- Money

2. Where was the object taken from?
- The student center
- A car
- A classroom

3. How many people were involved in the theft (not counting the person filming/witness)?

- Three
- Two
- One

APPENDIX D

Visual Search Tasks

Please scan the photo and answer the following questions to the best of your ability.
The page will advance automatically after time has elapsed.

Inaccurate or partial answers will not be penalized
However, incomplete answers or unintelligible answers are potential qualifications to be
excluded from data collections without payment.
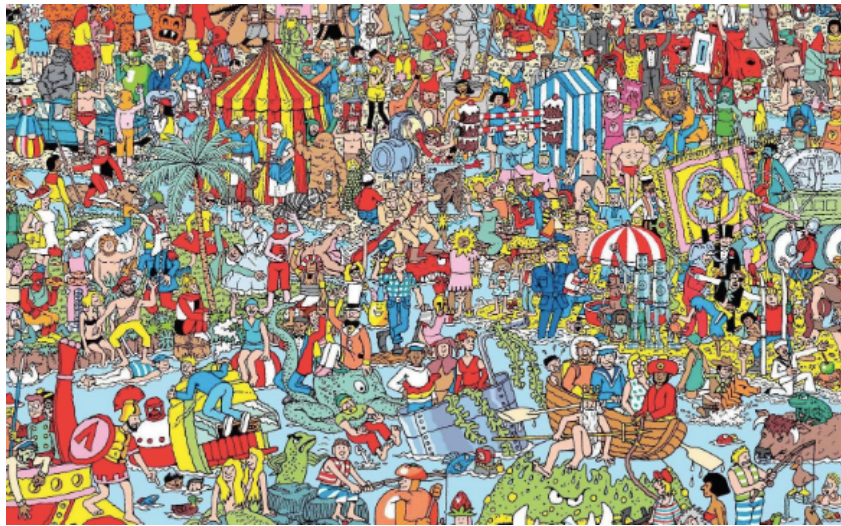
1. Please describe in great detail the scene above

2.Can you find three monsters in the picture? Please describe them and what they are
doing in as much detail as possible.

3. For some the details in this scene may be difficult to see. Can you see the image
clearly? Please describe in as much detail as possible everything you can make out from
the image.
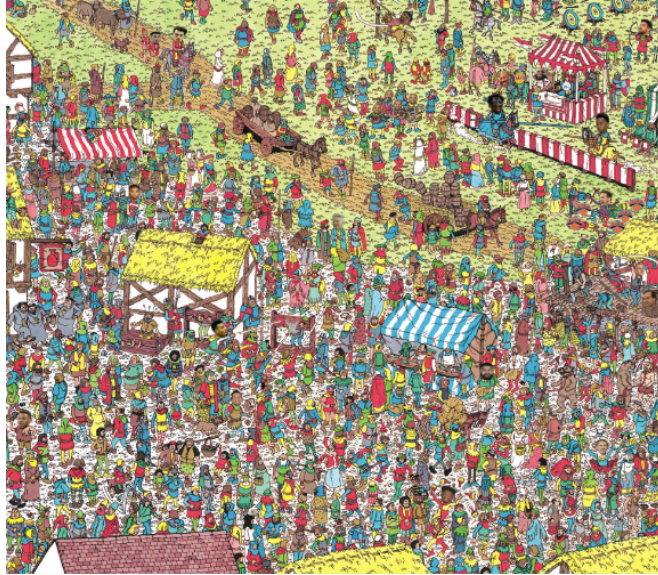
4. Do you notice anything that stands out about this image? If so, describe in detail what is different and how many out of place items you can detect.

5. Describe in as much detail as possible what you are seeing occur in this scene.

6. Take a moment to scan the photo again, how many horses can you find in the above image? And please describe some difference among the horses.

APPENDIX E

Cover Story

The video you are about to watch is now property of the Miami-Dade police department and was captured by a concerned citizen parked in an overflow parking lot of a large university in South Florida. The citizen submitted this video into the Miami-Dade Crime Stoppers website as an anonymous source.

Prior to receiving this video tip, police were investigating an uptick in thefts on the university's campus. The majority of the thefts involved items being stolen out of unlocked vehicles that were parked in overflow parking lots on campus. These parking lots have no security cameras and very little foot traffic.

The psychology department at FIU is collaborating with the Miami-Dade Police to test a new identification policy. In accordance with this new policy, police must take photos of the area and all people in the area. Shortly after photos are taken, they then must crowd source identifications made from Crime Stoppers footage. As part of the present study, you will be a part of the crowd sourced identification procedure.

You are about to be shown the Crime Stoppers footage mentioned above. Please pay attention to the video, as you will be asked about the video later.

APPENDIX F

1. How familiar are you with the United States criminal justice system?
   a. Extremely familiar
   b. Very familiar
   c. Moderately familiar
   d. Slightly familiar
   e. Not familiar at all

2. Have you ever taken Legal or Forensic Psychology course?
   a. Yes
   b. No

3. Have you ever had experience within the criminal justice system?
   a. Yes, as a suspect
   b. Yes, as a victim
   c. Yes, as a witness
   d. Yes, in a professional capacity (intern, attorney, law enforcement, etc.)
   e. No

4. How trustworthy do you find police officers to be?
   a. Extremely trustworthy
   b. Very trustworthy
   c. Moderately trustworthy
   d. Slightly trustworthy
   e. Not trustworthy at all

5. Have you ever been interviewed by a law enforcement officer?
   a. Yes, as a suspect
   b. Yes, as a witness
   c. Yes, for another reason
   d. No

1. Please describe the event in the video in as much detail as possible. Take your time. Every little detail is important for investigators.

Now I want you to zero in on the perpetrator as you saw him/her **at the scene of the crime**. Close your eyes and think about the perpetrator.

2. To help guide you in your description, let's start with the perpetrator's overall body type. Describe the perpetrator's overall build including approximate height and weight as well as notable characteristics of their body shape.

How confident are you in the details you just wrote down?

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
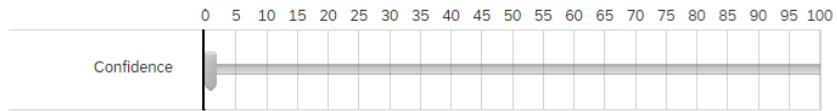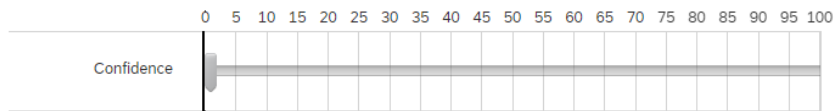
Confidence

3. Now let's focus on the face and head. What do you remember about their facial features, head shape, and hairstyle?

How confident are you in the details you just wrote down?

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
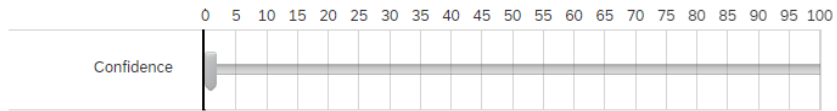
Confidence

4. Let's focus on their clothing now. What was the perpetrator wearing? Be sure to describe all items of clothing you remember from head to feet.

How confident are you in the details you just wrote down?

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Confidence

5. Please describe any noticeable marks the person may have had on their body (tattoos, scars, piercings, etc.).

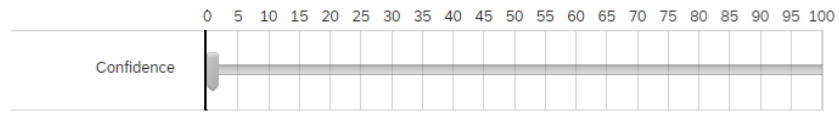How confident are you in the details you just wrote down?

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
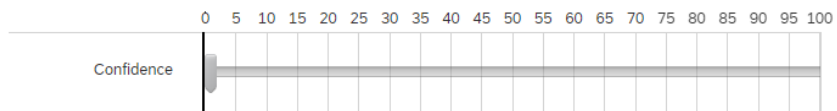
Confidence

6. Did the perpetrator have on any jewelry? If so, describe what type.

How confident are you in the details you just wrote down?

0　5　10　15　20　25　30　35　40　45　50　55　60　65　70　75　80　85　90　95　100
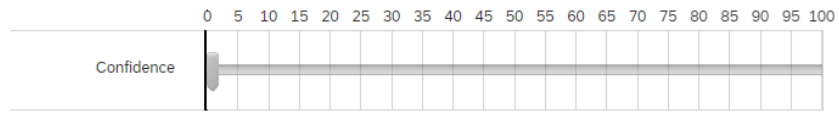
Confidence

7. Finally, describe any other identifiable features you may remember including, but not limited to, any scars, markings on the skin, tattoos, beauty marks, facial hair, etc.

How confident are you in the details you just wrote down?

0　5　10　15　20　25　30　35　40　45　50　55　60　65　70　75　80　85　90　95　100

Confidence

8. Here provide any other observations of the perpetrator you remember. These can be of perceived facial expression, demeanor, etc.

How confident are you in the details you just wrote down?

0　5　10　15　20　25　30　35　40　45　50　55　60　65　70　75　80　85　90　95　100

Confidence
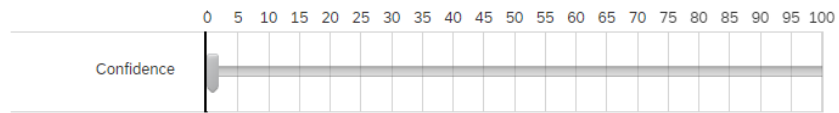
Appendix H

Do you remember being shown a photograph of a suspect after viewing the crime video?

- Yes, I remember it vividly
- Yes, I remember it vaguely
- No, I do not recall being shown a picture of the suspect

Appendix I

Please take each of the details (can be a phrase or sentence) you mentioned previously in the interview portion and copy and paste them into the appropriate bins below (there are 3). Please copy and paste phrases and/or sentences.

Below are the descriptors you gave earlier.

[Participants responses]

Details that were shown only in the crime video:

[Text box with participant response]

Details that were shown only in the showup (photograph of suspect):

[Text box with participant response]

Details that were shown in both the crime video and the showup:

[Text box with participant response]

VITA

KELSEY HESS

2013-2017   B.A., Psychology and Criminal Justice
Ohio Northern University
Ada, Ohio

2017-2022   Doctoral Candidate of Psychology
Florida International University
Miami, Florida

PUBLICATIONS AND PRESENTATIONS

Schwartz, B., Pournaghdali, A., Hess, K.L. (under review) Comparative approaches to the natural ecology of metacognition. *Comparative Cognition and Behavior Reviews.*

Hess, K.L. (2022) Post-dictive confidence judgements in eyewitnesses. [Conference presentation]. Southern Society for Philosophy and Psychology (SSPP) Conference, Mobile, AL

Hess, K.L., Fisher, R.P. (2022) The influence of a showup identification on a witness description. [Conference presentation]. American Psychology-Law Society (AP-LS) Conference, Denver, CO

Hess, K., Fisher, R (2020, March). Subverting memory safeguards: Hijacking metamemorial Monitoring. [Conference presentation]. American Psychology-Law Society (AP-LS) Conference, New Orleans, LA.

Hess, K., Fisher, R., McLaney, S., Gomez-Lostalo, C. (2019, March). Subverting memory safeguards: Hijacking metamemorial monitoring under poor encoding conditions. Poster presented at the meeting of American Psychology-Law Society, Portland, OR

Hess, K., Fisher, R., McLaney, S., Gomez-Lostalo, C., Rengel-Isea, M. & Smith, S. (2018, March). Metacognitive instruction and encoding condition on memory for a word list. Poster presented at the meeting of American Psychology-Law Society, Memphis, TN.

Hess, K.L., Wolfs, A., Goldfarb, D., Evans, J.R., Hayes, T., Granitur, C., McLaney, S. (2022). The influence of gender and other extralegal factors on student loan bankruptcy decisions. *Psychology, Public Policy, and Law, 28*(1), 137-150. https://doi.org/10.1037/law0000338

Hess, K.L., Wolfs, A., Granitur, C., McLaney, S., Goldfarb, D., Evans, J.R., Bailey, F. (2020, March 5–7). *Exploring judicial biases in student loan discharge decisions* [Conference presentation]. American Psychology and Law Society (AP-LS) Conference, New Orleans, LA

McLaney, S. Hess, K., Castro. A, & Fisher. R. (2019, March). Derived cues and mnemonics: Students remembering college courses. Poster presented at the meeting of American Psychology-Law Society, Portland, OR

Mindthoff, A., Meissner, C., Hess, K.L., Vallano, J. (2021, September) What works? Rapport [Conference presentation]. International Investigative Interviewing Research Group (IIIRG), Virtual.

Mindthoff, A., Meissner, C., Hess, K.L., Vallano, J. (2021, July) What works? Project update: Rapport. [Conference presentation]. High-Value Detainee Interrogation Group (HIG) Research Symposium, Virtual.

Riggenbach, M. R., Weiser, J. N., Mosley, B. E., Hipskind, J. J., Wireman, L. E., Hess, K. L., Duffy, T. J., Handel, J. K., Kaschalk, M. G., Reneau, K. E., Rorabaugh, B. R., Norrholm, S. D., Jovanovic, T., & Zoladz, P. R. (2019). Immediate pre-learning stress enhances baseline startle response and fear acquisition in a fear-potentiated startle paradigm. *Behavioural Brain Research*, *371*, 111980.

Zoladz, P., Daley, A., Nagle, H., Fiely, M., Mosely, B., Brown, C., Duffy, T., Scarf, A., Earley, M., Hess, K., Handel, J., Riggenbach, M., Rossier, M., Wireman, L., Hipskind, J., Rohrbaugh, B. (2017, Nov.). FKBP5 polymorphisms influence pre-learning stress-induced alterations of learning and memory. Poster presented at the meeting of National Society for Neuroscience Conference, Washington, D.C.