

CAN AUTHORITY INFLUENCE MISINFORMATION? THE RELATIONSHIP BETWEEN
MISINFORMATION AND EYEWITNESS ACCURACY

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Can Authority Influence Misinformation?

The Relationship Between Misinformation and Eyewitness Accuracy

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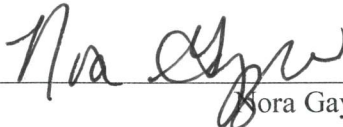
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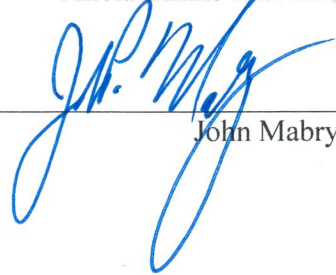
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ABSTRACT

Mistaken identification by eyewitnesses was involved in 72% of the cases where people were later exonerated by DNA testing (Smalarz & Wells, 2015). There has been a large movement in support of eyewitness being unreliable. Misinformation and the pitfalls of memory have been widely studied; however, an interesting avenue of thought is how might the presence of authority interact with these phenomena. While previous research studied how authority impacted memory, few studies have examined the role that individual differences in response to authority impacted memory. This study examined how authority and response to authority impacted eyewitness memory. One hundred twelve participants were randomly assigned to four conditions (high authority-leading questions, low authority-leading questions, high authority-nonleading questions, and low authority-nonleading questions). Participants watched a short video in which a bank robbery was committed. Participants were interviewed and asked leading or nonleading questions by a person with high or low authority. After, participants were asked to make a statement about any details they could remember. For interview accuracy, there was a main effect of question type. Participants demonstrated better recall for nonleading than leading questions. The finding replicates previous research that shows leading questions can create more misinformation than neutral questions. However, no other effects were found for the interview accuracy or the witness statement accuracy. Thus, it appears that authority and response to authority did not impact eyewitness memory. This could be due to a weak authority manipulation and that participants may need additional cues, such as uniform, to legitimize a persona as an authority figure. Thus, it could be that when examining characteristics of the interview (e.g., response to authority), there may be other systems impacting recall other than authority. Limitations and future directions are discussed.

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INTRODUCTION

Mistaken identification by eyewitnesses was involved in 72% of the cases where people were later exonerated by DNA testing (Smalarz & Wells, 2015). The work on misinformation and memory has shown how unreliable witnesses' statements can be. These witness statements are not made in isolation, but instead, they are typically given in interviews from an authority figure (e.g., police officer, judge, lawyer, etc.). During these interviews, authority figures may unintentionally introduce misinformation, which can lead to memory errors for eyewitnesses. Once these memory errors are introduced, eyewitnesses cannot differentiate between false memories versus real (accurate) memories (Pickrell et al., 2016). The research on authority focuses more on how people will behave when authority is physically present, which can lead to changes in behavior or increased compliance from interviewees. However, what is not known is how individuals' responses to authority moderate the impact authority may have on eyewitnesses' recollection of events.

Eyewitness Memory and the Misinformation Effect

Changes in eyewitness memory have been shown to have many causes. Loftus and Palmer (1974) found that introducing small changes to verbiage influenced eyewitnesses' recollection of events. In the study, when an interviewer solicited feedback from the participant, one word was changed. The sentences read: "How fast was the car going when it hit the other car?" versus "How fast was the car going when it smashed the other car?" Only the verbs changed, which led participants to estimate that the car was going faster in the "smashed" condition versus the "hit" condition. Loftus and Palmer theorized that the type of wording used during questioning impacted how eyewitnesses perceived and recalled a minor car accident. They thought that the introduction of misleading post-event information (MPI) misinformed

eyewitnesses. They called this effect the misinformation effect, which refers to the tendency for MPI to reduce one's memory accuracy for the original event (Pickrell et al, 2016; Loftus, 1975). This MPI can be innocent, but often information given after the fact can have a misleading effect. The misinformation effect has been widely studied, and it has been found that this misleading information can occur in many situations with a range of possible effects from influencing, changing, and even creating new memories (Pickrell et al, 2016). These impressions often lead to higher recall of altered memories of real-life events. While these seem like minor influences, these subtle differences could greatly impact eyewitnesses' memory.

The addition of MPI during repeated questioning can also create false memories. This addition could be detrimental in an interview setting, especially if the police officer/interviewer makes any assumptions to fill in the gaps or introduces deviations through repeated questions (Hain, 1976). Laboratory studies have used similar methods to mimic what would happen during interviews. One characteristic that was replicated during interviews was repeated questioning, which is commonly used to catch people in lies. In one study, participants were questioned several times about an event that "happened" during childhood (no event actually happened). After being asked three times if participants could remember an event, one that did not even happen, 25% of the participants either partially or wholly believed the false suggestion that as a child they had become been lost in the mall (Laney & Loftus, 2016; Pickrell et al, 2016). This false feedback manipulation is when people adjust their memories to match new information they were given when they are told a certain experience must have happened to them (Laney & Loftus, 2016). The introduction of MPI can generate completely new, false memories. It is important to consider that witnesses are often asked to give written statements and repeatedly questioned about the events they have witnessed. They are questioned multiple times from

multiple sources (e.g., police officer, judges, lawyers, etc.). Any type of MPI could allow for distortions of memory to occur.

The introduction of MPI can occur at any stage of the interview process. For instance, eyewitnesses could be given feedback about a suspect in a case during the lineup, not during questioning, which is known as post identification feedback (Smalarz & Wells, 2015). Wells and Bradfield (1998) demonstrated how feedback from interviewers influenced how confident participants were in their assessment. Participants viewed a crime video and were given a suspect photo lineup after the video. The actual suspect from the video was not included in the suspect lineup. Therefore, if participants were accurate, they would not select any of the individuals in the photo lineup. After giving a response, participants were given either confirmatory feedback (i.e., "Good, you identified the suspect."), disconfirming feedback (i.e., "Actually, the suspect was [insert number]."), or no feedback. After this, participants were asked how confident they were that they selected the actual suspect. Those in the confirmatory condition demonstrated the highest confidence levels, followed by no feedback, and then disconfirming feedback. Thus, Wells and Bradfield concluded that feedback from interviewers can influence the confidence witnesses have in the accuracy of their memories. This study demonstrated how small amounts of feedback affect confidence ratings, which may alter the strength of eyewitness memory.

Semantic Memory Organization and Spreading Activation Theory

The human mind contains vast amounts of information in semantic memory, which is organized hierarchically and categorically. According to Collins and Quillian (1968), semantic memory (knowledge) is organized into superordinate and subordinate categories. In addition, categories are organized by semantic relatedness. For example, transportation would be a superordinate category with many semantically related subordinate categories (e.g., planes,

trains, and automobiles). Each concept and category are separate nodes. When information is accessed within semantic memory, the node becomes activated, which will spread activation to other semantically related items. This phenomenon is called spreading activation theory.

When studying false memories and how spreading activation may explain potential memory errors, the Deese-Roediger-McDermott (DRM) Paradigm may offer further insight into eyewitness memory errors. The DRM refers to a task where subjects are given a list of semantically related words all concerning a similar theme or topic. For example, participants view a list of words related to the word "sweet" (e.g., heart, tart, candy). The word "sweet" is not presented to participants during the study phase. After a delay, participants are given a free recall test where they list as many words as they can remember from the list they previously studied. A small number of people recalled seeing the word "sweet" even though it was not presented during the study phase (Blair, Lenton, & Hastie, 2002; Pardilla-Delgado & Payne, 2017). This design is most often used with false memory research, but can also be linked with semantic memory and activation spreading (Collins & Loftus, 1975). The previously unseen word is likely recalled because it was so closely related to the listed words sharing similar nodes and network pathways, which leads to the highly related but unrepresented word to be activated.

Semantic relatedness commonly leads to incorporating misinformation in laboratory tests. The main difference is that the misinformation paradigm requires an external source of information for altered memory or information to occur, while the DRM is purer in that the false information reported is self-gathered (Pardilla-Delgado & Payne, 2017). However, it is likely that spreading activation of the semantic network plays a part in both phenomena.

Response to Authority

While there is considerable research documenting the effects of misinformation and changes in memory, there is less information about authority and how this interacts with the misinformation effect. For example, the presence of an authority figure at a traffic stop may lead drivers to obey traffic laws if there was a uniformed authority present compared to a non-uniformed presence (Sigelman & Sigelman, 1976). In addition, Milgram (1963) demonstrated how authority impacted human behavior. The seminal research determined that participants were more likely to administer lethal shocks to others when an authority figure (i.e., a man in a white lab coat) was present and stated to keep going with the administration of shocks. Milgram argued that regardless of whether participants were willing to continue with the administration of shocks, people were more likely to be obedient to authority figures.

If the presence of authority could so greatly impact explicit behaviors, then it should follow that authority can also influence implicit behaviors. For instance, authority figures can trigger unconscious levels of social desirability in others. People who respond highly to authority may be more motivated to cooperate with law enforcement. During lineups, both adults and children were more likely to choose someone out of a line up regardless of the perpetrator being present in the lineup, which could be an unconscious assumption that the target is present, and they must choose someone (Fitzgerald & Price, 2015). There is a possibility that any misinformation presented by an authority figure could influence how an eyewitness recalls the event. Most everyone who has witnessed a crime will typically encounter a police officer, which would typically be done through interviews. When doing these interviews, police are trained to build a rapport with the witnesses, which is a part of the structured cognitive interview (Wright, Nash, & Wade, 2015). Studies showed that when rapport building was used during the interview,

it doubled the percentage of false accusations. Additionally, the same study found that the act of building rapport had the same impact as viewing tangible incriminating evidence on witnesses' accusations (Wright, Nash, & Wade, 2015). Rapport building may have helpful and harmful consequences on memory. The technique regularly used by police authority increases compliance and can influence witnesses' memory of events, even if done unintentionally.

Examining the background of authority could help explain why the presence of an authority figure could impact the acceptance of misinformation. Research in evolutionary psychology and moral foundation theory suggests that authority plays a role in the way people judge moral situations. The moral foundation theory states that five foundations have developed due to the adaptive challenges (Haidt & Joseph, 2007; Koleva, Beall, & Graham, 2015). In particular, the foundation or mechanism of interest for the current research is the authority/subversion foundation. The authority foundation evolves from the adaptive challenge of negotiating hierarchy (Haidt, & Joseph, 2007). In a hierarchical environment displaying dominance and submission, the subordinates show deference and respect, while the dominants protect them from outside threats and maintain order. This behavior solves adaptive problems by having a cohesive and stronger group allowing for survival. This authority foundation underlies institutions that favor leadership, respect, or deference (Koleva, Beall, & Graham, 2015). This foundation gives credence to the idea that there might be an inherent need to submit to authority figures in order to maintain law and order. It suggests that it is innate for humans and other primates to develop emotions and behaviors related to authority (Haidt & Joseph, 2007). This idea could also help explain why people of high authority may be more likely to successfully pass on misinformation. Based off these theories, it is possible some people may be predisposed to being influenced by authority. In addition to this possible underlying mechanism, an important

thing to consider is people's personal experiences and attitudes regarding authority. Personal experiences could color anyone's view of authority impacting any future interactions.

It is quite common for people to have developed strong attitudes regarding authority. A good example of this is authoritarianism. Authoritarianism centers on several attitudes (conventionalism, authoritarian submission, and authoritarian aggression) regarding authority (Zakrisson, 2005; Ziegler-Hill & Marcus, 2016). Specifically, conventionalism is the following along with societal norms that are endorsed by authority figures, while authoritarian aggression is defined as general aggressiveness against others when it is believed to be sanctioned by an authority. Central to this argument is authoritarian submission, which is defined as people having a strong tendency to submit and comply with authority figures (Benjamin Jr, 2014; Russo, Manzi, & Roccato, 2017; McHoskey, 1996). Milgram's (1963) study exemplifies authoritarian submission. Participants kept going with the study following the prompting of the higher authority (the researcher). There has been research showing that the stability in the authoritarianism trait can be attributed to genetic influences, which can tentatively explain why this trait can be found in people as young as preschool age (Ledeke & Krueger, 2013; Reifen Tagar et al, 2014; Zeigler-Hill & Marcus, 2016) and may suggest that anyone could have this attitude to capitulate to authority figures.

Authority figures, such as police, may be more successful in introducing misinformation because they hold a certain degree of power over others. Power is often defined as an individual's capacity to modify other people's states through providing or withholding resources and/or administering punishments (Keltner, Gruenfeld, & Anderson, 2003). Typically, people who are high in power are more influential, insofar as they are more outspoken, take leadership positions, and resist social influences, than lower power individuals (Guinote, Judd, & Brauer,

2002; Keltner, Gruenfeld, & Anderson, 2003). For these reasons, low-power individuals tend to rely on the high-powered individuals. Skagerberg and Wright (2003) found that when participants were paired in high/low powered pairings, the lower-powered participant were more influenced by their higher-powered partner's memory, while the high-powered partner was not influenced by the lower-powered participant's memory. This study demonstrated that those in higher-power can influence lower-powered individuals, but higher-powered individuals' memory is not influenced by those perceived to have low power. What can be taken from this study, in terms of misinformation, is that police officers may introduce misinformation during the interview process, which can lead witnesses to fill in the gaps (Hain, 1976). This effect could lead to incorrect or altered witness memories.

While it is known that authority may have a strong influence on eyewitness memory, less is known about individual differences in this phenomenon. Previous research has shown that high-powered individuals can affect a low power person's memory (Skagerberg & Wright, 2003). One characteristic that may moderate this effect is authoritarian submission. This is how much an individual thinks that they should submit to an authority figure. Those that are higher in authoritarian submission are more likely to submit or comply with authority figures (Benjamin Jr, 2014; Russo, Manzi, & Roccato, 2017; McHoskey, 1996). What this could entail is that if individuals are higher in authoritarian submission, they may be more likely to believe what high-powered authority figures tell them compared to lower-powered authority figures. Thus, authoritarian submission may make the misinformation effect stronger than those who score lower in authoritarian submission. The purpose of the present study is to investigate how authority and response to authority influence eyewitness memory.

Present Study

Authority and power are related but separate constructs. In a sociological view, authority is described as a form of power that goes with an office or position and involves a level of consent based on the belief in legitimacy of said authority. Additionally, it can be described that authority is the legitimization of power; basically, the source of authority is the legitimized exercise of power (Haugarrd, 2018). Similarly, psychological views describe authority or authoritativeness as the voluntary compliance based on legitimate power (Tyler & Lind, 1992). Since it is generally accepted that authority and power are related to each other, it could logically follow that the presence of authority could have similar effects on memory conformity within the misinformation effect. One aspect that has not been studied is how people respond to authority or their attitudes towards authority. It has been assumed that people will submit under authority, but little is known about how the role of peoples' attitudes towards authority impact the misinformation effect. This study aimed to examine the relationship between how individuals' attitudes affect the development of misinformation. It could be that the submission to authority may open up participants to take in misinformation, which would lead to less accurate memory for a crime.

The present study investigated the relationship between authority, response to authority (authoritarian submission), and eyewitness testimony accuracy. Witnesses to a crime will oftentimes interact with an authority figure from the criminal justice system. Due to the effects of authoritarian submission and the evidence linking power and misinformation, it is logical to assume that an authority figure giving misinformation could increase the likelihood of the MPI being accepted if that person is higher in submission to authority. Based on this interpretation, I hypothesized that misleading questions would introduce MPI more than nonleading questions.

Specifically, interview and eyewitness statement accuracy (proportion correct) would be lower for leading questions containing misinformation than nonleading questions with factual information. This effect is related to the false memory findings from Loftus and Palmer (1975), which demonstrated how the introduction of MPI can negatively impact memory. I also hypothesized that authority would impact eyewitness memory. Previous studies have shown that higher-powered individuals impact memory of low-powered individuals (Skagerberg & Wright, 2003). Finally, I hypothesized that this effect would be moderated by the authority of the interviewer. Higher powered, leading questions would introduce high amounts of MPI, which would alter witnesses' memory of event more than higher powered nonleading questions, after controlling for individual attitudes towards authority. This effect would be seen in the low power interviewer conditions, but the magnitude of the phenomenon would be weaker compared to high authority conditions. Particularly, when witnesses were interviewed by an authority figure (introduced as an adjunct professor or undergraduate student), more MPI would be seen for the adjunct professor than the undergraduate student. Participants attitudes towards authoritarian submission were assessed using the Right-Wing Authoritarianism Scale. Scores on this subscale were used as a covariate. Previous studies have shown how authority impacts witnesses' recollection of events (Collins & Loftus, 1975; Laney & Loftus, 2016; Loftus & Palmer 1975; Pickrell et al. 2016; Smalarz & Wells, 2015). Additionally, studies have shown how individual responses to authority may impact how much MPI is accepted by participants.

METHOD

Participants

Any participants who failed complete the tasks in full were removed from the data analysis. For this study, 112 participants completed the experiment. Participants were from the

undergraduate psychology pool at the University of Central Oklahoma. They received partial course credit for participating in this experiment.

Materials

Crime Video

The video was taken from the movie *Bonnie & Clyde* (Beatty & Penn, 1967). The video portrayed a bank robbery. Three people walk in to rob the bank, two men (Clyde and Buck) and one woman (Bonnie). Clyde stays at the front to threaten the bank patrons with his guns. Buck and Bonnie go to the bank tellers to have them put money in the bags. The tellers put the money in the bag. A policeman in the bank goes for his gun, but Clyde shoots at him first halting his movements. Once the money is in the bags, the robbers leave the bank. On the way out, Buck steals a bank patron's glasses and gives him his name. All of the robbers run out of the bank where another man (C.W. Moss) is guarding the bank door and a woman (Blanche, Buck's wife) is waiting in a car. All five get into the car and drive off.

Right-Wing Authoritarianism Scale

To measure response to authority, the Right-Wing Authoritarianism scale short version was used (Zakrisson, 2005). The measure is composed of 15 items, which was adapted from Altemeyer's (1981) original scale but shortened to 15 items. The scale still contains the reliability and validity found in the original with the Cronbach's alpha being 0.72. There are three subscales in the short form: authoritarian aggression (four items), authoritarian and submission (six items), and conventionalism (five items). For authoritarian aggression, participants would rate statements such as "If the society so wants, it is the duty of every true citizen to help eliminate the evil that poisons our country from within." For authoritarian submission, participants would read statements such as "It would be best if newspapers were

censored so that people would not be able to get hold of destructive and disgusting material." Finally, for conventionalism, participants read statements such as "Our country needs free thinkers, who will have the courage to stand up against traditional ways, even if this upsets many people." For each of the 15 items, participants rate on a seven-point Likert-type scale ranging from 1 = strongly agree to 7 = strongly disagree. For the purposes of data analysis, only the authoritarian submission subscale was used as a covariate for data analysis.

Procedure

The participants were randomly assigned to a 2 (authority: high vs. low) \times 2 (question type: leading vs. non-leading) between-subjects factorial design. Authority was defined as the interviewer introducing themselves as an adjunct professor (high authority) or an undergraduate research assistant (low authority). For question type, participants in the leading question condition received questions that were created to introduce new, incorrect information. This created four conditions: high-leading ($N = 30$), low-leading ($N = 29$), high-nonleading ($N = 26$), and low-nonleading ($N = 27$). Participants in the non-leading question condition responded to questions based solely on the facts from video stimulus (see Appendix A). Participants' memory (proportion correct) was measured to ensure accurate recall of the crime. Proportion correct was calculated for interview accuracy and witness statement accuracy. Additional information about specific coding is provided in the respective section in the *Results*.

In order to control for any gender differences, the interviewers were counterbalanced by having both male and female confederate interviewers across conditions. For each of the four conditions, half of the time the interviewer was male, and the other half the interviewer was female. Thus, gender was equal across authority and question type. Additionally, the interviewers were trained on how to ask the questions. The interviewers learned how to speak in

the same tone and speech rate, which was done to account for personal differences in the interviewers.

To account for the COVID-19 pandemic, this research was conducted online. All participants were sent a Zoom link. The interviewer shared their screen and played the video. Immediately after the video clip, the participants completed several filler tasks (e.g., personality tests) to allow for a short break before they were interviewed about the video. The completion of these filler tasks prevented rehearsal of the information in the crime video. Therefore, the task made it difficult to ruminate on the details in the video. After the short break, participants were interviewed based on the two question sets (leading or non-leading) by a high or low authority figure. Directly following the interview, participants performed a free description task. The interviewers asked participants to write and submit their statement about the video (i.e., in your own words, please, describe what happened in the video). As the participants complete the witness statement task, they were monitored by the interviewer so they cannot access outside sources to confirm the information from the video. Following the interview and witness statement task, participants completed the Right-Wing Authoritarianism scale to measure participant attitude regarding authoritarian submission. This scale came after the authority manipulation as to not prime participants.

RESULTS

Interview Accuracy

Scoring

Two raters coded for accuracy from the participant against a fact sheet. The fact sheet contained the correct answers to the questions (See Appendix B). Accurate responses were defined as a hit, where participants responses matched the fact sheet. Inaccurate responses were

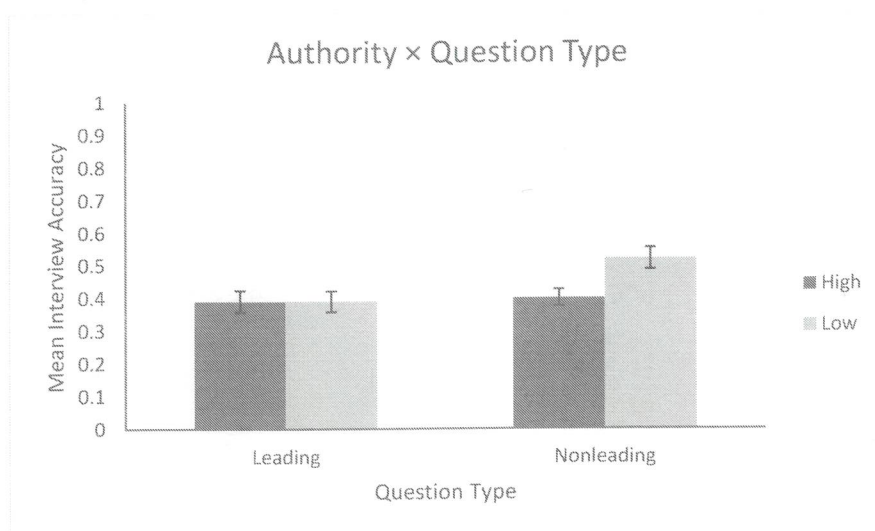
defined as when participant responses were either false alarms (incorrect) or missed (did not answer). The number of accurate and inaccurate details of each question type (leading or nonleading) were coded by both raters. The ratings were highly correlated, $r = .88$. Based on this analysis, interrater reliability was considered acceptable to analyze the interview accuracy data. Proportion correct was calculated by dividing the number of accurate responses by the total number of responses. Since misinformation was only included in certain questions, calculation was completed for the leading questions that contained misinformation and the corresponding nonleading questions. In Appendix A, the items containing misinformation were underlined.

Interview Accuracy Analysis

A 2×2 between subjects ANCOVA was used to analyze the influence of the authority (high vs low) and question type (leading vs nonleading) on mean proportion correct for interview accuracy. Scores on the authoritarian submission subscale of the RWA (response to authority) were included as the covariate. Authoritarian submission was not a significant covariate, $F(1,107) = .10, p = .75, \eta^2 = .001$. A main effect of question type was significant, $F(1, 107) = 4.41, p = .04, \eta^2 = .04$, demonstrating higher accuracy scores for non-leading questions ($M = .46, SD = .18$) than leading questions ($M = .39, SD = .17$). A main effect of authority was marginally significant, $F(1, 107) = 3.20, p = .08, \eta^2 = .03$, showing a marginal difference between high authority ($M = .40, SD = .17$) and low authority ($M = .45, SD = .19$). The significant Authority \times Question Type interaction, $F(1, 107) = 3.48, p = .07, \eta^2 = .03$, was not significant (Figure 1).

Figure 1

Authority × Question Type Interaction for Interview Accuracy



Note. Mean accuracy rates for the four groups (high authority, leading question; low authority, leading question; high authority, nonleading question; and low authority, nonleading question). Error bars represent the standard error of the mean.

Witness Statement Accuracy

Scoring

Scoring was done in the same manner as the interview accuracy. The number of accurate and inaccurate details of each question type condition (leading or nonleading) were coded by the same raters. The ratings were highly correlated, $r = .92$. Based on this analysis, interrater reliability was considered acceptable to analyze the witness statement accuracy data.

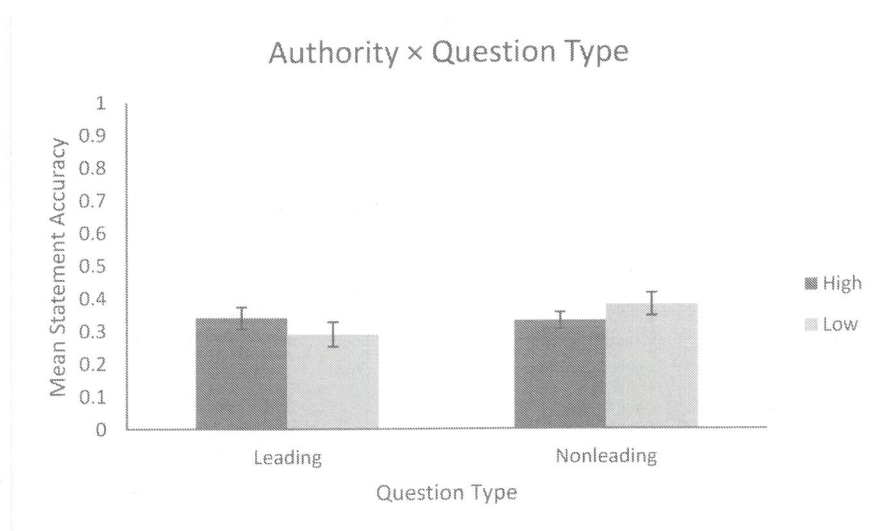
Witness Statement Accuracy Analysis

A 2×2 between subjects ANCOVA was used to analyze the influence of the authority (high vs low) and question type (leading vs nonleading) on mean proportion correct for witness statements. Scores on the authority submission subscale of the RWA (response to authority) were

included as the covariate. Authoritarian submission was a significant covariate, $F(1,107) = 6.69$, $p = .01$, $\eta^2 = .06$. A main effect of question type was not significant, $F(1, 107) = 1.73$, $p = .19$, $\eta^2 = .02$, demonstrating no difference between non-leading questions ($M = .36$, $SD = .18$) than leading questions ($M = .31$, $SD = .19$). A main effect of authority was not significant, $F(1, 107) = .05$, $p = .83$, $\eta^2 = .02$, indicating no difference between high authority ($M = .33$, $SD = .18$) and low authority ($M = .33$, $SD = .20$). The Authority \times Question Type interaction, $F(1, 107) = 1.96$, $p = .16$, $\eta^2 = .02$, was not significant (Figure 2).

Figure 2

Authority \times Question Type Interaction for Statement Accuracy



Note. Mean accuracy rates for the four groups (high authority, leading question; low authority, leading question; high authority, nonleading question; and low authority, nonleading question). Error bars represent the standard error of the mean.

DISCUSSION

This study investigated misinformation and how authority and response to authority impacts eyewitness memory. I hypothesized that higher authority interviewers (adjunct

professor) would increase the likelihood of misinformation (leading questions) being accepted compared to a low authority interviewer (undergraduate research assistant). Additionally, it was hypothesized that how individuals respond to authority (scores on RWA) would influence the misinformation-authority effect. For interview accuracy, there were some significant effects, but mostly marginal effects, while witness statement demonstrated no significant effects. The only significant effect was a replication of previous findings related to the misinformation effect. When given misinformation, accuracy decreases compared to when not given misinformation.

The purpose of this study was to examine the role that response to authority, particularly authoritarian submission, impacts authority and eyewitness memory. When investigating response to authority, previous research has demonstrated how those in a high-power position can influence eyewitness accounts of criminal activity (Skagerberg & Wright, 2008; Smalarz & Wells; 2015). When high authority is applied, it can lead the eyewitness to think that the authority figure has accurate information, even though the authority figure may have misleading information. This assumption could lead to incorporating misinformation into the memory trace, which leads to inaccuracies in memory.

Those with high authority tend to be thought of as more powerful. Previous research has found that those in high authority have greater influence over how other's think (Guinote, Judd, & Brauer, 2002; Keltner, Gruenfeld, & Anderson, 2003; Skagerberg & Wright, 2003). Additionally, within an evolutionary psychology framework, individuals tend to submit to high authority figures more than low authority figures (Haidt & Joseph, 2007; Koleva, Beall, & Graham, 2015). However, this study demonstrates that authority and the response people have to it did not influence eyewitness memories.

An alternative explanation for the findings could be that participants did not see the interviewers as a legitimate authority figure. When an individual is approached by a police officer, there are several nonverbal cues to authority. For example, police officers have a uniform, weapon, or strong body language that can be used to activate an authority pathway. Milgram (1963) found that when the experimenter (the individual wearing a white lab coat that instructed participants to continue with the experiment) did not wear the white lab coat and wore plain clothes, obedience to authority decreased. With this study, there were fewer nonverbal cues to authority compared to when talking to a police officer (Sigelman & Sigelman, 1976). This could have led participants to not perceive the interviewer as a legitimate authority figure. Thus, the present study's authority manipulation may not have been strong enough to observe authority effects to misinformation.

Limitations and Future Directions

One possible limitation, in this study may be attitudes towards gender and gender roles. In this study interviewers were both male and female to counterbalance any effect the role of gender of the interviewer may have. It could be that if a person is being interviewed by a woman in a high authority position and they have traditional gender roles, they may not see that woman as being credible. However, participants' attitudes towards gender were not measured or accounted for. These attitudes could be an issue because the gender authority hypothesis and gender stereotype hypothesis suggest that the male gender and stereotypical male characteristics have a stronger association to authority than women and stereotypical female characteristics. Rudman and Kilanski (2000) found that women in high authority jobs (i.e., law or doctors) received more implicit negative feedback in priming studies than men of the same occupations. This finding was consistent across gender of the participants, with both male and female

participant's more likely to give negative feedback for the high authority woman condition. There were individual differences in female participants with self-reported feminist identification showing less prejudice for female authority. It is possible that some of the participants' attitudes towards the interviewers' gender may have led them to be more dismissive of the female interviewers. Given the research on implicit attitudes and biases on gender and authority, it is possible that the results may have been impacted by participants' attitudes towards females in authority.

The findings of this study may support previous findings on response to authority. Due to COVID-19, the manipulation of authority had to be changed to virtual instead of in-person. This change may also offer some explanation as to why the results conflicted with the underlying theory and hypothesis. It is possible that introducing the 'authority' figure by Zoom inheritably took away some of what made them an authority. It could be argued that there is something intangible about authority and it must be physically present to garner a response from people, which can also be seen in Milgram's (1963) shock study. One specific condition of his study had the experimenter (the authority) out of the room instructing the participant over the phone for the participant to shock the learner. However, when the experimenter was not physically there, the participants were less inclined to shock the confederates (see review in McLeod, 2007). This finding suggests that a physical presence of authority may be needed for maximum impact. Additional research could be done to investigate this response to authority by using the same or similar methodology with both in person and zoom interviews by interviewers of varying degrees of authority. Not only would this fix any ecological validity issues, but it could also provide insight into people's response to authority.

Finally, a lack of obtaining confidence ratings of eyewitness' memory. Confirmatory feedback has been shown to increase the strength in the confidence ratings of memory (Wells & Bradfield, 1998). Research has shown a link between accuracy of identification and confidence ratings (Brewer & Wells, 2006; Juslin, Olsson, & Winman, 1996). Wixted and Wells (2017) examined eyewitness identification. In general, eyewitness identification tasks involve selecting a potential suspect from a lineup. Many conditions must be met: no influence can be made by the lineup administrator, use of good lineup practices (e.g., sequential presentation or not including suspect in lineup), and an immediate confidence report must be made. These conditions must be met before confidence predicts accuracy well. In the present study, authority may impact confidence in the statements similar to Wells and Bradfield (1998). Authoritarian influence may skew confidence ratings and therefore accuracy, which could demonstrate another way of how response to authority can impact not only eyewitness memory accuracy but confidence in their memory.

Conclusion

The findings of this study demonstrate that links between authority, misinformation, and response to authority are influenced by a multitude of different systems. It may not be as straightforward as previous research has made it out to be. This information is critical in the criminal justice system. Understanding how much influence police, lawyers, and judges have on eyewitness memory can lead us to improved interview techniques and the wording of questions to facilitate accurate eyewitness accounts.

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APPENDIX A

Leading Question Set

1. Can you tell me what happened? What did you see?
2. Did you get a good look at the people inside the bank? Can you describe them? If yes, ask the following.
 - a. What did the men look like?
 - i. What was his race?
 - ii. What color was his hair?
 - iii. How tall was he?
 - iv. What was his body type? (fit/in shape, overweight and heavy?)
 - v. What clothing was he wearing?
 - b. What did the woman look like?
 - i. What was her race?
 - ii. What color was her hair?
 - iii. How short was she?
 - iv. What was her body type? (fit/in shape, overweight and heavy?)
 - v. What clothing was she wearing?
3. What did they do while they were inside the bank?
 - a. What did the woman do while inside the bank?
 - i. Did she speak? If yes, ask the following
 1. Do you remember what she said?
 2. Was there anything you noticed about their speech pattern that stood out?

- ii. Did she discharge her gun?
- b. What did the men do while inside the bank?
 - i. Did either of them speak?
 - 1. Did you hear one of the men introduce himself as Ruck Barrel? Do you remember anything else that he said?
 - 2. Was there anything you noticed about their speech patterns that stood out?
 - ii. Did either man discharge their gun(s)? If yes, ask the following.
 - 1. Was it the man with the black hat or the man called ruck who shot the gun?
 - 2. Where was the man with the black hat standing when the teller was shot at?
- 4. Did you see how they escaped? If yes, ask the following.
 - a. Was there a car waiting for them? If yes, ask the following.
 - b. Was there anyone waiting for them in the black car?
 - i. If so, can you describe them?
 - 1. What was his/her race?
 - 2. What color was his/her hair?
 - 3. How tall were they?
 - 4. What clothing was he/she wearing?
 - c. What did the car look like?
 - i. What type of car did they leave in?
 - ii. What was the car's color?

- iii. Was the car two door or four door?
- iv. What direction did the car travel?
- d. Can you recall what direction the vehicle went when they left?

Non-Leading Question Set

1. Can you tell me what happened? What did you see?
2. Did you get a good look at the people inside the bank? Can you describe them? If yes, ask the following.
 - a. What did the men look like?
 - i. What was his race?
 - ii. What color was his hair?
 - iii. What was his height?
 - iv. What was his body type? (fit/in shape, overweight and heavy?)
 - v. What kind of clothes was he wearing?
 - b. What did the woman look like?
 - i. What was her race?
 - ii. What color was her hair?
 - iii. What was her height?
 - iv. What was her body type? (fit/in shape, overweight and heavy?)
 - v. What kind of clothes was she wearing?
3. What did they do while they were inside the bank?
 - a. What did the woman do while inside the bank?
 - i. Did she speak?
 1. Do you remember what they said?

2. Was there anything you noticed about her speech pattern that stood out?
 - ii. Did she discharge her gun?
 - b. What did the men do while inside the bank?
 - i. Did either of them speak?
 1. Do you remember what they said?
 2. Was there anything you noticed about their speech pattern that stood out?
 - ii. Did either men discharge their gun(s)?
 1. Can you describe which man used his gun?
 2. Who or where did he shoot at?
 - a. If mentioned, was the policeman injured?
4. Did you see how they left? If yes, ask the following.
 - a. Was there a vehicle waiting for them? If yes, ask the following.
 - b. Was there anyone waiting for them at the vehicle?
 - i. If so, can you describe them?
 1. What was his/her race?
 2. What color was his/her hair?
 3. What was his/her height?
 4. What was his/her body type? (fit/in shape, overweight and heavy?)
 5. What kind of clothes was he/she wearing?
 - c. What did the vehicle look like?
 - i. What was type of vehicle?

- ii. What was the vehicle's color?
 - iii. Was the vehicle two door or four door?
 - iv. Where there any distinguishing features of the car?
- d. Can you recall what direction the vehicle went when they left?

APPENDIX B

Scoring Fact Sheet

1. Three people walk in to rob the bank, two men and one woman. (some variation of this statement)
2. Suspect descriptions
 - a. Clyde
 - i. White, Caucasian man with short brown hair. He was tall (above 5'11) and in good shape wearing a nice grey suit with a white pocket square with a dark green tie and a white fedora hat. He was carrying two guns.
 - b. Buck
 - i. White, Caucasian man with short brown curly hair. He was not as tall as Clyde, maybe average height (5'9-5'11). He was wearing a greyish taupe colored suit with a white shirt and a red tie. He was carrying a bag and a gun.
 - c. Bonnie
 - i. White, Caucasian woman with shoulder length blond hair. Average in height (5'3-5'6) and slim. She was wearing a white striped dress suit with a black undershirt and a black hat. She was carrying a bag and a gun.
3. Suspect actions in the bank
 - a. Bonnie
 - i. She went over to the teller window and had the teller put money into her bag.
 - ii. She did not speak and did not discharge her gun.

b. Buck

- i. He went and jumped over the divider onto the teller side and had the teller put money into his bag.
- ii. He took the policeman's sunglasses and told him to take a look and introduced himself as Buck Barrow and shouted their gang's name as they left the bank.
- iii. He did not shoot his gun.

c. Clyde

- i. He stayed at the front of the bank threatening people with his guns while the others got the money.
- ii. He was the talker. He introduced their gang and told everybody they were robbing the place and to take it easy. He spoke to one bank patron and asked if the money on the counter was his or the banks' which the man responded it was his money; he let the man keep his money.
- iii. The policeman made a move and Clyde shot near the policeman's head saying next time he would aim lower. The policeman was uninjured.

4. Suspect leaving the bank.

- a. They ran outside where there was a man guarding the outside of the bank and a woman waiting in a car (some variation of this)
 - i. The woman in the car was white, average height (5'3-5'6), Caucasian with short light brown curled hair. She was wearing a light blue colored top with a white lace collar.

- ii. The man was in a grey suit with a grey hat with a blue scarf tied around his neck and average height (5'9-5'11), brown hair and Caucasian
 - iii. The vehicle was a dark green colored four door car.
- b. The car drove straight; there is no way in the video to tell which direction. Participants may answer no, I don't know, or they drove straight off (etc.) and be correct. For this reason, there is not a column for this on the scoring as there is no way to tell.