

Investigating Investigators: How Presentation Order Influences Investigators'

Interpretations of Alibi and Bystander Witness Evidence

by

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B.A., University of Calgary, 2001
M.Sc., University of Victoria, 2004

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ABSTRACT

Eyewitness identification evidence is often essential in criminal investigations, yet little is known about how police investigators evaluate identification evidence. This research simulated a police investigation by having participant-investigators obtain information about a crime, examine a database of potential suspects with the goal of choosing a likely suspect for the crime, and evaluate an eyewitness's lineup identification decision. Experiments 1 and 2 examined the effect of order of presentation of the eyewitness decision. When the eyewitness identified the investigator's suspect, ratings of the suspect's guilt were similar regardless of when the eyewitness decision occurred. However, when the witness reported that the culprit was not present in the lineup, a recency effect occurred (the information that was presented last had a larger impact). Experiment 3 continued to examine order effects while also examining how investigators evaluated alibi information and eyewitness testimony when they had already identified a suspect in the case. The investigators evaluated alibi evidence that was either strong or weak (in regards to exonerating the suspect) and eyewitness evidence involving a witness who either identified the investigator's suspect or rejected the suspect (by not making an identification). The order of presentation of the alibi information and eyewitness testimony was manipulated such that half of the participants received the alibi

information before the eyewitness testimony while the other half received the alibi information after the eyewitness testimony. Both the eyewitness decision and alibi evidence affected ratings of guilt. A recency effect was present only in the ID Suspect/Strong alibi conditions, such that when investigators saw the witness identify the suspect and then received the strong alibi, they rated the likelihood that their suspect had committed the crime as lower than when they received the strong alibi first and then saw the witness identification. Otherwise, the two forms of evidence had an additive effect. Together, these studies provide a valuable examination of the influence of presentation order and the importance of different forms of evidence on role-playing police investigators.

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Dedication

For my parents, whom I love very much. And for my grandfather, who taught me that no matter what I achieve, nothing is more important than the ties of my family.

Investigating Investigators: How presentation order influences investigators' interpretations of eyewitness and alibi evidence

Recent DNA exonerations have shown that eyewitness misidentifications are the leading cause of wrongful imprisonment (e.g., Wells, et al., 1998). For example, of the first 134 DNA exonerations, mistaken eyewitness identifications were involved in 75% of the cases (The Innocence Project, retrieved April 23, 2007). In addition, research examining eyewitness identifications in real-world settings have also found high error rates. For example, in their examination of eyewitness identifications in actual crime investigations, Behrman and Davey (2001) found that 24% of witnesses identified an innocent foil in a live lineup situation. Similarly, Wright and McDaid (1996) found that 19.9% of the witnesses they observed in real criminal investigations identified an innocent foil. Although it is interesting to observe the frequency of eyewitnesses identifying innocent foil lineup members, of greater interest is the number of instances when the witness identifies the suspect but that suspect turns out to be innocent. These two studies were unable to report how often this occurs in the real world. Nevertheless, this is the most dangerous example of a mistaken identification because this is the situation in which an innocent suspect would be mistakenly accused of a crime.

Eyewitness Accuracy

A great deal of research has been conducted to determine the factors that are likely to affect eyewitness accuracy (e.g., Brewer, Potter, Fisher, Bond, & Luszcz, 1999; Davies, Shepherd, & Ellis, 1979; Steblay, Dysart, Fulero, & Lindsay, 2001; see Wells, 1993; and Shepherd, Ellis, & Davies, 1982, for review). Cutler, Penrod, and Martens (1987) found that disguise, exposure time, and delay all affected the accuracy of

eyewitnesses' lineup decisions. Own-race biases, where witnesses are better able to identify people of their own ethnicity (Brigham & Malpass, 1985; Meissner, Brigham & Butz, 2005), and weapon focus (Loftus, Loftus, & Messo, 1987, Steblay, 1992) have also been found to decrease accuracy.

In addition, the lineup presentation procedures used during lineup identifications can influence eyewitness accuracy (e.g., Steblay et al., 2001; Wells, 1993). For example, Steblay et al. found in a meta-analysis comparing simultaneous and sequential lineups that correct decisions were more likely to occur in a sequential lineup (where lineup members are presented individually, one following the other) than in a simultaneous lineup (where all lineup members are presented at the same time). Critically, in a sequential lineup, correct rejections were 23% higher and identifications of innocent foils were 22% lower than in simultaneous lineups. Further, biased lineup instructions (instructions that do not warn the witness that the culprit might not be present in the lineup) also lead to poorer performance; particularly on target absent lineups (when the culprit is not present in the lineup). That is, given biased instructions and a target absent lineup, eyewitnesses are less likely to correctly reject the lineup by reporting that the culprit is not present and therefore are more likely to make a mistaken identification (e.g., Clark, 2005).

Impact of Eyewitness Decision

The immense impact of eyewitness identifications has been demonstrated through decades of psychological research. As far as a jury is concerned, eyewitness identifications provide strong evidence for the guilt of the defendant (e.g., Cutler, Penrod, & Stuve, 1988; Deffenbacher & Loftus, 1982; Leippe, Manion, & Romanczyk, 1992;

McAllister & Bregman, 1986; Wells, & Leippe, 1981; Wells, Lindsay, & Ferguson, 1979). For example, Loftus (1974) found that jurors were more likely to convict a defendant if a witness identified him as the culprit than if there was only circumstantial evidence to implicate the defendant. Moreover, the eyewitness identification increased convictions even when jurors learned that the witness had poor eyesight and was not wearing glasses at the time of the crime. In addition, Cutler, Penrod, and Dexter (1990) found that mock jurors are insensitive to the factors that can decrease eyewitness accuracy. That is, jurors were unaffected by knowledge of the presence of a disguise, weapon, delay, and biased lineup instructions. In fact, despite the documented small correlation between accuracy and confidence (e.g., Bothwell, Deffenbacher, & Brigham, 1987; Brigham, 1990; Busey, Tunnicliff, Loftus, & Loftus, 2000; Penrod & Cutler, 1995; for a discussion of an alternative argument regarding the confidence accuracy correlation see Lindsay, Read, & Sharma, 1998; Read, Lindsay, & Nicholls, 1998), witness confidence was found to be the only variable that reliably influenced juror judgments.

The impact of eyewitness confidence on jurors is extremely problematic because a vast amount of research (e.g., Leippe, 1980; Luus & Wells; 1994b; Wells, Leippe, & Ostrom, 1979; Wells, Rydell, & Seelau, 1993; Wells, Seelau, Rydell, & Luus, 1994) has shown that between the witness's identification decision and testifying in court, a number of factors can increase a witness's confidence in his or her decision. For example, Luus and Wells (1994a) found that witnesses' identification confidence increased when told that a co-witness identified the same person. Feedback from lineup administrators has also been found to influence eyewitness confidence (e.g., Garrioch & Brimacombe, 2001; Wells & Bradfield, 1998; 1999; Wells, Olson, & Charman, 2003). For example,

Bradfield, Wells, and Olson (2002) found that participant-witnesses who received feedback that their decision was correct were more confident in that decision than participants who received no feedback. In addition, rehearsal can also influence eyewitness confidence such that participant-witnesses who were instructed to rehearse their answers to potential testimony-related questions were more confident post-rehearsal than those who were not instructed to rehearse (Wells, Ferguson, & Lindsay, 1981).

A further problem is that juries are likely only exposed to eyewitnesses who are highly confident, because prosecutors (knowing the impact of witness confidence) will not want to present a witness who is unsure of his or her lineup decision. Furthermore, juries are also unlikely to evaluate witnesses who identified an innocent foil or rejected the lineup as part of the investigation. Therefore, jurors see only a small (and likely non-representative) subset of the eyewitnesses who give identification evidence, and they see them long after that evidence was initially collected.

Impact of Eyewitness Decision on Police

Police investigators, however, are likely to observe witnesses making a variety of decisions with varying levels of confidence, and therefore, unlike juries, are able to assess the witnesses at the time of identification. As such, the police encounter the witness before rehearsal, feedback, coaching, and other confidence-inflating factors typically occur. However, very little research has examined the influence of eyewitnesses on investigators (e.g., Lindsay, Nilsen, & Read, 2000). This is problematic because police investigators not only interact with eyewitnesses during the lineup identifications, they also must evaluate and interpret the eyewitness decision to decide whether the eyewitness identification is credible and reliable enough to warrant pursuing the suspect. Therefore,

it is important to understand how they evaluate various eyewitness decisions.

The research that has examined interactions between police investigators and eyewitnesses has typically only examined how police officers might influence the eyewitness through the construction of the lineup (e.g., Wells, Rydell, & Seelau, 1993; Wells, Seelau, Rydell, & Luus, 1994; Wells et al., 1998), or through their interviewing techniques (e.g., Fisher, Geiselman, & Raymond, 1987; Yarmey, 2001). Although this research is important, it ignores the impact that the eyewitness has on the investigator. In addition, many studies that do simulate investigator/witness interactions do so by simply telling the participant-investigator that they will be taking on the role of a police officer, and in lineup identification studies, these investigators are simply told who the suspect is in the lineup (e.g., Garrioch & Brimacombe, 2001). Yet in the real world, police likely not only know who the suspect is in the lineup but also what evidence there is against that suspect that led to the lineup identification test being conducted. Therefore, investigators make significant decisions based on their evaluation of eyewitnesses in light of their knowledge of other case-relevant evidence.

Further, police investigators are likely to become personally invested in the investigation, wanting to catch the culprit and to have enough evidence to ensure that the culprit is punished and prevented from committing additional crimes. This personal investment has not been simulated in prior research and is unlikely to be as strong for participants in the roles of mock jurors, as they are less likely to feel personally responsible for making sure that the correct suspect gets punished.

Dahl, Lindsay, and Brimacombe (2006) set out to examine how undergraduate students role-playing police investigators would integrate eyewitness identification

decisions into their knowledge of other evidence against the suspect using a simulated investigation paradigm. The participants individually interviewed a confederate witness about a videotaped crime. (A confederate witness was used to manipulate the identification decision and to keep the interview answers and the witness's confidence consistent across participants). They then went through a computer database using the information obtained during the interview to help them choose a suspect. Participants were told that the database contained people with prior criminal records and that they should examine each potential suspect to determine whether that person could have committed the crime described by the witness. The database included information on each suspect's physical description, prior criminal record, alibi, and fingerprints. Participants selected a suspect and estimated the probability that the suspect was guilty. The participant-investigators subsequently administered a photo lineup (containing their suspect) to the witness, and following the witness's decision, re-estimated the suspect's guilt and rated their confidence in the witness's decision.

According to Innes (2002), cases that do not have an immediate solution regarding the culprit's identity typically progress through this type of information gathering procedure. Innes examined homicide cases in Britain and found that during the initial investigation, the police spent the majority of their time interpreting available information to determine which evidence is useful to the investigation and which is not.

Using this simulated investigation paradigm, Dahl et al. (2006) found that participant-investigators overwhelmingly overestimated the informativeness and credibility of an eyewitness's decision. If the witness identified the suspect, probability estimates regarding the likely guilt of the suspect increased dramatically. If the witness

identified an innocent lineup member or rejected the lineup, investigators' probability estimates plummeted, even when pre-lineup objective evidence (e.g., fingerprints) was strong. Dahl et al. subsequently examined participants in the role of eyewitnesses using the materials that the investigator studies were based on. When presented with the video and lineup from the investigator studies, eyewitnesses performed at chance. Therefore, had the investigators been working with real participant-witnesses they likely would have been highly influenced by an incorrect decision.

One possible explanation for the impact of the eyewitness decision in the Dahl et al. (2006) studies is that it is due to the timing of the presentation of the eyewitness decision. The eyewitness identification decision was always at the very end of the procedure. Therefore, the strength of the eyewitness decision may have been overemphasized because it was the last piece of the puzzle that either confirmed the investigator's beliefs or put them back at square one. As such, a recency effect (when recently encountered stimuli are more salient than earlier presented material) might be blamed for the large influence the eyewitness decision had on investigators.

Recency Effects

Early order effects research looked at participants' ability to recall list items. The typical experiment presented participants with a list of around 30 words, and participants were asked to free recall as many words as they could immediately after the last word was read (Waugh & Norman, 1965). Participants were typically best able to remember the words presented at the very beginning of the list (a primacy effect) and at the end of the list (a recency effect). This pattern of results was explained by referencing long and short term (or working) memory, by suggesting that words at the beginning of the list

would be fairly well rehearsed by participants and therefore stored in long term memory. However, only the first few words would receive this kind of focused attention, after that, the words in the middle of the list share attention with the words before and after them, and therefore receive less attention. The words at the very end of the list, on the other hand, will still be in working memory at the time of recall and this accounts for those words being remembered better, hence the recency effect (Rundus, 1971).

However, recency effects have been found in long-term memory tasks as well (e.g., Baddeley, 1963; Bjork & Whitten, 1974). For example, when university rugby players were asked to recall all of the teams they had played against that year, a recency effect was observed, with more recent games being recalled more frequently (Baddeley & Hitch, 1977). Adelman, Tolcott, and Bresnick (1993) also found a recency effect using a task that did not involve recall memory. Trained army personnel performed a paper and pencil replication of air defense situations that they would routinely face on the job. The participants were asked to determine whether an aircraft was likely to be one of the army's own, or an enemy aircraft based on various forms of diagnostic information. They found that participants were more likely to categorize the aircraft as hostile when the information that suggested that this was the case was presented late in the procedure.

Given that a recency effect can occur outside of working memory explanations, what is responsible for the recency effect in these situations? Baddeley and Hitch (1993) suggested that the recency effect is due to the distinctiveness of the information. One way the information can be distinctive is via its position in the list, that is, being at the end of the list makes the information more salient and therefore easier to recall. Another way that the information could be distinctive is if it is contradictory to the information

that was already received. Therefore, the information is more memorable because it conflicts with other pertinent information.

Other researchers suggest that the recency effect is most likely to occur outside of working memory tasks when the decision-maker is using a step-by-step process to evaluate the information. Step-by-step processing requires the decision-maker to assess each new piece of evidence when it is encountered, rather than making an assessment once all of the information has been gathered. As such, Hogarth and Einhorn (1992) suggest that in step-by-step processing, each new piece of information will be compared to the previous information until the final decision. Therefore, in step-by-step processing, this means that each new piece of information will potentially alter the initial hypothesis or anchor point (and each subsequent anchor) until the final decision is made, with more recent information given more weight than prior information at each point of assessment (Adelman et al., 1993). However, Hogarth and Einhorn propose that a recency effect is only likely to occur in step-by-step processing if the information is contradictory. This is explained by their adjustment model as being due to the fact that belief adjustment will be affected by both the direction (positive or negative) of the evidence and the level of the initial anchor. When evidence is contradictory, if confirming evidence is processed in a disconfirming/confirming order, then the participant has a lower initial anchor than when processed in a confirming/disconfirming order.

Therefore, according to Hogarth and Einhorn (1992) when examining belief updating, memory and recall abilities are no longer responsible for order effects as in earlier serial position studies. Instead, people are constantly updating their beliefs (with

step-by-step processing) with each new piece of information having a weight attached to it that is either positive or negative in valence compared to the initial anchor or belief. That initial anchor might be the person's belief upon entering the situation, or it might be the first piece of information that they encounter that serves as the initial anchor. When the evidence that people encounter is consistent (that is, both positive or both negative) the evidence will act in an additive fashion. However, when the evidence is contradictory, the final belief anchor will reflect the initial anchor point and the fact that the final piece of evidence encountered will be weighed more heavily than the initial anchor, hence a recency effect.

Recency Effect and Juries

Although there have not been any studies (to my knowledge) examining order effects in police decision-making, there has been research examining the effect of order of presentation of evidence in jury decision-making (e.g., Davis, Tindale, Nagao, Hinsz, & Robertson, 1984; Wallace & Wilson, 1969; Wilson, 1971). Jury decisions are set up to be end-of-sequence decisions (jurors are instructed to only make a decision at the very end of the process). However, the length of the trial and the complexity of the evidence could lead jurors to use a step-by-step process (e.g., Strawn & Munsterman, 1987). As such, it is possible that as jurors hear new pieces of evidence they spontaneously update their beliefs regarding the guilt of the suspect.

Research in this area has found recency effects with juror decision-making. For example, Furnham (1986) gave participants transcripts from an actual court case and had participants indicate their verdict after receiving each piece of evidence. Participants made 15 judgments of a defendant's culpability (therefore, it was a step-by-step

procedure). Participants were susceptible to a recency effect, such that when the prosecution evidence was presented after the defense arguments, participants were significantly more likely to render a guilty verdict than when the defense arguments were presented after the prosecution arguments. Therefore, even though all of the participants received identical information, the order in which the information was presented affected final judgments such that the most recently heard evidence had the strongest effect on final verdicts. Carlson and Russo (2001) found the same effects when studying prospective jurors and students.

Other studies using a more ecologically valid method of studying juror decision-making (jurors were only asked for their decision at the end of the presentation of all evidence, as in real life) have also found recency effects. Constabile and Klein (2005) suggested that because the presentation order of prosecution and defense arguments is fixed in the real world (in Canada, the prosecution always presents its evidence first and then can have a rebuttal after the defense presents), it is important to examine the effects of evidence order within an attorney's case rather than comparing presentation order of the prosecution or defense's arguments. They manipulated whether strong incriminating evidence was more persuasive when presented either early or late in the prosecutor's case. Participants were presented with all of the evidence and were then asked to make a decision regarding the defendant's guilt. They found that the incriminating evidence was most persuasive when presented late in the trial.

Recency Effect with Participant-Investigators

The decision-making literature does suggest the possibility that a recency effect could have been responsible for participant-investigators overemphasizing eyewitness

identification decisions in the Dahl et al. (2006) study. Much like the Constabile and Klein (2005) jury study, the order of presentation of information in the investigator studies was fixed, with a strong piece of evidence presented at the very end of the procedure. Therefore, similar to the jurors in the Constabile and Klein study, the investigators might have found the eyewitness evidence less persuasive if it was presented at a different time during the procedure. In addition, the procedure in the Dahl et al. studies promoted the use of step-by-step processing by assessing participant-investigators' judgments after each source of evidence (the database and the eyewitness decision). Therefore, according to order effects literature, a recency effect would be likely to occur in this situation (Hogarth & Einhorn, 1992).

One of the goals of the current research was to determine whether the large influence of an eyewitness's decision in the Dahl et al. (2006) studies could be due to a recency effect. Experiments 1 and 2 examined this possibility by manipulating the order in which the investigators receive the eyewitness information and the database information. If the impact of the eyewitness decision is due to a recency effect then the participant-investigators should be less influenced by that information when the information comes before the database information. If, on the other hand, the eyewitness decision is just an extremely salient form of evidence for the investigators, then participant-investigators' probability ratings should remain the same regardless of the order in which the eyewitness decision is received.

The Effect of Other Evidence

In addition to examining the influence of order effects on participant-investigators, one of the other goals of the current research was to examine how

participant-investigators dealt with two similar forms of person evidence: an alibi witness and an eyewitness. An alibi witness testifies regarding a suspect's account of where they were and what they were doing at the time the crime took place. Given that it is meant as a form of exoneration, an alibi implies that the person could not have been at the scene of the crime. An eyewitness also testifies about the whereabouts of the suspect in relation to a witnessed crime. Therefore, alibi witnesses and eyewitnesses share many similar attributes. They are both called upon to report their memory for an event, and as such, they are both vulnerable to the same memory errors (Burke, Turtle, & Olson, 2006).

Importantly for this research, in addition to sharing the possibility of being unintentionally inaccurate, alibi witnesses and eyewitnesses also share the characteristic that they are a live and in-person form of evidence, as compared to other forms of evidence that are processed as written reports and therefore may lack some of the saliency and contextual cues of witness evidence. As such, these witnesses are likely to be seen as a more ambiguous form of evidence than physical evidence, not only because their memories might be faulty, but also because they are being judged on their verbal and nonverbal reactions during testimony, their demeanor, their clothing, etc., (although a recent study by Allison, 2006, did not find an effect of the contextual cues of gender or attractiveness on a suspect's alibi believability). Most importantly, in the alibi witness's case, the police will be taking the witness's relationship with the defendant into account when assessing the credibility of the alibi.

In this way, alibi witnesses differ quite dramatically from eyewitnesses. Eyewitnesses will most likely be assumed to be telling the truth because they have nothing to gain by lying about the identity of the culprit. Alibi witnesses, on the other

hand, could potentially be lying to protect the suspect. As such, it is likely that police investigators view alibi witnesses with more skepticism than they view eyewitnesses. Indeed, Burke and Turtle (2003) suggested that police are biased while interviewing alibi witnesses to look for inconsistencies and signs of deception (however, Olson, 2004, did not find any evidence that laypeople approach alibis with this kind of extreme skepticism).

Alibi Research

Research regarding the believability of alibis is still relatively new and only one study (to my knowledge) has examined how participants in the role of police investigators interpret the evidence. Olson and Wells (2004) examined whether participants in the role of police investigators would be biased against alibi information, particularly when it came from someone who would potentially lie for the suspect. The authors proposed that the believability of an alibi is dependent upon how much proof can be offered that the alibi is factual. Proof can be offered up in the form of physical evidence (e.g., receipts, security camera video, etc.) or through an alibi witness.

Olson and Wells (2004) presented participants with a crime description and three possible suspects for that crime. Taking on the role of police officers, the participants evaluated the alibis for each of the suspects. The alibis were manipulated using a three (Physical Evidence: none, easily fabricated, and hard to fabricate) by four (Alibi Witness: none; corroborated by one who might lie and is unlikely to mistakenly identify the suspect; corroborated by one who would not likely lie but could mistakenly identify the suspect; and corroborated by one who would not likely lie and would not likely mistakenly identify the suspect) design. Therefore, the suspect's girlfriend might lie but

would be unlikely to mistakenly identify the suspect, a convenience store clerk would likely not lie but could mistakenly identify the suspect, and a neighbor would not likely lie or mistakenly identify the suspect. There were 36 possible alibis and each participant assessed three alibis. Physical evidence was manipulated within each participant's package, but the person evidence (the alibi provider) was manipulated on a between-subjects level only. That is, each participant was given three alibis that described the same type of alibi witness but different forms of physical evidence. The participants sequentially rated each alibi for its believability and rated the probability that each suspect was guilty.

Olson and Wells (2004) found that the alibi provider only had a significant effect on believability ratings when no physical evidence was present. When there was no physical evidence, an alibi corroborated by one who would not lie about the alibi and also not mistakenly identify the suspect (e.g., a neighbor) was viewed as more believable than an alibi provided by someone who would be willing to lie for the suspect (e.g., the suspect's girlfriend).

The strongest form of alibi (hard to fabricate physical evidence along with an alibi provided by someone unlikely to lie or mistake the suspect for someone else) received a mean believability rating of only 7.41 out of 10. Olson and Wells (2004) suggest that this is due to participants' overall cynicism towards alibis in general. If participants read the alibis with a bias towards disbelief then even a strong alibi would be rated as less believable than if participants read the alibis with a more open mind.

Jurors' Evaluations of Alibis

A number of studies have examined the effect of alibis on jurors. For example,

McAllister and Bregman (1989) examined the effect of presenting jurors with an alibi witness when the jurors were also presented with eyewitness testimony. Conviction rates were assessed and the researchers found that conviction rates were lower when the alibi witness provided an alibi for the defendant. This was the case even when there was an eyewitness who identified the defendant as the culprit. However, Lindsay, Lim, Marando, and Cully (1986) found that an alibi witness only impacted juror verdicts (when direct eyewitnesses were involved) when the alibi witness was unrelated to the defendant. In addition, Sanders (1984) found that no matter how compelling the alibi witness's statements were, an eyewitness's testimony almost always trumped the alibi witness's testimony when both were presented in the same case. Therefore, the research examining the influence of alibi witnesses on jurors appears mixed when an eyewitness is involved in the case. McAllister and Bregman suggest that the alibi leads to lower conviction rates, whereas Lindsay et al. suggested that an alibi witness only affected conviction rates when the alibi witness was not someone who would likely lie for the defendant, and Sanders found that the eyewitness testimony was more likely to affect verdicts than alibi testimony.

More recently, Culhane and Hosch (2004) also examined the influence of alibi testimony on juror decision-making. They manipulated the type of alibi testimony (corroborating, noncorroborating, and ambiguous); the relationship between the alibi witness and the defendant (girlfriend or neighbor); and the eyewitness's confidence in his identification (completely confident or not completely confident). They found that jurors were least likely to convict when the neighbor corroborated the defendant's alibi and the eyewitness was not confident in his decision. Conviction rates were highest when the

neighbor refuted the defendant's alibi and the eyewitness was confident in his decision. There was a main effect of alibi type such that a corroborating alibi witness decreased convictions rates compared to a noncorroborating alibi and an ambiguous alibi. In addition, conviction rates were lower with an alibi provided by a neighbor than with an alibi provided by a girlfriend. When the alibi was provided by the girlfriend, conviction rates were no lower than when there was no alibi witness at all.

Therefore, there is some evidence that both participant-investigators (Olson & Wells, 2004) and participant-jurors (Lindsay et al., 1986; Sanders, 1984) are biased toward disbelieving an alibi witness, particularly when that witness had a close relationship with the suspect. It also appears that in the Culhane and Hosch (2004) study, participant-jurors were evaluating the alibi witness's statement in comparison to the eyewitness's statement, such that if the eyewitness was not very confident, participants were more likely to believe the alibi.

Current Research

One difference between the previous alibi research and the current research is that all of the evidence in the previously described studies was presented via written materials. Although it is quite possible that an investigator would only encounter evidence through a report written by another officer, it is also possible that investigators would have face-to-face contact with alibi witnesses and eyewitnesses, and that this could affect how investigators' evaluate this evidence. Therefore, the additional contextual cues provided by watching actual people in the roles of alibi witnesses and eyewitnesses could affect the salience of this evidence and the impact that this evidence has on participants in the role of police investigators. In addition, investigators in the current

line of research are much more involved in the investigative process than the participants have been in the previously described participant-investigator studies. The paradigm used in the current research was designed to encourage participants to become more personally involved and invested in the outcome of the case. By going through the database, choosing a suspect, and encountering different sources of evidence, the participant-investigators develop a hunch regarding the likely guilt of their suspect and therefore might be susceptible to various biases when interpreting subsequent information.

It is important to acknowledge that although the current research attempts to replicate an investigative experience, there are still likely many differences between the paradigm and the participant-investigators, and real world investigations and police officers. The potential differences and implications of these differences will be discussed in the General Discussion.

Therefore, Experiment 3 was designed to examine how participant-investigators evaluate and interpret alibi witness and eyewitness testimony when they already have beliefs regarding the guilt of the suspect. Previous research has always examined how participants interpret alibi evidence compared to an eyewitness who implicates the suspect (e.g., Sanders, 1984), but in the real world, police investigators are also likely to have eyewitnesses who reject the lineup (and therefore the investigator's suspect). How do police investigators interpret an alibi witness's testimony in this case? The goal of Experiment 3 was to examine how role-playing police investigators evaluate alibi evidence (provided by an alibi witness) that is either strong or weak in regards to exonerating the suspect when they have an eyewitness who has either identified the

suspect or rejected the suspect (by not making an identification).

Of particular interest was whether participant-investigators in this paradigm treat the alibi witness with more skepticism than they treat the eyewitness. If this is the case and the investigators are inherently more likely to trust an eyewitness over an alibi witness, then their beliefs regarding the suspect's guilt should be less affected by the alibi witness's testimony. In addition, how do investigators evaluate two forms of evidence that are strong and contradictory? For example, what happens in a case when the eyewitness identifies their suspect but there is a strong alibi? Also of interest is whether a weak alibi has the potential to serve as either exonerating or incriminating evidence depending on the eyewitness's decision. That is, if investigators have a witness who identifies the suspect, will a weak alibi make them more likely to believe that that suspect is guilty (and therefore serve as incriminating evidence)? Compare this to a situation where investigators have an eyewitness who rejects the lineup (and therefore does not identify the suspect). Will investigators in that situation see the weak alibi as a form of corroborating exonerating evidence?

Experiment 3 also aimed to explore the presence of order effects with alibi and eyewitness evidence. Given that prior research regarding juror decision-making has found some evidence of recency effects, the current study is interested in examining whether investigators will be more likely to believe an alibi witness if that testimony is presented after the eyewitness and vice versa. For example, will investigators who hear a strong alibi believe that they made a mistake and chose the wrong suspect and therefore view the subsequent eyewitness identification decision differently in light of that belief? Experiment 3 aims to examine all possible combinations of presentation order of the alibi

witness and eyewitness testimony. This is important, because if the evidence is identical but investigators are influenced by it in different ways depending on the order in which it was presented, this could have a dramatic impact on how investigators subsequently pursue the case.

Therefore, this dissertation describes three experiments. The first two experiments examined whether the impact of the eyewitness decision in previous research was due to a recency effect. If that were the case then probability ratings of the suspect's guilt should be less affected by the witness's decision if the decision occurs before the investigators receive other evidence in the case. The third study continued to examine order effects but also examined how participant-investigators evaluated alibi witness testimony in addition to the eyewitness testimony. Of particular interest was whether the participant-investigators approached the alibi witness testimony with more skepticism than the eyewitness testimony, and whether the order in which they were presented with the two forms of evidence affected their subsequent beliefs regarding their suspect's likely guilt, particularly when the information that they received was contradictory.

Experiment 1

The goal of Experiment 1 was to examine whether the large influence of eyewitness decisions found in previous studies (Dahl et al., 2006) was due to a recency effect. To examine this, the procedure was manipulated to alter when the participant-investigators received the eyewitness decision. Participants either received it after they had gone through the database and selected their suspect (as in previous studies), or they

received it before they had gone through the database and encountered other information about the crime.

Method

Participants. Forty male ($N = 12$) and female ($N = 28$) University of Victoria undergraduate students participated individually in return for bonus points in an introductory psychology course. Participants were randomly divided into four conditions. Half of the participants had an eyewitness who identified their suspect and the other half had an eyewitness who rejected the lineup (that is, did not make an identification). In addition to the lineup manipulation, half of the participants went through the database before obtaining the eyewitness's decision and the other half went through the database after obtaining the eyewitness's decision. Therefore, it was a 2 (ID Decision: ID Suspect, Not Present) by 2 (Order: Database First, ID First) between-subjects design.

Materials and Procedure. Participants were informed that they would be participating in pairs and the sign-up website was rigged to make it appear that this was true. In fact, only one participant signed up for each session, as the other person was a confederate. A confederate eyewitness was used to maintain consistency in behavior and confidence, and to manipulate the identification decision. When participants arrived they were informed that they would be taking on the role of a police officer in the experiment and were told that another participant (the confederate) would take on the role of an eyewitness.

Materials were based on a 3-minute simulated crime video that depicted a robbery. Participants first interviewed the witness regarding this video. The description

of the crime and culprit given by the confederate during the interview with the investigator was based on the video. Participant-investigators were not given a script for the interview but were given a list of suggested question categories (e.g., description of crime, culprit, car, etc.). During the interview, the confederate responded in a fairly confident manner with predetermined answers. If a question was asked that was unrelated to the predetermined answers, the confederate answered that she did not know. After the interview was completed, the confederate went to another room.

In the Database First condition, the participant was then given instructions for using a computer database to search for a suspect. Participants were to imagine that they were police officers in a small town and as part of their investigation they would examine a database containing information on people in the town who had previous arrests or convictions. Participants were told to use the information obtained in the interview to attempt to find a suspect in the database. To start the program, participants clicked on a potential suspect's name (out of thirteen possibilities) to view information regarding the suspect's physical description, prior criminal record, alibi, current employment, and registered vehicles. (See Appendix A for an example of database information.) Participants were instructed to imagine that all of the information was up to date. Consequently, if a suspect's physical description was not a good match to that given during the interview then that suspect could not have committed the crime. Participants had to click on each suspect's name at least once before they could indicate their decision as to which (if any) of those in the database they suspected committed the crime. Once they had made their decision they were shown a page containing their suspect's photo (the perpetrator in the video) and were instructed to look closely at their suspect's picture.

The program was designed so that the same picture appeared regardless of which suspect was chosen.¹ After participants chose their suspect and saw their suspect's photo they were taken to a page containing the lineup. The participants were instructed that the lineup consisted of one person who could have committed the crime (their chosen suspect) and five innocent people (foils) and the lineup labeled the six lineup members as being either the participant's suspect or in jail. Once they had viewed this page they were shown an identical lineup sans labels for use during the lineup administration. (The match-description lineup was created by J. D. Read and has been used in many other experiments, e.g., Lindsay, Read, & Sharma; 1998).

Participants in the Database First condition were then given instructions about the lineup procedure. Participants were told to try not to influence the witness toward choosing their suspect. They were also informed that they must instruct the witness that the culprit might not be present in the lineup and, if not, that the witness should not make an identification. Participants then administered the lineup to the confederate. The confederate looked over the lineup and then responded either: "It's number three" (ID Suspect condition) or "He's not there" (Not Present condition). After the confederate made her decision, the participant was informed that he/she could ask any additional questions that he/she thought would be helpful. The majority of participants did not ask any further questions, but some participants subsequently asked how confident the witness was in her decision. If this was the case, the witness responded "fairly confident".

Following the lineup, the witness left the room and the participant completed the

¹ However, all participants in this study chose the same suspect as the database was designed to suggest the guilt of that suspect.

questionnaire. It first asked participants to indicate which lineup member (if any) the eyewitness chose. Participants then rated how confident they were in the accuracy of the witness's decision on a scale from 1 to 10. Participants then estimated the probability that the suspect they chose had committed the crime using a scale from 0% to 100%. They also indicated whether they would arrest the suspect and how confident they were in that decision. Afterward, participants were fully debriefed regarding the purpose of the experiment and the use of the confederate.

The ID First condition was virtually identical to the Database First condition except that after the initial interview with the witness, the witness was asked to step out of the room and the participant investigator was given instructions for the lineup procedure. The participant was told to imagine that a fellow police officer had put together a lineup based on the eyewitness's description. Participants were instructed that number three in the lineup was the other officer's suspect and that everyone else in the lineup was in jail and therefore was innocent. Participants were reminded that just because number three was a suspect, that did not necessarily mean that he had committed the crime. The participants were then given the same instructions for administering the lineup as the participants in the Database First condition. The confederate witness was brought back into the room and the participant administered the lineup to the witness.

Following the lineup procedure, the confederate was taken out of the room and the investigator was given the instructions for the database. Participants were told to imagine that regardless of the eyewitness's lineup decision, as police investigators they would want to make sure they had pursued all of their options as far as finding the likely culprit of the crime. Therefore, they were going to go through a database of potential

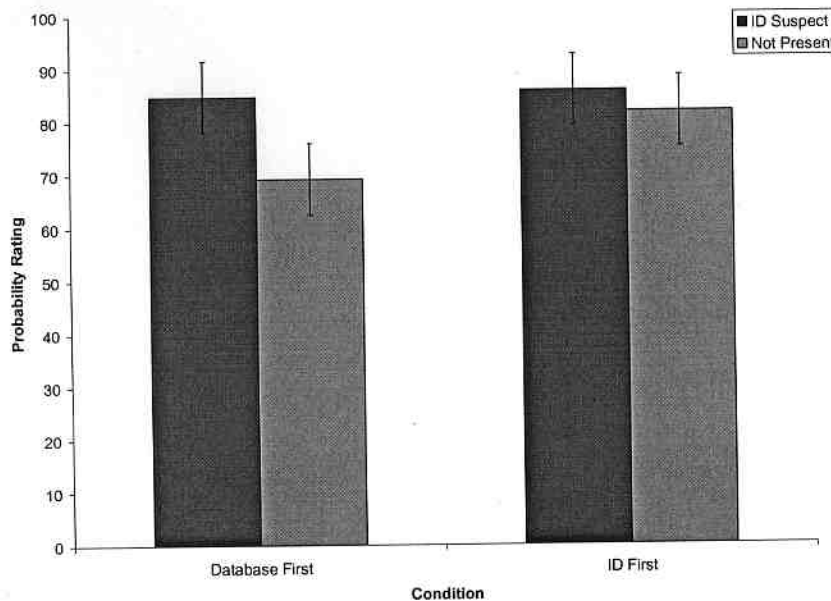
suspects. The database and instructions for the database were identical to those used in the Database First condition. When the participants chose their suspect they were shown a photo of their suspect and the photo was identical to the photo of lineup member three that they had earlier been told was the suspect in the lineup. After completing the database, the participants were then given the same questionnaire as participants in the Database First condition.

Results

Probability Suspect Committed Crime. Participants rated the probability that their suspect had committed the crime. A 2 (Order: ID First, Database First) x 2 (ID Decision: ID Suspect, Not Present) between subjects ANOVA was used to investigate whether there were significant differences in participants' estimates of the probability that the suspect was the culprit. There was a main effect of ID, $F(1, 36) = 8.67, p < .05, \eta_p^2 = .19$. Participants who believed that the witness had identified their suspect were significantly more likely to think that their suspect was the culprit than participants in the Not Present condition regardless of when that decision took place. There was also a main effect of order, $F(1, 36) = 4.29, p < .05, \eta_p^2 = .11$. Participants in the ID First condition had higher probability ratings than those in the Database First condition. The interaction was not significant, $F(1, 36) = 3.02, p = .09, \eta_p^2 = .08$. (See Figure 1.)

Confidence in the Witness. Participants were asked to rate their confidence in the witness's decision. There was a significant main effect of ID. Participants whose witness identified the suspect were much more confident in that witness than those whose witness rejected the lineup ($M = 8.45, SD = 1.05$ vs. $M = 4.25, SD = 2.17$, respectively), $t(38) = 7.78, p < .001$, Cohen's $d = 2.46$. There was not a significant main effect of order

Figure 1.



Error bars = 95% CIs based on a pooled estimate of variability.²

$t(38) = 1.17, p > .05$, Cohen's $d = .37$. There was also not a significant interaction, $F < 1$.

Arrest Decision. Participants were asked whether they would arrest the suspect.

There was a significant main effect of ID Decision, $\chi^2(1) = 6.67, p < .05$, Cramer's $V = .41, p = .01$. When the witness identified the suspect, participants were much more likely to arrest the culprit (16/20) than when participants rejected the lineup (8/20). There was not a significant main effect of order, $\chi^2(1) = 1.67, p > .05$, Cramer's $V = .20, p > .05$.

There was not a significant interaction using a two-tailed Fisher Exact Probability Test, ($p > .1$).

Discussion

² The pooled estimate is the error term for the between-subjects factor in the ANOVA analysis. Pooling the estimates of variability provides a more stable estimate of variability. Given the pooled estimate of variability, it is appropriate to compare the different between-subjects conditions with one another using the error bars. (See Masson & Loftus, 2003, for a complete explanation of the computation and use of these confidence intervals.)

The results of this experiment do not indicate a clear recency effect of eyewitness identification decisions. Participants in the ID Suspect condition were similarly affected by that identification decision regardless of when it occurred in the procedure. That is, both groups of participants in the ID Suspect condition were near ceiling levels in their beliefs that the suspect had committed the crime whether they received that decision before or after they went through the database.

A recency effect appears possible in the Not Present condition; however, the Not Present condition appears to have had less of an effect on the participant-investigators in this study than in previous studies regardless of the order of presentation. In a number of previous studies using these materials and procedure, probability ratings of the suspect's guilt were around 50% (e.g., Dahl et al., 2006). In the Database First condition of this study (which was nearly identical to the procedure of previous studies) the mean was 69.25%. The only difference in the procedure between this study and previous studies is that in the current study there was only one questionnaire that was completed at the very end of the procedure. In previous studies, there were two identical questionnaires, one of which was completed following the database and the other was completed after the identification decision. Therefore, in the previous studies participants were encouraged to think about how additional information would change the probability that their suspect had committed the crime (a step-by-step procedure).

It is possible that by using only one questionnaire in the current study, the procedure changed substantially enough (from a step-by-step to an end-of-sequence procedure) that participants were no longer updating their beliefs throughout the study about the probability that their suspect committed the crime and that this was responsible

for the abnormally high probability ratings in the Not Present condition. End-of-sequence processing research would typically predict a primacy effect in this case (e.g., Hogarth & Einhorn, 1992). This is due to the fact that in end-of-sequence processing people are not updating their beliefs as they go along, but rather are only comparing the aggregate impact of all the evidence they encounter with their initial belief. Therefore, the initial belief or anchor will be given more weight than each of the following individual pieces of subsequent information (Hogarth & Einhorn, 1992).

However, this doesn't appear to work as an explanation for the Not Present conditions in Experiment 1. If primacy effects were occurring then probability ratings would be expected to be much lower in the ID First Not Present condition than in the Database First Not Present condition, and that was not the case. Therefore, although one might explain the high ratings in the Database First Not Present condition as being due to a primacy effect (because the information suggesting that the culprit committed the crime came before the rejection of the lineup) this does not explain the high ratings in the ID First Not Present condition.

However, one potential confound in the ID First conditions was the way in which the lineup was presented to the investigators. To inform the investigators who the suspect was in the lineup, participants were asked to imagine that the lineup had been put together by a fellow police officer who had reason to believe that the suspect might have committed the crime. (In the Database First conditions, participants did not receive this instruction because they understood that the lineup was constructed around their own chosen suspect.) This is potentially a confound because it could have suggested to investigators in the ID First condition that there was a greater likelihood that the suspect

had committed the crime because they had the knowledge that another police officer also suspected (perhaps with good reason) that that suspect was the culprit. Therefore, perhaps the investigators were treating the fact that their fellow police officer had put together the lineup as additional support for the guilt of their suspect, leading to higher probability ratings in the ID First condition.

Therefore, it is possible that the results in the Not Present conditions can be explained by a primacy effect in the Database First condition and by the potential confound in the ID First condition. In both conditions the participants were willing to disregard the eyewitness decision. In the Database First condition they were weighing the database more heavily than the ID decision because of the order in which it was received, and in the ID First condition they were disregarding the ID decision because it went against the database information and against their fellow police officer's decision. In both the Database First and ID First conditions they rated their confidence in the witness as quite low, suggesting that they believed the witness was making a mistake and that they did not put a lot of trust in that decision.

Consequently, it is difficult to know exactly what was responsible for the results of the Not Present conditions in this study. Sample sizes were likely too small to truly examine the effects of an end-of-sequence decision-making procedure. Although it would be interesting to empirically examine the influence of the type of procedure (step-by-step vs. end-of-sequence) on the participant investigators' decision-making, at this point the likelihood of order effects given the typical procedure is the priority. Therefore, a follow-up study was conducted using the same confederate, materials, and procedure as Experiment 1; however, the assessment procedure reverted back to using two

questionnaires (and therefore the step-by-step procedure) to assess participant's beliefs in the probability that their suspect committed the crime.

Experiment 2

Experiment 2 was designed to determine whether the change in procedure regarding the questionnaires in Experiment 1 was responsible for the high probability ratings in the Not Present condition. As such, identical questionnaires were given to the participants to complete both after they finished the database and after they administered the lineup to the witness, regardless of when those two tasks took place in the experiment. Of interest, was whether the impact of the eyewitness decision would be weaker when that eyewitness decision occurred before the database using a step-by-step decision-making process.

Method

Participants. Sixty male ($N = 13$) and female ($N = 47$) University of Victoria undergraduate students participated individually in return for bonus points in an introductory psychology course. Participants were randomly divided into the four conditions. It was a 2 (ID Decision: ID Suspect, Not Present) by 2 (Order: Database First, ID First) between-subjects design.

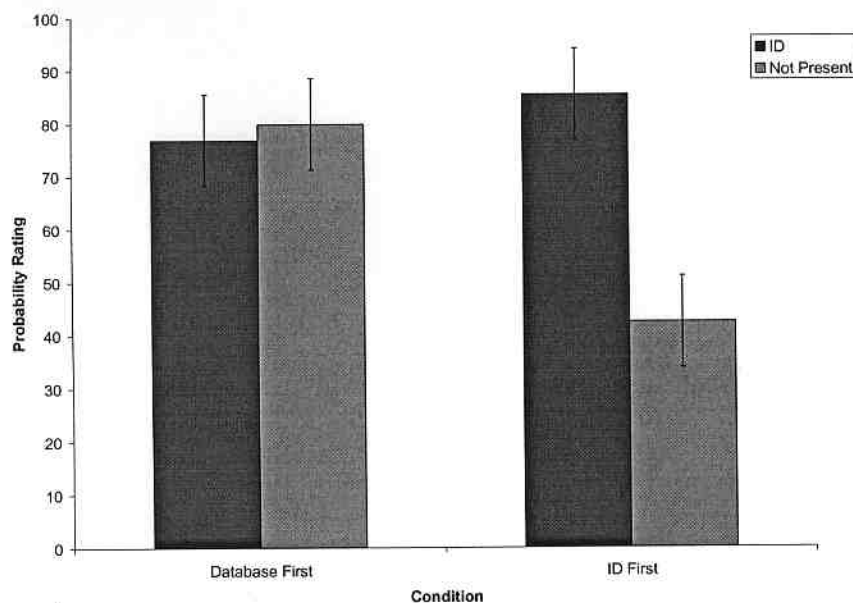
Materials and Procedure. The materials and procedure were identical to those used in Experiment 1 except that a second questionnaire was added. Participants filled out nearly identical questionnaires after they completed the database and after the lineup identification task, regardless of when those tasks occurred in the procedure. The only difference between the questionnaires is that the question assessing investigators' confidence in the witness was always presented on the second questionnaire.

Results

First Questionnaire Probability Suspect Committed Crime. A 2 (Order: ID First, Database First) x 2 (ID Decision: ID Suspect, Not Present) between subjects ANOVA was used to investigate whether there were significant differences in participants' estimates of the probability that the suspect was the culprit. There was a main effect of order on estimates of the probability that the suspect was the culprit, those in the ID First condition had lower probability ratings than those in the Database First condition, due to the low ratings in the ID First, Not Present condition, $t(58) = 2.31, p < .05$, Cohen's $d = .67$. There was a main effect of ID decision as well, not surprisingly, probability ratings were higher when the witness identified the suspect than when the witness rejected the lineup and this was also driven by the high ratings in the ID First condition, $t(58) = 3.53, p < .01$, Cohen's $d = .91$.

The interaction was also significant, $F(1, 56) = 27.42, p < .001, \eta_p^2 = .33$. (See Figure 2.) In the ID First condition, participants rated the probability that their suspect had committed the crime significantly lower when the witness rejected the lineup than those in the Database First condition, $t(28) = 4.77, p < .05$, Cohen's $d = 1.74$. In addition, in the ID First condition, participants also rated the probability that their suspect had committed the crime significantly higher when the witness identified the suspect than those in the Database First condition, $t(28) = 2.20, p < .05$, Cohen's $d = .80$. However, this interaction is relatively uninteresting because at this point in the procedure participants in the Database First condition do not have the ID decision and therefore cannot be affected by it. (Note in Figure 2 that the means are similar for both ID Decisions in the Database first condition.)

Figure 2.



Error bars = 95% CIs based on a pooled estimate of variability.

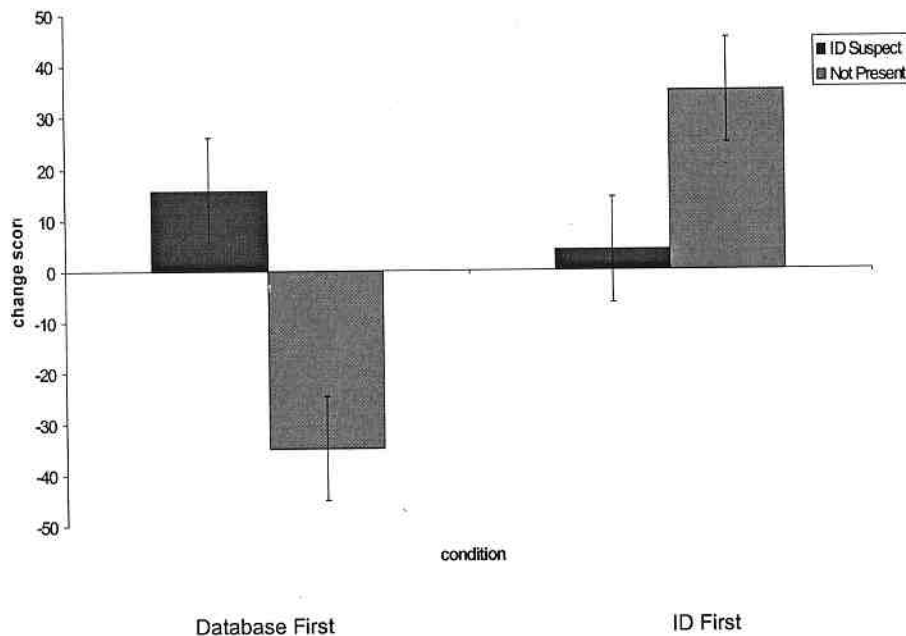
First Questionnaire Arrest Decision. Participants were asked whether they would arrest the suspect. There was not a significant interaction using a two-tailed Fisher Exact Probability Test, ($p > .1$). However, there was a significant main effect of ID Decision, $\chi^2(1) = 11.92, p < .01$, Cramer's $V = .45, p = .01$. In the ID First condition, when the witness identified the suspect, participants were much more likely to arrest the culprit (9/15) than when participants rejected the lineup (1/15). In the Database First condition, 13 of the 30 participants were willing to arrest the suspect. There was not a significant main effect of order, $\chi^2(1) = .64, p > .05$, Cramer's $V = .10, p > .05$.

Second Questionnaire Probability Suspect Committed Crime. A 2 (Time: First Questionnaire, Second Questionnaire) x 2 (Order: ID First, Database First) x 2 (ID Decision: ID Suspect, Not Present) repeated measures mixed model ANOVA was

conducted on participants' estimates of the probability that the suspect was the culprit.

There was a significant interaction, $F(1, 56) = 63.64, p < .01, \eta_p^2 = .53$. When the witness identified the suspect, probability judgments increased significantly from the first questionnaire to the second questionnaire regardless of the order that the identification occurred in, $t(14) = 5.97, p < .01$, Cohen's $d = 1.79$ (Database first) and $t(14) = 2.38, p < .05$, Cohen's $d = .36$ (ID first). When the witness rejected the lineup, probability judgments decreased significantly from the first questionnaire to the second questionnaire in the Database First condition, $t(14) = 5.17, p < .01$, Cohen's $d = 1.74$. (See Figure 3) However, in the ID First condition, probability judgments increased significantly from the first questionnaire to the second questionnaire, $t(14) = 4.97, p < .01$, Cohen's $d = 1.66$.

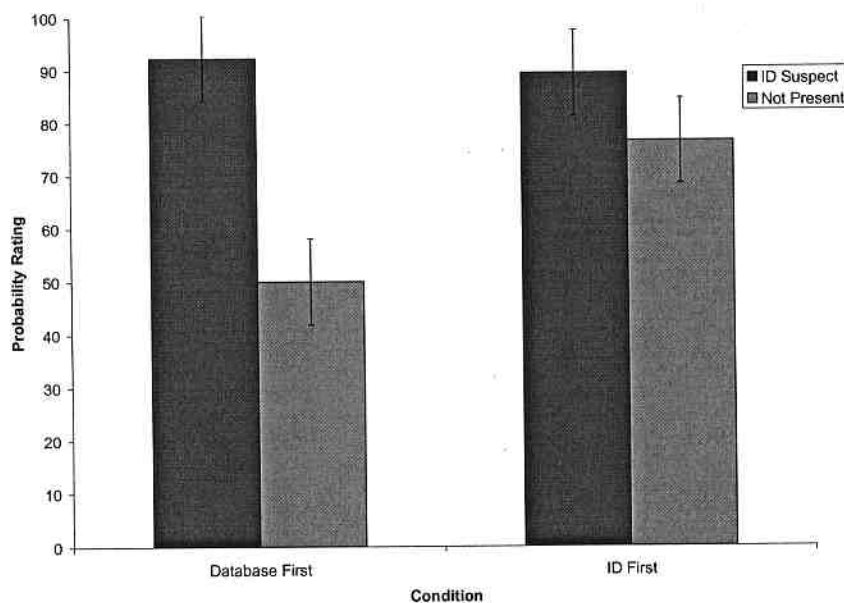
Figure 3.



Error bars = 95% CIs based on a pooled estimate of variability.

Of primary interest is whether the eyewitness decision has the same impact regardless of when it was encountered; given that, analyses were conducted on final probability ratings. There were significant main effects of ID and Order. Probability ratings were higher in conditions where the witness identified the suspect, $F(1, 56) = 51.92, p < .01, \eta_p^2 = .48$. Probability ratings were also higher in conditions where the witness decision came before the database, $F(1, 56) = 15.17, p < .01, \eta_p^2 = .21$. There was also a significant interaction, $F(1, 56) = 20.29, p < .01, \eta_p^2 = .27$. (See Figure 4.) Probability ratings were near ceiling levels in the ID Suspect conditions regardless of when that identification took place, $t(28) = .82, p > .05$, Cohen's $d = .30$. When the witness rejected the lineup, participants' probability ratings were significantly lower when the database came first than when the ID came first, $t(28) = 4.53, p < .01$, Cohen's $d = 1.65$.

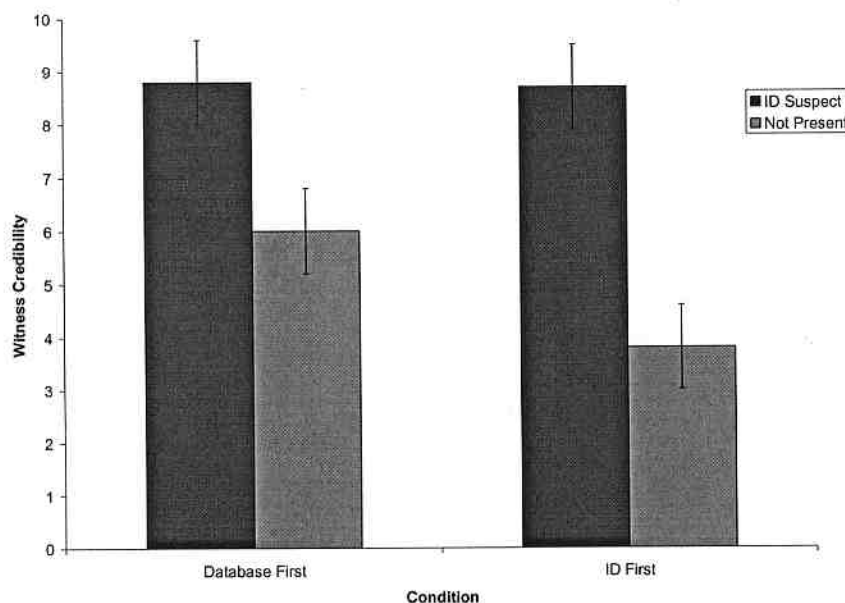
Figure 4.



Error bars = 95% CIs based on a pooled estimate of variability.

Second Questionnaire Confidence in the Witness. There was a main effect of ID, $F(1, 56) = 80.76, p < .01, \eta_p^2 = .59$. Participants were more confident in the witness when the witness identified their suspect. There was also a main effect of Order, $F(1, 56) = 14.65, p < .01, \eta_p^2 = .21$, such that participants who received the database first were more confident in the witness than those who received the ID decision first. There was also a significant interaction, $F(1, 56) = 13.41, p < .01, \eta_p^2 = .19$ (See Figure 5). In the ID Suspect conditions, participants were highly confident in the witness's decision regardless of when that decision took place, $t(28) = .19, p > .10$, Cohen's $d = .07$. In the Not Present conditions, participants who went through the database before receiving the ID were significantly more confident in the witness than those who obtained the ID before going through the database, $t(28) = 4.19, p < .01$, Cohen's $d = 1.53$.

Figure 5.

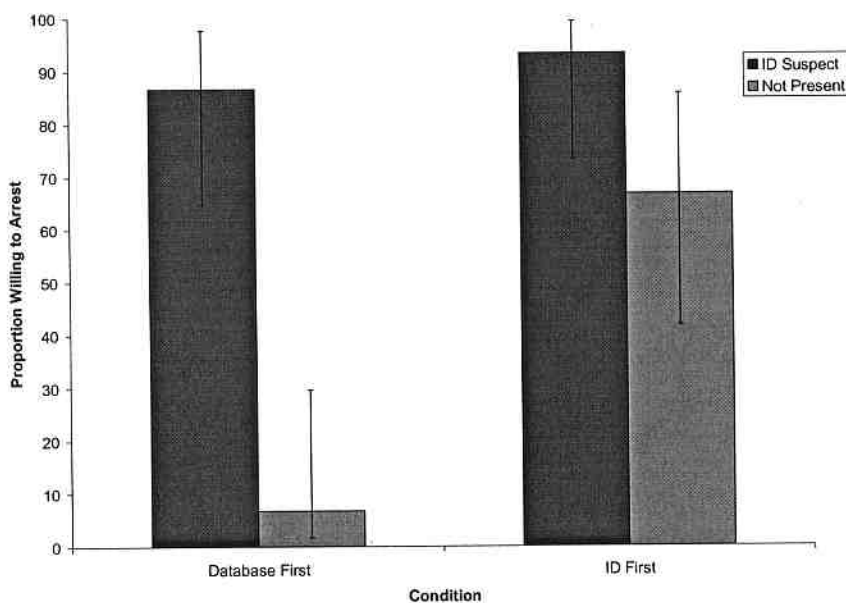


Error bars = 95% CIs based on a pooled estimate of variability.

Second Questionnaire Arrest Decision. There was a significant main effect of ID

Decision, such that when the witness identified the suspect, participants were more likely to arrest the suspect, $\chi^2(1) = 18.37, p < .01$, Cramer's $V = .55, p = .01$. There was also a main effect of Order, such that when the ID decision came before the database participants were more likely to arrest the suspect, $\chi^2(1) = 7.18, p < .05$, Cramer's $V = .35, p < .05$. There was also a significant interaction using a two-tailed Fisher Exact Probability Test, ($p < .05$). (See Figure 6.) Participants were willing to arrest the suspect in nearly every condition. There were no significant differences in willingness to arrest the suspect between the ID First Not Present condition and the ID Suspect conditions (all p 's $> .08$). There was, however, a significant difference between the ID First Not Present condition and the Database First Not Present condition, such that participants were more willing to arrest their suspect when the witness rejected the lineup before the participant went through the database, $\chi^2(1) = 11.63, p < .01$.

Figure 6.



Error Bars = 95% confidence intervals of the cell means.

Discussion

A recency effect does not appear to be completely responsible for the impact of eyewitness testimony on participant-investigators. In the ID Suspect conditions, investigators rated the probability that their suspect had committed the crime near ceiling levels regardless of when that identification occurred. In the Not Present condition the investigators continued to be influenced by the eyewitness decision, even when it was presented before they had any real expectations regarding their suspect.

With the addition of the second questionnaire we replicated the results of previous studies (Dahl et al., 2006) in the Database First, Not Present condition. It appears that having only one questionnaire in Experiment 1 did affect participants' beliefs about the suspect's guilt such that they were less affected by disconfirming evidence than when they updated using a step-by-step process as in the current study.

When the ID decision came before the database in the Not Present condition, participants were not as affected by that disconfirming evidence (on the second questionnaire) as they were when they encountered the database first. That is, even though they were still significantly affected by the rejection of the lineup (their probability ratings were significantly lower than in the ID Suspect condition and did change significantly from the initial assessments of their beliefs), their ratings of the suspect's guilt remained relatively high compared to the Database First, Not Present condition. Thus, it appears that when the ID decision occurs early on, participant-investigators are more likely to disregard this evidence when subsequent evidence suggests the guilt of the suspect. This hypothesis is supported by the fact that participants in this condition rated their confidence in the witness significantly lower than participants

in the Database First, Not Present condition.

However, the way in which the lineup was presented to the investigators in the ID First conditions remains a potential confound.³ Therefore, investigators in the ID First condition were potentially treating the fact that their fellow officer had put together the lineup as additional support for the guilt of their suspect. If this were the case, one might expect investigators to be even more confident in the ID Suspect condition when that identification came before the database as well, but there were no significant differences between the Database First and ID First ID Suspect conditions (although this might be due to ceiling effects). As such, it is difficult to determine how much, if any, of the recency effect that was observed is due to the difference in the presentation of the lineups between the Database First and ID First conditions.

Therefore, at this point the only strong evidence of a recency effect appears in the Not Present condition. The rejection of the lineup had less of an impact on the investigators when it occurred before they encountered other evidence regarding the guilt of the suspect. According to recency effects literature, it is not all that surprising that a recency effect was only found in the Not Present condition. Hogarth and Einhorn (1992) suggest that when participants are presented with a short set of evidence and are asked to update their beliefs using step-by-step processing there will be no order effects when the evidence is consistent (that is, both pieces of evidence confirm the participant's beliefs or both disconfirm the participant's beliefs) but that there will be a recency effect when the evidence is contradictory. This is the case in the Not Present conditions. On the one hand, they have an eyewitness who is telling them that their suspect did not commit the

³ The potential for the instructions in the ID First Not Present condition to serve as a confound was only discovered after Experiment 2 had been conducted which is why the procedure was not changed between Experiments 1 and 2.

crime by refusing to identify that suspect and reporting that the culprit is not present in the lineup. But on the other hand, they have information from the database (such as the suspect's physical description, prior record, and ownership of a car that matches the description of the car provided by the witness) that suggests the suspect's guilt.

The results of this study suggest that the order in which evidence is presented could have a significant impact on how investigators pursue the case (as seen in the participant's willingness to arrest the suspect in the Not Present conditions). If the witness correctly rejected a target-absent lineup and the investigator disregarded that rejection and remained confident in the guilt of the suspect, it could lead to a waste of the investigator's time and resources, not to mention unnecessary suffering for the innocent suspect.

Experiment 3

Experiment 2 suggested that order of presentation of information in the investigator paradigm can influence how that information is weighed in some circumstances. Of main interest in Experiment 2 was the effect of eyewitness identification evidence on investigators given the order in which it was received. Eyewitness identification decisions (and how investigators interpret this form of evidence) are obviously extremely important given the impact of eyewitness misidentifications. But investigators must interpret that evidence in light of other evidence such as fingerprints, confessions, DNA, and alibis. If an investigator is faced with a case in which the only evidence is an eyewitness's identification decision and the suspect's alibi for the duration of the crime, how will the investigator interpret those two forms of evidence? Further, will the order in which those two forms of evidence are

presented to investigators affect investigators' beliefs regarding the guilt of their suspect? For example, if an investigator watches an eyewitness make an identification but then sees an alibi witness (someone who provides the suspect's alibi) present strong evidence that the suspect could not have been there at the time of the crime, how will the investigator deal with this contradictory information? Both forms of evidence rely on someone's memory (the eyewitness's and the alibi witness's). Will the investigators exhibit a recency bias such that whichever piece of evidence is presented last has the largest influence on investigators' decisions? Or, will they always view the eyewitness as stronger evidence because the alibi witness could be fabricating the alibi?

Experiment 3 aimed to examine how participant-investigators would deal with eyewitness evidence and alibi witness evidence when they both confirmed the investigator's hunch, both disconfirmed the investigator's hunch, or were contradictory regarding the guilt of the suspect. Also of interest was whether the presentation order of this contradictory information would have an effect, suggesting either a recency effect, or a bias toward one source of evidence over another. To examine this, participants went through the same computer database used in the first two experiments and then watched a video of an eyewitness who either identified the suspect or rejected the lineup, and of an alibi witness who either provided a strong or a weak alibi. The order in which participants viewed these videos was manipulated such that half of the participants saw one of the eyewitness videos and then watched the alibi video, while the other half watched one of the alibi witness videos and then watched the eyewitness video.

Method

Participants. One hundred and sixty male ($N = 36$) and female ($N = 124$)

University of Victoria undergraduate students participated individually in return for bonus points in an introductory psychology course. Participants were randomly divided into the experimental conditions. The study was a 2 (ID Decision: ID Suspect, Not Present) by 2 (Alibi Strength: Strong Alibi, Weak Alibi) by 2 (Order: Eyewitness First, Alibi First) between-subjects design.

Materials and Procedure. The database was identical to that used in Experiments 1 and 2. In the current study the database was always presented before the eyewitness and alibi witness. After participants arrived and were told about their role in the study, they were presented with a written description of the crime and culprit in the form of a police file. This description was based on descriptions of the crime event provided by participant-witnesses who took part in an earlier study (see Dahl et al., 2006).

Following the database, participants were shown a video that depicted either an alibi witness or an eyewitness. The alibi witness video showed the alibi witness providing either a weak or a strong alibi for the suspect. The alibi witness's testimony in both the weak and strong alibi conditions was based loosely on the alibis used by Olson and Wells (2004). The alibis used in the Olson and Wells study were rather brief and presented in written form. Therefore, in the current study the alibis were expanded to be narrative in structure and to provide more contextual information for the participant-investigators. In both conditions, the alibi witness was asked (by an unseen interviewer) about his relationship with the suspect and then was asked to describe where the suspect was on the day the crime took place.

In both the strong and weak alibi conditions, the main plot of the alibi was that the suspect went to Tofino (a town about 4 hour's drive from Victoria where the crime took

place) when the crime was supposed to have occurred. Olson and Wells (2004) found that the weakest alibi was one that was provided by someone who was familiar with the suspect and would be motivated to lie, such as a family member or a girlfriend. In the weak condition of the current study, the alibi was provided by the suspect's closest male friend. The alibi witness described how they drove to Tofino on a whim to go surfing and that they would have been on the road on the day that the crime was supposed to have taken place. They did not have any hotel receipts because they slept in the van and they did not keep any other receipts from the trip. Therefore, similar to the Olson and Wells study, the weak alibi did not include any physical evidence and was based solely on testimony provided by someone who might be willing to lie for the suspect. (See Appendix B for a script of the weak alibi.)

In the strong alibi condition, the alibi provider was a male co-worker of the suspect's who reportedly was sent to Tofino with the suspect for a conference. He said that on the day of the crime they were attending a conference attended by several other people who could vouch for the suspect's whereabouts. The alibi provider claimed to have copies of hotel receipts in the suspect's name. Olson and Wells (2004) found that the strongest alibi was one in which there was physical evidence available and the alibi was provided by someone who was familiar with the suspect but who would be less likely to lie for the suspect to protect him. (See Appendix B for a script of the strong alibi.)

Both the strong and weak videos were pilot tested to ensure that they were viewed as appropriately strong and weak alibis. Thirty male ($N = 8$) and female ($N = 22$) undergraduates participated in return for bonus credits towards their introductory

psychology course. Half of the participants saw the weak alibi video and half saw the strong alibi video. Participants then completed a questionnaire assessing how strong they thought the alibi was on a scale from one to ten, with one representing "very weak, most likely not true" and ten representing "very strong, most likely true". In the weak alibi condition the mean was 3.14 with a standard deviation of 1.33. In the strong alibi condition the mean was 7.83 with a standard deviation of 1.54.

The eyewitness's video showed the witness being interviewed (by a hidden experimenter) about the crime. The interviewer asked the witness the same questions that had been used by the investigators in Experiments 1 and 2. The witness responded to these questions according to the same script used by the confederate witness in Experiments 1 and 2.) The witness was then administered the lineup using the identical instructions from Experiments 1 and 2. The screen was divided in half at this point so that one half of the screen showed the witness and the other half showed a close-up of the lineup. The witness then either identified the suspect by saying "It's number 3" and pointing to the suspect's picture on the video or rejected the lineup by saying "He's not there." (See Appendix C for a script of the eyewitness interview.)

To attempt to maintain consistency between the alibi and eyewitness videos, both videos were shot in the same room and both used male witnesses who were dressed similarly and who were both of the same ethnicity. Both actors were filmed performing all of the alibi and eyewitness parts and the videos were pilot tested to ensure that participants did not find one actor to be more convincing than the other. When asked how credible they found the eyewitness/alibi witness to be, there were no significant differences between the two actors (all p 's > .12). In addition, the videos were counter-

balanced so that half of the participants saw actor 1 as the eyewitness and actor 2 as the alibi witness and the other half saw actor 2 as the eyewitness and actor 1 as the alibi witness.

After participants saw the first video of either the alibi witness or the eyewitness, they were given the first questionnaire which was identical to the first questionnaire used in Experiment 2 (See Appendix D). Once they completed the questionnaire, the investigators were shown the second video of either the alibi witness or eyewitness (whichever one they did not originally watch) and again completed a questionnaire (See Appendix E) that was identical to the first questionnaire except that they were asked to rate how credible they thought the eyewitness's decision was, and how credible they thought the eyewitness himself was. They were also asked to assess the credibility of the alibi and the alibi provider. In addition, participants were asked an open-ended question assessing what information they used when determining the likely guilt of their suspect. Participants were also asked to rate how important the database, eyewitness, and alibi witness were in their decision to arrest the suspect. Participants were then fully debriefed and dismissed.

Results

Effect of Actor on Questionnaire Measures. Analyses were conducted (on all measures from both questionnaires) to determine whether differences existed between the actors portraying the eyewitness and the alibi provider, there were no significant differences based on the actor (all p 's $> .5$), therefore this will not be discussed further.

First Questionnaire Probability Suspect Committed Crime. Independent samples t -tests were conducted to determine whether the eyewitness decision or the alibi

information had an effect on participants' ratings of the probability that their suspect had committed the crime. Participants in the ID Suspect condition ($M = 82.45$, $SD = 12.16$) were significantly more confident in their choice of suspect than participants in the Not Present condition ($M = 49.85$, $SD = 27.00$), $t(78) = 6.96$, $p < .001$, Cohen's $d = 1.56$. There was also a significant main effect of alibi, $t(78) = 4.31$, $p < .001$, Cohen's $d = .96$. Participants in the Strong Alibi condition ($M = 47.78$, $SD = 25.20$) rated the probability that their suspect was the culprit significantly lower than participants in the Weak Alibi condition ($M = 69.28$, $SD = 19.02$).

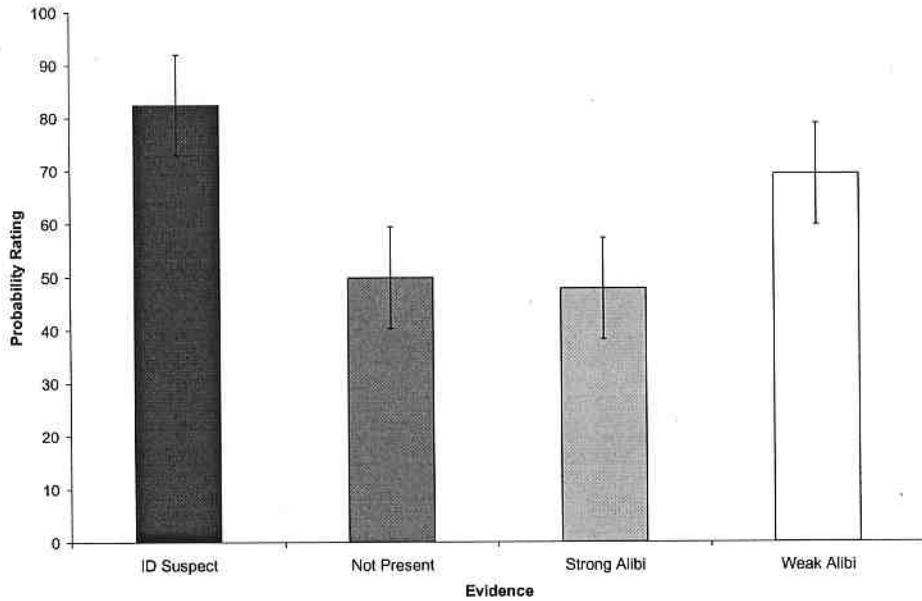
A number of planned comparisons were carried out to determine whether one form of evidence (eyewitness decision or alibi evidence) was more compelling than the other. (See Figure 7.) There was a significant difference between the ID Suspect condition and the Weak Alibi condition, $t(78) = 3.69$, $p < .001$, Cohen's $d = .83$, such that probability ratings were higher when investigators saw a witness who identified their suspect than when they saw an alibi witness who provided a weak alibi. Similarly, there was also a significant difference between the ID Suspect condition and the Strong Alibi condition, $t(78) = 7.84$, $p < .001$, Cohen's $d = 1.75$. There was a significant difference between the Not Present condition and the Weak Alibi condition as well, $t(78) = 3.72$, $p < .001$, Cohen's $d = .83$. Participants who saw a witness reject the lineup rated the probability that their suspect committed the crime lower than those who saw an alibi witness provide a weak alibi. However, there was not a significant difference between the Not Present condition and the Strong Alibi condition, $t(78) = .35$, $p > .05$, Cohen's $d = .08$.

Therefore, although the ID Suspect condition did lead to the highest probability

ratings, the overall pattern did not suggest that participant-investigators were more skeptical of the alibi evidence than of the eyewitness evidence.

First Questionnaire Arrest Decision. Participants were asked whether they would arrest the suspect. There was a significant main effect of ID Decision, $\chi^2(1) = 12.17, p < .001$, Cramer's $V = .39, p < .001$. When the witness identified the suspect, participants were more likely to arrest the culprit (22/40) than when the witness rejected the lineup (7/40). There was also a significant main effect of alibi, $\chi^2(1) = 4.94, p < .05$, Cramer's $V = .25, p < .05$. Those in the Weak Alibi condition were more likely to arrest the suspect (16/40) than those in the Strong Alibi condition (7/40). There were not significant

Figure 7.



Error bars = 95% CIs based on a pooled estimate of variability.

differences between the ID Suspect and Weak Alibi condition, $\chi^2(1) = 1.8, p > .1$.

First Questionnaire Arrest Evidence. If participants reported that they would not

arrest the suspect they were asked in an open-ended question to indicate what evidence they would need to arrest the suspect. One hundred and eight participants reported that they would not arrest the suspect at this point. Responses were subsequently coded into four categories: alibi information, eyewitness identification, physical evidence, and suspect confession. Frequency data were then computed. Overall, the most popular response was to obtain physical evidence (64/151 responses⁴), this included fingerprints, DNA, stolen goods, and the car used for the crime. The next most frequent response was additional alibi information (52/151). Following that was an eyewitness identification (27/151), and finally a suspect's confession (8/151). This pattern remained the same regardless of whether the data were broken down into participants who had received the alibi evidence versus those who had received the eyewitness decision (that is, regardless of the evidence condition, the most popular response was physical evidence followed by additional alibi information, an eyewitness identification, and a confession), $\chi^2(3) = 1.89$, $p > .05$.

Second Questionnaire Probability Suspect Committed Crime. A 2 (Order: Alibi First, Eyewitness First) x 2 (Alibi: Strong, Weak) x 2 (ID Decision: ID Suspect, Not Present) between subjects ANOVA was conducted on participants' estimates of the probability that the suspect was the culprit. There were significant main effects of both the Eyewitness Decision and the Alibi. Participants whose witness identified the suspect ($M = 72.29$, $SD = 27.44$) rated the probability that their suspect committed the crime significantly higher than those whose witness responded that the suspect was not present ($M = 32.92$, $SD = 26.57$), $F(1, 152) = 130.81$, $p < .01$, $\eta_p^2 = .46$. Participants who

⁴ Note, some participants responded with more than one type of additional information.

received the Strong Alibi ($M = 38.42$, $SD = 32.30$) rated the probability that their suspect committed the crime significantly lower than those who received the Weak Alibi ($M = 66.79$, $SD = 28.17$), $F(1, 152) = 67.92$, $p < .01$, $\eta_p^2 = .31$.

There was not a significant interaction between the ID Decision and the Alibi, $F(1, 152) < 1$. However, the other two-way interactions were significant. There was a significant interaction between Order and Alibi, $F(1, 152) = 9.83$, $p < .01$, $\eta_p^2 = .06$. Participants who received the Strong Alibi, rated the probability that their suspect committed the crime significantly lower when that alibi was presented after the eyewitness decision ($M = 30.71$, $SD = 27.19$), $t(78) = 2.19$, $p < .05$, Cohen's $d = .49$. (Participants who received the Strong Alibi first had a mean rating of 46.13 with a standard deviation of 35.38.) There was not a significant difference in the Weak Alibi condition, $t(78) = .98$, $p > .05$, Cohen's $d = .22$. Participants who received the Weak Alibi before the eyewitness decision ($M = 69.88$, $SD = 27.40$) rated the probability that their suspect had committed the crime similarly to those who received the Weak Alibi after the eyewitness decision ($M = 63.70$, $SD = 28.93$).

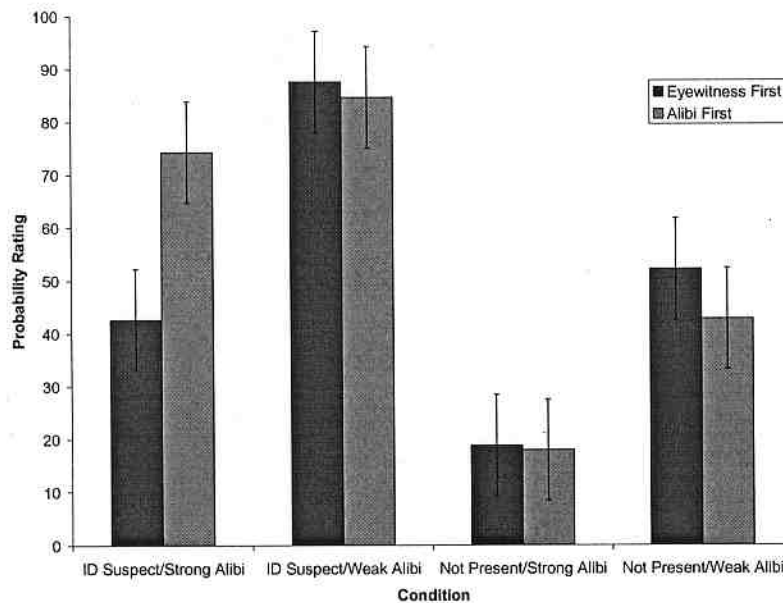
There was also a significant interaction between Order and Eyewitness Decision, $F(1, 152) = 8.03$, $p < .01$, $\eta_p^2 = .05$. Participants in the ID Suspect condition rated the probability that their suspect was the culprit higher if they received that identification decision after receiving the alibi ($M = 79.48$, $SD = 21.66$) than if they received it before the alibi ($M = 65.10$, $SD = 30.83$), $t(78) = 2.41$, $p < .05$, Cohen's $d = .54$. Participants in the Not Present condition who received that decision before the alibi ($M = 35.49$, $SD = 29.60$) rated the probability that their suspect had committed the crime similarly to those who received Not Present decision after the alibi ($M = 30.35$, $SD = 23.25$), $t(78) = .86$, p

> .05, Cohen's $d = .19$.

There was a marginally significant three-way interaction, $F(1, 152) = 3.60$, $MSE = 473.93$, $p = .06$, $\eta_p^2 = .02$. In the condition where there was a strong alibi but the witness identified the suspect, probability ratings were lower when the alibi came after the witness decision ($M = 42.6$, $SD = 27.44$) than when it came before the decision ($M = 74.3$, $SD = 22.72$), $t(38) = 3.97$, $p < .01$, Cohen's $d = 1.26$. Ratings of the suspect's guilt within the ID Suspect/Weak Alibi conditions, Not Present/Strong Alibi conditions, and Not Present/Weak Alibi conditions did not differ significantly based on the order in which the information was received, (all p 's > .2). (See Figure 8.)

Therefore, the order of presentation of evidence only had a significant effect in the ID Suspect/Strong Alibi condition. In general, when the witness identified the suspect ratings were higher than when the witness rejected the lineup and ratings were

Figure 8.



Error bars = 95% CIs based on a pooled estimate of variability.

also higher when there was a weak alibi than a strong alibi.

Probability Suspect Committed Crime Change Scores. A 2 (Order: Alibi First, Eyewitness First) x 2 (Alibi: Strong, Weak) x 2 (ID Decision: ID Suspect, Not Present) between subjects ANOVA was conducted on the change scores examining the difference between participants' initial ratings of their suspect's guilt on the First Questionnaire and their ratings on the Second Questionnaire. There were significant main effects of the alibi and the eyewitness decision, $F(1, 152) = 23.25, MSE = 393.22, p < .01, \eta_p^2 = .13$, and $F(1, 152) = 41.59, MSE = 393.22, p < .01$, partial $\eta^2 = .22$, respectively. In general, a Strong Alibi led to larger change scores than a Weak Alibi and rejecting the lineup led to larger change scores than identifying the suspect's culprit.

An independent samples t-test was carried out to examine whether the Weak Alibi would be used as exonerating information if received after the eyewitness rejected the lineup and as incriminating information if received after the eyewitness identified the suspect. Therefore, the change scores were examined for these conditions to determine whether the ratings of the suspect's guilt increased in the ID Suspect condition and decreased in the Not Present condition. The t-test was not significant, $t(38) = .16, p > .05$, Cohen's $d = .51$.

There was not a significant interaction between the ID Decision and the Alibi, $F(1, 152) < 1$. However, there was a significant interaction between Order and Alibi, $F(1, 152) = 36.89, p < .01, \eta_p^2 = .2$. When the alibi was presented first there was not a significant difference in change scores between the Strong ($M = -1.65, SD = 32.18$) and the Weak ($M = -5.58, SD = 27.37$) alibi conditions, $t(78) = .59, p > .05$, Cohen's $d = .13$. However, when the eyewitness information was presented first there was a significant

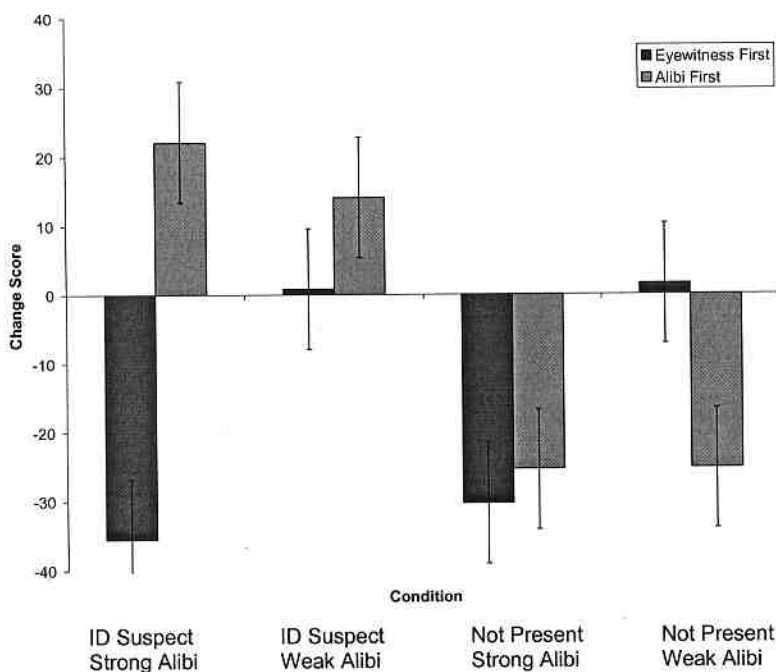
difference between the Strong ($M = -32.94$, $SD = 22.49$) and Weak ($M = 1.23$, $SD = 14.99$) alibi conditions, $t(78) = 8.00$, $p < .01$, Cohen's $d = 1.79$, therefore, the strong alibi had a larger effect on change scores than the weak alibi only when that alibi was presented after the eyewitness decision. In addition, within the Weak Alibi conditions there were no significant differences in change scores depending on the order, $t(78) = 1.38$, $p > .05$, Cohen's $d = .31$, therefore, the weak alibi did not affect participants ratings in either of the order conditions. In the Strong Alibi conditions, on the other hand, order did have a significant effect such that the change score was larger when the Strong Alibi was presented after the eyewitness decision, $t(78) = 5.04$, $p < .01$, Cohen's $d = 1.13$.

There was also a significant interaction between Order and Eyewitness Decision, $F(1, 152) = 54.78$, $p < .01$, $\eta_p^2 = .27$. When the eyewitness decision was presented first, there was not a significant difference between the ID Suspect ($M = -17.35$, $SD = 25.42$) and Not Present ($M = -14.36$, $SD = 26.04$) conditions on change scores, $t(78) = .52$, $p > .05$, Cohen's $d = .12$. However, when the alibi was presented first, there was a significant difference between the ID Suspect ($M = 18.10$, $SD = 20.96$) and Not Present ($M = -25.32$, $SD = 19.66$) conditions, $t(78) = 9.56$, $p < .01$, Cohen's $d = 2.14$. When an alibi was presented before the eyewitness decision, when the witness identified the suspect probability ratings increased, but they decreased when the witness rejected the lineup. However, when the eyewitness decision was presented before the alibi, probability ratings were lower in both conditions after the alibi. In addition, within the ID Suspect and Not Present conditions, order always had a significant effect, ID Suspect: $t(78) = 6.81$, $p < .05$, Cohen's $d = 1.52$ and Not Present: $t(78) = 2.13$, $p < .05$, Cohen's $d = .48$. There was not a significant three-way interaction, $F(1, 152) = 1.01$, $p > .30$, $\eta_p^2 = .007$.

(See Figure 9.)

Therefore, the weak alibi had very little effect on ratings scores, regardless of when it was presented. However, order did have a significant effect with the strong alibi such that the change score was larger when the Strong Alibi was presented after the eyewitness decision. In general, a Strong Alibi led to larger change scores than a Weak Alibi and rejecting the lineup led to larger change scores than identifying the suspect's culprit.

Figure 9.



Error bars = 95% CIs based on a pooled estimate of variability.

Second Questionnaire Evidence That Affected Probability Rating Decision. After re-rating the probability that their suspect had committed the crime, participants were asked an open-ended question regarding what evidence affected that decision. The responses were subsequently coded as alibi information, eyewitness decision, physical

description of culprit, and database information (which included prior record and car ownership). Overall, the most frequently reported information was the alibi (84/311⁵), followed closely by the eyewitness decision (83/311). The physical description of the culprit was third (79/311), followed by database information (65/311). Participants in the ID Suspect/Strong Alibi conditions were most likely to list the alibi information (24/84), then the eyewitness decision (21/84), followed by the physical description (20/84), and the database information (19/84). Participants in the ID Suspect/Weak Alibi condition were most likely to list the alibi information (26/75), then the database information (18/75), the eyewitness decision (16/75), and the physical description (15/75). Participants in the Not Present/Strong Alibi condition reported the eyewitness decision most often (24/72), followed by the alibi information (17/72), the physical description (16/72), and the database information (15/72). Finally, participants in the Not Present/Weak Alibi condition reported the physical description most often (28/88), then the eyewitness decision (22/88), then the database information (21/88), and finally, the alibi information (17/88).

Second Questionnaire Confidence in the Witness Decision. Participants were asked to rate on a scale from one to ten how credible they thought the eyewitness's decision was. The only significant main effect was the Eyewitness Decision, $F(1, 152) = 29.40, p < .01, \eta_p^2 = .16$. Participants in the ID Suspect condition ($M = 7.44, SD = 1.95$) were more confident in that decision than participants in the Not Present condition ($M = 5.94, SD = 1.78$).

There was a significant two-way interaction between Eyewitness Decision and

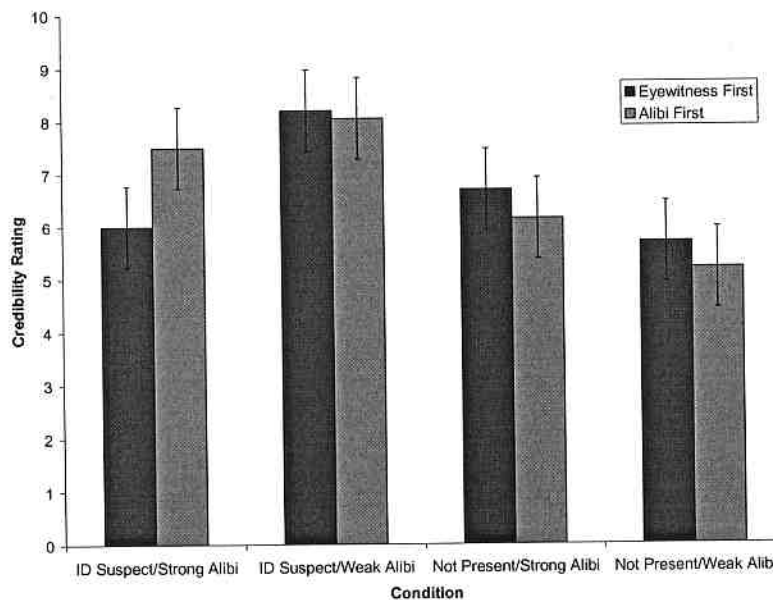
⁵ Participants could list as many sources of information as they wanted; therefore, what is reported is the total number of times the information was listed across participants.

Alibi, $F(1, 152) = 18.05, p < .01, \eta_p^2 = .11$. (See Figure 10.) In the Strong Alibi condition, participants were similarly confident in the witness's decision regardless of what that decision was, $t(78) = .76, p > .05$, Cohen's $d = .17$. In the Weak Alibi condition, participants whose witness identified the suspect were significantly more confident in the witness than those whose witness rejected the lineup, $t(78) = 7.36, p < .01$, Cohen's $d = 1.65$. In addition, when participants were in the ID Suspect condition, they were less confident in the witness's decision when there was a Strong Alibi as compared to a Weak Alibi, $t(78) = 3.36, p < .01$, Cohen's $d = .75$. However, in the Not Present condition, participants were less confident in the witness's decision when there was a Weak Alibi, $t(78) = 2.53, p < .05$, Cohen's $d = .56$.

There was also a significant interaction between Order and Eyewitness Decision, $F(1, 152) = 4.70, p < .05, \eta_p^2 = .03$. When the alibi was presented before the eyewitness decision, participants were more confident in the witness's decision when the witness identified the suspect ($M = 7.78, SD = 1.93$) than when the witness reported that the suspect was not present ($M = 5.68, SD = 1.67$), $t(78) = 5.21, p < .01$, Cohen's $d = 1.16$. However, when the alibi was presented after the eyewitness decision, participants were similarly confident in the decision, regardless of what the decision was, $t(78) = 2.12, p > .05$, Cohen's $d = .48$. Participants whose witness identified their suspect had a mean of 7.10 ($SD = 1.93$), and when the witness reported that the culprit was not present in the lineup the mean was 6.20 ($SD = 1.87$). There were no significant differences within the ID Suspect and Not Present conditions given the order in which they were received (all p 's $> .12$). There was not a significant three-way interaction on ratings of confidence in the witness's decision, $F(1, 152) = 2.36, p > .05, \eta_p^2 = .02$.

Therefore, in the Strong Alibi condition, participants were similarly confident in the witness's decision regardless of what that decision was but in the Weak Alibi condition, participants whose witness identified the suspect were significantly more confident in the witness than those whose witness rejected the lineup. Further, when the alibi was presented before the eyewitness decision, participants were more confident in the witness's decision when the witness identified the suspect than when the witness rejected the lineup. However, when the alibi was presented after the eyewitness decision, participants were similarly confident in the decision, regardless of what the decision was.

Figure 10.



Error bars = 95% CIs based on a pooled estimate of variability.

Second Questionnaire Perceived Credibility of the Witness. Participants were also asked how credible or trustworthy they found the witness himself to be on a scale from one to ten. There was a significant main effect of the Eyewitness Decision, $F(1,$

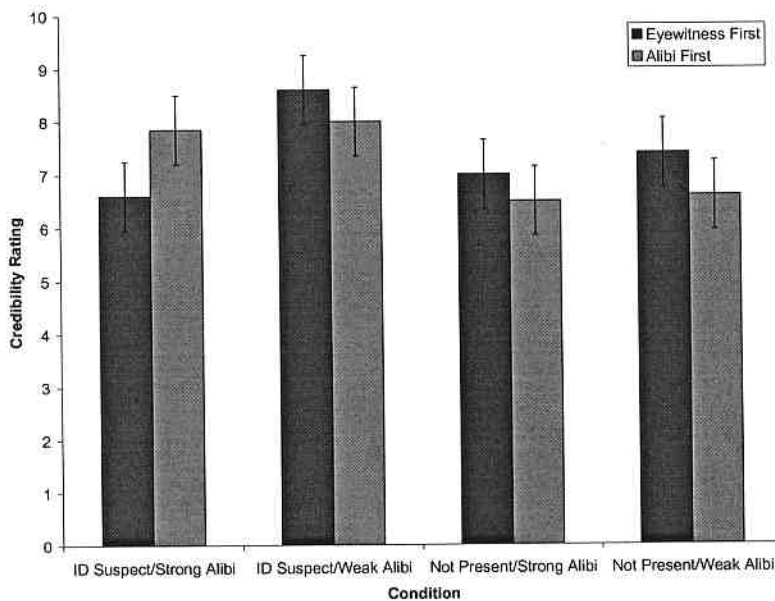
152) = 14.57, $p < .05$, $\eta_p^2 = .09$. Participants thought the witness was more credible when he identified their suspect ($M = 7.76$, $SD = 1.53$) than when he rejected the lineup ($M = 6.88$, $SD = 1.57$). There was also a significant main effect of the Alibi, $F(1, 152) = 8.12$, $p < .05$, $\eta_p^2 = .05$. Witnesses were rated as more credible when their decisions were accompanied by a Weak Alibi ($M = 7.65$, $SD = 1.56$) than a Strong Alibi ($M = 6.99$, $SD = 1.60$).

There was a significant interaction between Order and the Eyewitness Decision, $F(1, 152) = 4.40$, $p < .05$, $\eta_p^2 = .03$. (See Figure 11.) When the alibi was presented first, participants thought the witness was more credible when the witness identified the suspect ($M = 7.93$, $SD = 1.49$) than when the witness reported that the suspect was not present ($M = 6.55$, $SD = 1.57$), $t(78) = 4.02$, $p < .01$, Cohen's $d = .90$. However, when the alibi was presented after the eyewitness decision, participants thought the witness was equally credible, regardless of what the eyewitness's decision was, $t(78) = 1.15$, $p > .05$, Cohen's $d = .26$, (ID: $M = 7.60$, $SD = 1.58$, NP: $M = 7.20$, $SD = 1.52$). There were no significant differences within the ID Suspect and Not Present conditions given the order in which they were received (all p 's $> .07$).

There was also a significant interaction between Order and the Alibi information, $F(1, 152) = 5.34$, $p < .05$, $\eta_p^2 = .03$. When the alibi was presented first, participants thought the witness was equally credible regardless of the alibi strength, $t(78) = .33$, $p > .05$, Cohen's $d = .07$, (S: $M = 7.18$, $SD = 1.63$, W: $M = 7.30$, $SD = 1.73$). When the eyewitness decision was presented first, participants thought the witness was more credible when the decision was followed by a Weak Alibi ($M = 8.00$, $SD = 1.30$) rather than a Strong Alibi ($M = 6.80$, $SD = 1.57$), $t(78) = 3.72$, $p < .01$, Cohen's $d = .83$. In

addition, within the Weak Alibi conditions, participants thought the witness was more credible when the eyewitness decision came before the alibi information (EW1: $M = 8.00$, $SD = 1.30$, A1: $M = 7.30$, $SD = 1.73$), $t(78) = 2.05$, $p < .05$, Cohen's $d = .46$. But credibility ratings did not differ based on order in the Strong Alibi conditions (EW1: $M = 7.18$, $SD = 1.63$, A1: $M = 6.80$, $SD = 1.57$), $t(78) = 1.05$, $p > .05$, Cohen's $d = .24$. None of the other interactions were significant (all p 's $> .07$).

Figure 11.



Error bars = 95% CIs based on a pooled estimate of variability.

Therefore, similar to the confidence in the witness's decision measure, in the Strong Alibi condition, participants thought the witness was equally credible regardless of what that decision was but in the Weak Alibi condition, participants whose witness identified the suspect were that that witness was significantly more credible than when the witness rejected the lineup. Further, when the alibi was presented before the

eyewitness decision, participants thought the witness was more credible when the witness identified the suspect than when the witness rejected the lineup. However, when the alibi was presented after the eyewitness decision, participants thought the witness was equally credible regardless of the type of decision the witness made.

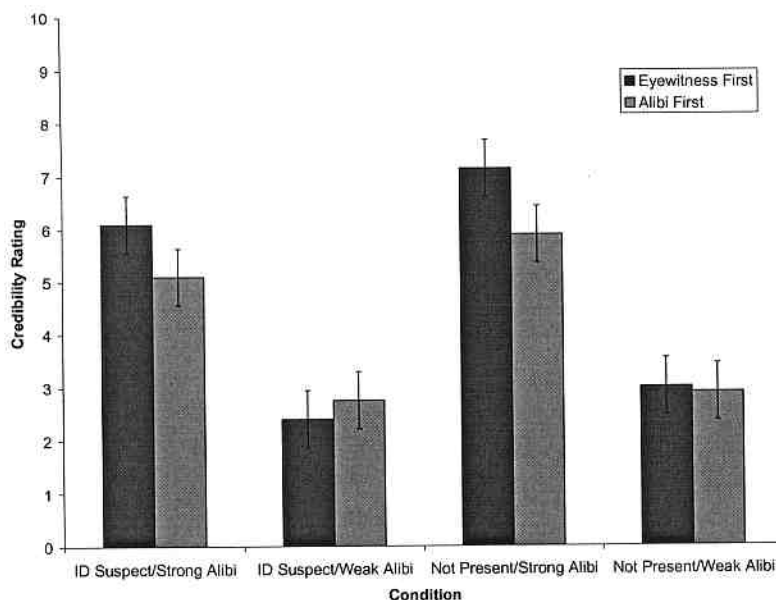
Second Questionnaire Perceived Credibility of the Alibi. Participants rated how credible they thought the alibi was on a scale from one to ten. There was a significant main effect of Alibi strength, $F(1, 152) = 145.74, p < .01, \eta_p^2 = .49$. Participants in the Strong Alibi condition ($M = 6.07, SD = 2.07$) believed that alibi to be more credible than participants in the Weak Alibi condition ($M = 2.76, SD = 1.43$). There was also a significant main effect of Eyewitness Decision, $F(1, 152) = 5.65, p < .05, \eta_p^2 = .04$. Participants in the ID Suspect condition ($M = 4.09, SD = 2.34$) believed that alibi to be less credible than participants in the Not Present condition ($M = 4.74, SD = 2.48$).

There was a significant interaction between the Order in which the alibi was presented and the Alibi Strength, $F(1, 152) = 5.23, p < .05, \eta_p^2 = .03$. (See Figure 12.) The Strong Alibi was always rated as more credible than the Weak Alibi regardless of whether the alibi was presented before or after the eyewitness decision, $t(78) = 7.00, p < .05$, Cohen's $d = 1.98$ and $t(78) = 9.85, p < .05$, Cohen's $d = 1.57$, respectively. When participants were in the Strong Alibi condition, they thought the alibi was more credible when it was presented after the Eyewitness Decision, $t(78) = 2.51, p < .05$, Cohen's $d = .56$. There was not a significant difference in credibility ratings of the alibi in the Weak condition, $t(78) = .39, p > .05$, Cohen's $d = .09$. No other interactions were significant (all p 's $> .3$).

Second Questionnaire Perceived Credibility of the Alibi Provider. Participants

were asked how credible or trustworthy they found the alibi provider to be. There was a

Figure 12.



Error bars = 95% CIs based on a pooled estimate of variability.

significant main effect of Alibi Strength, $F(1, 152) = 87.53, p < .05, \eta_p^2 = .37$.

Participants in the Strong Alibi condition ($M = 5.80, SD = 1.93$) believed that alibi provider was more credible than participants in the Weak Alibi condition ($M = 3.23, SD = 1.65$). There was also a significant main effect of Order, $F(1, 152) = 5.58, p < .05, \eta_p^2 = .04$. Participants in the Alibi First condition ($M = 4.19, SD = 1.94$) believed that alibi provider was less credible than participants in the Eyewitness First condition ($M = 4.84, SD = 2.40$).

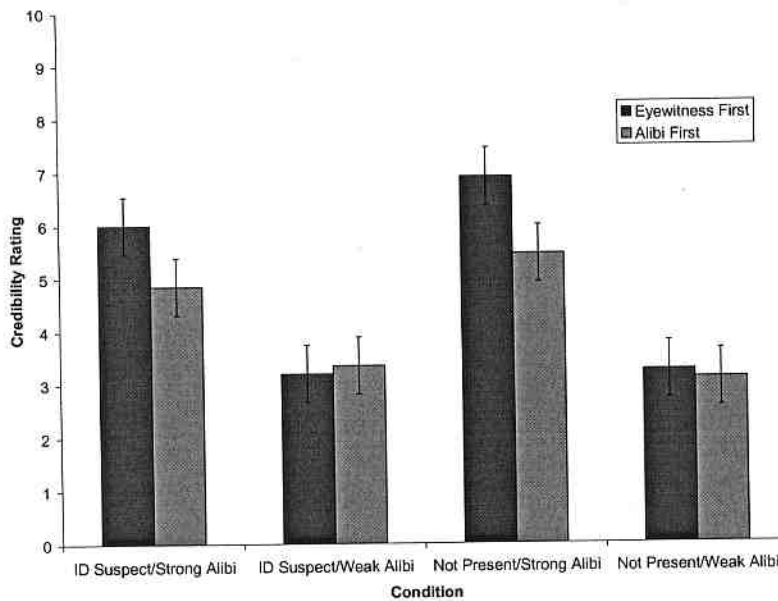
There was a significant interaction between the Order in which the alibi was presented and the Alibi Strength, $F(1, 152) = 5.58, p < .05, \eta_p^2 = .04$. (See Figure 13.)

The alibi provider was always rated as more credible when the alibi was Strong than

when it was Weak, regardless of whether the alibi was presented before or after the eyewitness decision, $t(78) = 5.08, p < .05$, Cohen's $d = 1.14$ and $t(78) = 8.07, p < .05$, Cohen's $d = 1.80$, respectively. When participants were in the Strong Alibi condition, they thought the alibi provider was more credible when the alibi was presented after the Eyewitness Decision, $t(78) = 3.19, p < .01$, Cohen's $d = .71$. There was not a significant difference in credibility ratings of the alibi provider in the Weak condition, $t(58) = .00, p > .05$, Cohen's $d = .0$. No other interactions were significant, (all p 's $> .13$).

Second Questionnaire Repeated Measures of Alibi Provider Credibility and Eyewitness Credibility. A repeated measures ANOVA was conducted to compare the credibility ratings of the Alibi Provider and the Eyewitness. There was a significant within-subjects main effect of both Alibi $F(1, 152) = 83.15, p < .01, \eta_p^2 = .34$ and Eyewitness Decision, $F(1, 152) = 11.66, p < .01, \eta_p^2 = .07$.

Figure 13.



Error bars = 95% CIs based on a pooled estimate of variability.

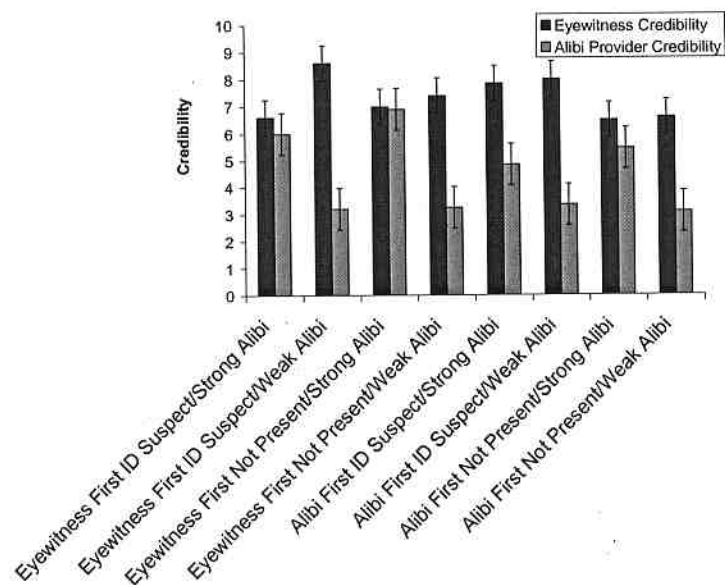
There was also a significant between-subjects interaction of Alibi information and Eyewitness Decision, $F(1, 152) = 5.25, p < .05, \eta_p^2 = .03$. In addition, there was also a significant within-subjects interaction between Order and Alibi, $F(1, 152) = 11.19, p < .01, \eta_p^2 = .06$. When the eyewitness decision was presented first and there was a Strong Alibi, there was not a significant difference in credibility ratings between the alibi provider and the eyewitness, $t(39) = .93, p > .05$, Cohen's $d = .21$. However, in all of the other conditions the witness was always rated as more credible than the alibi provider (all p 's $< .01$). (See Figure 14.)

Second Questionnaire Arrest Decision. There were significant main effects.

There was a significant main effect of ID Decision, such that when the witness identified the suspect, participants were more likely to arrest the suspect, $\chi^2(1) = 41.45, p < .01$, Cramer's $V = .51, p = .01$. There was also a main effect of Alibi, participants were more willing to arrest in the Weak Alibi condition than in the Strong Alibi condition, $\chi^2(1) = 12.02, p < .01$, Cramer's $V = .27, p < .01$. There was no significant main effect of Order, $\chi^2(1) = .03, p > .05$, Cramer's $V = .01, p > .05$.

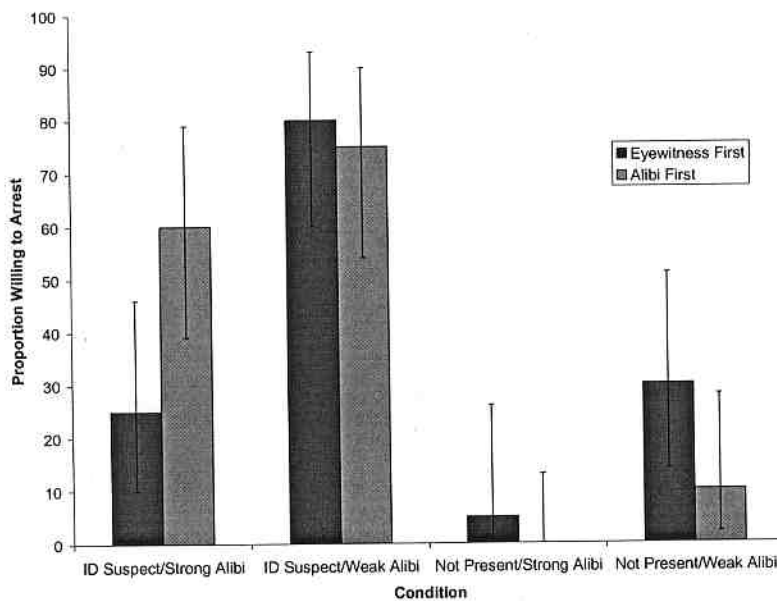
There was also a marginally significant two-way interaction between Order and Eyewitness Decision, $G^2(1) = 3.68, p = .055$. In the ID Suspect/Strong Alibi condition there was a significant difference in investigators' arrest decisions, $\chi^2(1) = 5.01, p < .05$. However there were no other significant differences in arrest decisions in any of the other conditions (all p 's $> .20$). No other two-way interactions were significant (all p 's $> .1$). A log-Linear analysis revealed a marginally significant three-way interaction, $G^2(4) = 8.86, p = .06$. (See Figure 15.)

Figure 14.



Error Bars = 95% confidence intervals of the cell means.

Figure 15.



Error Bars = 95% confidence intervals of the cell means.

Second Questionnaire Arrest Evidence. If participants reported that they would not arrest the suspect ($N = 103$) they were again asked in an open-ended question to indicate what evidence they would need to arrest the suspect. Responses were subsequently coded into four categories: alibi information, eyewitness identification, physical evidence, and suspect confession. Frequency data were then computed. Overall, the most popular response was again to obtain physical evidence (62/135 responses), this included fingerprints, DNA, stolen goods, and the car used for the crime. The next most frequent response was additional alibi information indicating that the alibi was false (37/135). Following that was an eyewitness identification (32/135), and finally a suspect's confession (4/135). This pattern was consistent across all the conditions (all p 's $> .21$).

Second Questionnaire Ratings of Evidence. Participants were asked to comparatively rate the importance of the database information, alibi information, and eyewitness information out of a scale of 100. (Therefore, they were asked to indicate the importance of each piece of information by dividing 100% by the three categories.) A repeated measures ANOVA was conducted to determine whether there were any significant differences. There were no significant between-subjects effects on the measure (all p 's $> .32$). There were significant within-subjects effects. The ratings of the different categories were significantly different depending on the Alibi that the investigators received, $F(2, 304) = 18.60, p < .05, \eta_p^2 = .11$. When participants received a Strong Alibi, they rated the alibi information as more important than either the database information, $t(59) = 3.82, p < .01$, Cohen's $d = .79$, or the eyewitness decision, $t(59) = 3.66, p < .01$, Cohen's $d = .72$. Alternatively, when participants received a Weak Alibi,

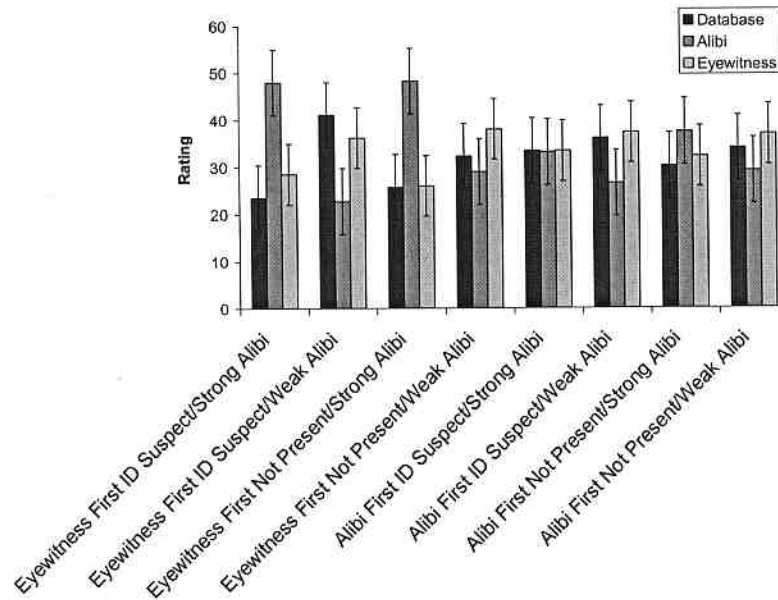
they rated the alibi information as less important than either the database information, $t(59) = 3.18, p < .01$, Cohen's $d = .60$, or the eyewitness decision, $t(59) = 3.77, p < .01$, Cohen's $d = .70$.

There was also an interaction between Order and the Alibi Strength, $F(2, 304) = 4.68, p < .05, \eta_p^2 = .03$. (See Figure 16.) When a Strong Alibi was presented before the eyewitness decision there were no differences in ratings of the various categories (all p 's $> .41$). However, when the Strong Alibi was presented after the eyewitness decision, the alibi ($M = 48.13, SD = 20.09$) was rated as more important than both the database ($M = 24.63, SD = 15.08$) and the eyewitness decision ($M = 27.25, SD = 13.01$), $t(39) = 4.50, p < .01$, Cohen's $d = 1.32$ and $t(39) = 4.36, p < .01$, Cohen's $d = 1.23$, respectively. There was not a significant difference between the database information and the eyewitness decision in this condition, $t(39) = .84, p > .05$, Cohen's $d = .19$.

When a Weak Alibi was presented before the eyewitness decision the alibi ($M = 27.89, SD = 12.52$) was rated as less important than both the eyewitness decision ($M = 37.07, SD = 13.10$) and the database ($M = 35.04, SD = 13.31$), $t(39) = 2.64, p < .05$, Cohen's $d = .72$ and $t(39) = 2.03, p < .05$, Cohen's $d = .55$, respectively. There was not a significant difference between the database information and the eyewitness decision in this condition, $t(39) = .84, p > .05$, Cohen's $d = .15$. When a Weak Alibi was presented after the eyewitness decision the same pattern occurred. The Weak Alibi ($M = 25.85, SD = 14.26$) was rated as less important than both the eyewitness decision ($M = 37.20, SD = 18.29$) and the database ($M = 36.70, SD = 19.02$), $t(39) = 2.68, p < .05$, Cohen's $d = .69$ and $t(39) = 2.44, p < .05$, Cohen's $d = .65$, respectively. There was not a significant difference between the database information and the eyewitness decision in this

condition, $t(39) = .09, p > .05$, Cohen's $d = .03$. No other interactions or main effects were significant (all p 's $> .08$).

Figure 16.



Error Bars = 95% confidence intervals of the cell means.

Discussion

One question of interest in Experiment 3 was whether one type of evidence (alibi or eyewitness) would be inherently more influential than the other for investigators. Given that alibi providers might be more likely to lie than eyewitnesses, it was hypothesized that investigators might be less influenced by the alibi information than by the eyewitness information. Overall this did not appear to be the case. On the first questionnaire when investigators had only one form of evidence to evaluate, having a witness who reported that the culprit was not in the lineup was not a more powerful source of influence than receiving a strong alibi (as evidenced in similar probability

ratings regarding the suspect's guilt). Having an eyewitness identify their suspect did lead to higher probability ratings than receiving a weak alibi, but in general, the trend was the same in both evidence conditions such that incriminating information led to relatively similar high probability ratings, regardless of the source of that information. In addition, similar results were found when we asked investigators whether they would arrest their suspect or not on the first questionnaire. Investigators were equally likely to arrest the suspect when they had received a strong alibi or a witness who rejected the lineup, but were slightly more (though not significantly so) likely to arrest when they had a witness who identified their suspect than when they had a weak alibi. Nevertheless, even though the eyewitness evidence did not tend to be more influential on investigators than the alibi evidence, in general, the investigators did rate the witness as more credible than the alibi provider.

Also of interest was whether the weak alibi might serve as exonerating information after the eyewitness rejected the lineup but as incriminating information after the witness identified the investigator's suspect. However, this did not appear to be the case as the weak alibi had very little influence on the probability ratings after either of the eyewitness identification conditions. This is similar to the findings of Lindsay et al. (1986) who found that jurors' verdicts were not affected by alibi evidence when it was presented by someone who had a close relationship to the defendant.

Overall, the strong alibi was rated as weaker than it was during pilot testing ($M = 6.07$ vs. $M = 7.83$). When the alibis were pilot tested, the participants were not given any other information regarding the case; they were only given the alibi information. Therefore, it is likely the addition of the database information and eyewitness information

that led to the decreased credibility ratings here. This provides support for the conclusion that even quite strong alibis (that contain physical evidence and multiple witnesses) can be viewed as only somewhat believable by those who have other information regarding the case.

Of main interest was whether the alibi evidence and eyewitness evidence would have differential effects depending on the order in which they were presented. If there were no order effects occurring, then probability ratings should have been the same across conditions regardless of the order in which the information was received. Although this was generally true (that is, in three of the four conditions probability ratings were similar regardless of the order in which the information was received suggesting an additive effect), a recency effect was observed in the ID Suspect/Strong Alibi conditions. When the witness identified the suspect after the investigators had received the strong alibi, probability ratings were higher than when the witness identified the suspect before receiving the strong alibi. Similar results were found when looking at investigators' willingness to arrest the suspect. In the ID Suspect/Strong Alibi conditions there was a significant difference in arrest decisions based on the order in which the investigators received the information. When participants received the strong alibi after the eyewitness decision they were far less likely to arrest the suspect than when they received the strong alibi before the eyewitness decision. Therefore, similar to Experiment 2 and to the predictions made by Hogarth and Einhorn (1992), a recency effect only occurred in the condition where the information was highly contradictory, otherwise the evidence had an additive effect.

The order effects extended to participants' ratings of the credibility of the witness

such that the witness was deemed more credible when the witness identified the suspect after the participants had received alibi information. Further, participants thought that the decision to identify the suspect (versus reject the lineup) was more credible when that decision came after the alibi information. The order effects also extended to credibility ratings of the alibi provider. When there was a strong alibi, the alibi provider was rated as more credible when that alibi was presented after the eyewitness decision. In addition, the strong alibi itself was deemed more credible when it was presented after the eyewitness decision rather than before.

Participants were asked to comparatively rate the three main sources of evidence, the initial database that contained information about the suspect's physical description and prior record, the alibi information, and the eyewitness's decision. This measure attempted to ascertain how the participants believed they were affected by the information that they received. Order also had an effect here such that when the strong alibi was presented after the eyewitness decision the alibi was rated as more important than both the database and eyewitness decision (which did not differ). But when it was presented before the eyewitness decision there were no differences in ratings of the three evidence categories. In the weak alibi condition, regardless of the order in which the alibi was received, it was always rated as less important than the database and eyewitness decision.

Therefore, the results of Experiment 3 suggest that the order in which simulated-investigators receive evidence can affect their beliefs in their suspect's guilt, their willingness to arrest the suspect, their beliefs regarding the credibility of the eyewitness and the alibi provider, and their beliefs regarding the importance of various types of

evidence. Consequently, given that real-world police investigators likely routinely encounter contradictory evidence when investigating a case, this suggests that the order in which they receive this information could affect how they pursue such an investigation.

General Discussion

Impact of the Eyewitness

Previous research using this paradigm (Dahl et al., 2006) found that eyewitness decisions over-influenced role-playing police investigators, regardless of the decision that the witness made, or the level of confidence that the investigator had in his/her suspect prior to the eyewitness decision. It was hypothesized that a recency effect might be responsible for the vast influence of the eyewitness decision because the eyewitness always made her identification at the very end of the experimental paradigm. However, Experiments 1 through 3 of the current research demonstrated that eyewitness decisions continued to have an enormous impact on participant-investigators largely independent of when they occurred in the procedure.

Participant-investigators were always highly influenced by an eyewitness who identified their suspect, particularly in the first two experiments. Recency effects were only found in the ID Suspect condition in Experiment 3 when there was contradictory evidence in the form of a Strong Alibi. Experiment 2 found that a recency effect occurred in the Not Present condition such that if the witness rejected the lineup after going through the database then the investigator was less confident in his/her choice of suspect and less likely to arrest that suspect. Again, much like the ID Suspect/Strong Alibi condition in Experiment 3, the recency effects found in Experiment 2 occurred in

the condition where the two forms of evidence (the eyewitness decision and the database) provided contradictory information regarding the likely guilt of the suspect. When the information was not highly contradictory it had an additive effect on participants' beliefs.

Therefore, the impact of the various eyewitness decisions on participant-investigators cannot simply be explained away as being due to a recency effect. Numerous experiments using this paradigm (assessing many different variables) have now consistently revealed that eyewitness identification decisions are extremely influential for participant-investigators.

Order Effects

In Experiment 1, the paradigm shifted from being a step-by-step procedure (as in previous studies) to being an end-of-sequence procedure such that participants were only asked to evaluate the evidence at the very end of the procedure. There was no evidence of recency effects (or any order effects) occurring using that procedure. However, Experiments 2 and 3 (that reverted back to using the step-by-step procedure) did find evidence of order effects such that a recency effect occurred whenever the two forms of evidence were most contradictory.

In the belief updating model proposed by Hogarth and Einhorn (1992) recency effects are predicted whenever the information is contradictory due to the adjustment of initial anchors and more weight being given to more recent pieces of evidence. Therefore, in the current studies if participants finish the database and set their initial anchor at around 78% probability that the suspect committed the crime (as was found in the Dahl et al., 2006, studies, and on the first questionnaire of Experiment 2 here) then each additional piece of information will change that anchor. As such, in the ID

Suspect/Strong Alibi condition, participants presumably had an initial anchor of around 78% (following completion of the database) which was then altered after they received additional information (the ID or the alibi). Looking at the results of the first questionnaire, in the ID Suspect condition, their probability scores were at 82% (at this point the information is consistent, hence no recency effect, and possibly a ceiling effect is occurring here as well). However, in the Strong Alibi condition, they rated the probability that their suspect was guilty at roughly 47% (this evidence was contradictory to the evidence they had received in the database suggesting the suspect was the culprit). Participants then received additional evidence that was contradictory to the evidence they had just received, therefore, they again had to adjust their most recent anchor. In the ID First condition they were presented with the Strong Alibi and their ratings plummeted from 82% to 42% and in the Alibi First condition they were presented with the ID decision and their ratings increased from 47% to 74%.

The Not Present/Weak Alibi conditions might also be considered to contain contradictory information (the witness suggests the suspect did not do, it but the alibi is weak suggesting that the suspect could have committed the crime), and as such, one might expect recency effects to occur in those conditions as well. However, as reported earlier, the weak alibi did not appear to have much of an effect on investigators at all, regardless of the order in which it was presented, or the type of eyewitness evidence it was presented with. Therefore, it appears that the participants were not really affected by the weak alibi, and therefore did not consider it contradictory information to the Not Present condition, resulting in a lack of significant order effects in this condition.

It appears that when using a step-by-step processing task with contradictory

information, decision-makers are vulnerable to order effects regardless of the role that they are playing in the criminal proceedings. Jury research that utilized a step-by-step procedure found similar recency effects, such that information presented later in the trial was given more weight than contradictory evidence presented earlier in the proceedings. In fact, Furnham (1986), Carlson and Russo (2001), and Kassin et al. (1990) all found evidence of a recency effect when using step-by-step processing with mock jurors.

Experiments 2 and 3 provide support for the adjustment model proposed by Hogarth and Einhorn (1992). However, the theory behind this belief adjustment with contradictory information is not clear. That is, Hogarth and Einhorn provide no clear psychological theory to explain why people are affected by contradictory information in this way. For example, why wouldn't the contradictory alibi evidence make the memory of the eyewitness decision more salient and thus lead participants to reject the alibi evidence resulting in a confirmation bias (e.g., Nickerson, 1998)? This is of particular interest because of the concerns regarding tunnel vision within police investigations (e.g., Scullion, 2004). The current research suggests that with highly contradictory information and repeated belief updating, tunnel vision (or a confirmation bias) would not likely occur. However, the current research also only presented participant-investigators with two forms of evidence (alibi and eyewitness), and real-world investigators likely have to evaluate many different forms of evidence. If most of the evidence confirms investigators' beliefs regarding the suspect's guilt, perhaps they would be more susceptible to a confirmation bias. Hogarth and Einhorn suggest that with multiple forms of evidence the initial anchor, the valence of the evidence, and the strength of the evidence will all affect the likelihood of obtaining order effects.

Therefore, although the current research found clear support for the occurrence of recency effects in the contradictory evidence conditions, the psychological mechanisms behind these effects are not obvious.

Impact of Non-Contradictory Evidence

Order effects were found when the two forms of evidence were most contradictory. However, in conditions where the information was not contradictory (that is, the two forms of evidence were: both incriminating; both exonerating; or more ambiguous, as in the Weak Alibi/Not Present condition) the evidence had an additive effect (e.g., Anderson, 1962) on investigators' decision-making. When both pieces of evidence were potentially incriminating (the ID Suspect/Database and the ID Suspect/Weak Alibi conditions in Experiments 2 and 3, respectively) ratings of the suspect's likely guilt were highest, and participants in these conditions were the most willing to arrest their suspect. This was the case regardless of the order in which the incriminating evidence was presented. When both pieces of evidence were exonerating (the Not Present/Strong Alibi condition in Experiment 3) probability ratings were the lowest and participants in these conditions were the least likely to arrest their suspect, again, regardless of the order in which this information was presented. In the more ambiguous condition (the Not Present/Weak Alibi condition in Experiment 3), probability ratings fell in between those found in the highly incriminating and highly exonerating conditions.

Hogarth and Einhorn (1992) proposed that order effects would not occur with consistent information and there has also been evidence in the realm of jury research of this type of additive decision rule. For example, Pickel (1993) found that an additive

decision rule best described jurors' ratings of a defendant's likely guilt. Pickel found that the additive rule was found to be superior to both an averaging rule and a Bayesian rule when examining mock-jurors.

Impact of the Alibi Witness

Only one study (Olson & Wells, 2004) has previously examined the influence of alibi witnesses on participants in the role of police investigators. However, the current research differs from that study in a number of ways. The Olson and Wells study had each participant investigator read an initial crime report and then rate three suspects' alibis. The alibi evidence was the only form of evidence in the study and it was presented quite briefly and in written format. The current study extends this research by basing the strong and weak alibi on those that were rated most believable and least believable in the Olson and Wells study, and comparing them to eyewitness identification evidence. The alibis used in the current study were presented to the participant-investigators in the form of video-taped interviews with the alibi provider, thus providing significantly more contextual information to the investigators than in the previous study. In addition, the alibis were modified to have more relevance to the participant-investigators, by situating the alibi in a well-known town near the city where the experiment took place. Further, the investigators in this study were more involved in the procedure, taking part in a simulated investigation, thereby encouraging the participants to have a more vested interest in the outcome of the case. As such, this research adds considerably to the currently available alibi literature examining simulated-investigators.

Although researchers (e.g., Burke & Turtle, 2003) have suggested that police might approach alibis with more skepticism than they would other evidence, this was not

the case with the participant-investigators in Experiment 3. Similar to what Olson (2004) found, there was no indication that participants were viewing the alibis with extreme skepticism. However, on the whole, participants did rate the alibi provider's credibility lower than the eyewitness's credibility, nevertheless, these lower credibility ratings did not translate into the alibis having less impact on the investigator than the eyewitness decision.

Research examining the impact of alibis on jurors found mixed results. McAllister and Bregman (1989) found that conviction rates were lower when an alibi witness provided an alibi for the defendant, even if an eyewitness identified the defendant as the culprit. We found this to be the case only when the strong alibi was presented after the eyewitness decision (McAllister and Bregman counterbalanced the order in which their information was presented to their participants and did not examine order effects). This is contradictory to Sanders (1984) who found that the eyewitness's identification of the defendant always had more of an impact on convictions than an alibi witness. Again, the current research found that the eyewitness's identification of the suspect only had a stronger impact than the strong alibi when that decision took place after the investigator received the alibi. Lindsay, et al. (1986) found that when an eyewitness identified the suspect only a strong alibi impacted verdicts. This was the case in the Experiment 3 as well; the weak alibi barely affected ratings of the suspect's guilt in the ID Suspect conditions.

Consequently, the current research provides support for the finding that weak alibis are not likely to affect people's assessments of the suspect's guilt when the eyewitness has identified the suspect. However, this research adds considerably to the

literature when looking at the impact of a strong alibi by suggesting that the strong alibi will have a differential impact on decision-makers depending upon the order in which it is received compared to the eyewitness identification.

Further, this research also extends current alibi research by examining the influence of the alibi on decision-makers when the eyewitness does not identify the suspect. All previous alibi studies have only examined what happens when the witness does identify the suspect. Although this makes sense for jury research (because an eyewitness is not likely to be asked to testify if he rejected the lineup and therefore did not identify the defendant), police investigators likely do encounter witnesses who reject the lineup and have to evaluate alibi evidence in light of that witness non-identification. The current research found that the strong alibi was more influential than the weak alibi when the witness reported that the culprit was not present, regardless of the order in which that information was received, and that investigators were least confident in their choice of suspect when the witness rejected the lineup and there was a strong alibi available.

Investigator Investment

The paradigm used with this research was meant to simulate the investigative experiences of a police officer on a much smaller scale. Of particular interest was trying to simulate the personal investment that police investigators might feel while investigating a case. Police investigators likely feel personally involved in the case because they want to ensure that the culprit is found, punished for the crime, and prevented from committing further offenses. As such, once they believe that they have found a likely suspect for the crime, information that confirms their belief is likely to lead

them to believe that they made the correct decision (potentially a confirmation bias), whereas information that contradicts their belief might lead them to question their decision. That is, each new piece of evidence is likely to impact the investigator's belief in the accuracy of his or her own decision regarding the guilt of the suspect. Police investigators differ from jurors in this way, because although jurors should be invested in ensuring that justice is carried out, they are unlikely to feel the personal responsibility regarding the accuracy of their decision that is experienced by police investigators.

Support for the personal involvement of the undergraduate participants in the current research comes not only from the way that their decisions were affected by the information that they received in the three experiments, but also from anecdotal evidence. Often after participants were debriefed they would ask whether they "got it right?" This was particularly likely to occur in cases where the evidence was contradictory, or exculpatory regarding the suspect's guilt. Participants in these conditions would ask who the actual culprit was or whether they had made the correct decision. Therefore, it appears that the participants did get quite involved in the simulated investigation and were interpreting the information in regards to their own decision-making and the likelihood that they had made a correct or incorrect decision.

Investigator Expertise

One significant difference between the participant-investigators and real-world police investigators is their experience with both the investigative process and the various forms of evidence. One might predict that expertise with investigations and evidence would lead investigators to be less biased in their decision-making and therefore, less susceptible to order effects. However, other similar decision-making research suggests

that this might not be the case.

For example, research examining medical doctors has found that experience does not prevent physicians from being susceptible to recency effects (e.g., Cunningham, Turnbull, Regehr, Marriott, & Norman, 1997; Curly, Young, Kingry, & Yates, 1988; Wallsten, 1981). Chapman, Bergus, and Elstein (1996) examined the potential for order effects in medical diagnosis. Practicing family physicians were presented with a case regarding a patient who was in remission for lung cancer. Half of the physicians received a scenario where the history of lung cancer was presented first while the other half received a scenario where the history was presented last. They also received information regarding a CT scan and a test to determine whether a disorder other than re-occurring cancer was likely. Order effects were found such that physicians who learned about the history of lung cancer at the end of the scenario were more likely to diagnose the patient with cancer than those who received the history at the beginning. There was no significant effect of physician experience on these order effects. That is, more experienced doctors were just as susceptible to the recency effect as less experienced doctors.

In addition, research examining real-world police officers has also shown that experience does not necessarily lead to better decision-making or better performance. For example, research in the area of deception detection has found that highly trained law enforcement often perform no better than undergraduate students (e.g., DePaulo & Pfeifer, 1986, Kohnken, 1987; Kraut & Poe, 1980). For example, Ekman and O'Sullivan (1991) showed participants videos that depicted 10 people either lying or telling the truth. Participants included Secret Service agents, custom agents, FBI agents, police, judges,

undergraduate students, and working adults. They found that on the whole, law-enforcement personnel performed no better than untrained undergraduates and working adults (although Secret Service agents did perform marginally better than the other groups). Therefore, presumed expertise does not always equal better performance. In addition, research in the area of criminal profiling has found similar results, such that professional profilers and police investigators who had received training with profiling techniques were no more accurate than untrained undergraduate students when creating a profile for a homicide case (e.g., Pinnizzotto & Finkel, 1990). Indeed, some research has found that experience can actually hamper performance when creating profiles (e.g., Kocsis, Hayes, & Irwin, 2002).

Therefore, given that expertise does not lead to better performance with police investigators on tasks that they are trained to do (as with detecting deception), and expertise also does not prevent medical doctors from being affected by presentation order when making medical diagnoses, it seems quite possible that real police-investigators would be susceptible to the order effects found in the current studies. In fact, it seems quite likely that expertise with investigative procedures and different forms of evidence would not inoculate police against basic decision-making biases such as recency effects. Nevertheless, further research is needed that evaluates real police investigators to determine whether this is the case.

Step-by-Step Versus End-of-Sequence Processing in Real-World Police Investigations

The original paradigm used in the Dahl et al. (2006) study, as well as the paradigms used in Experiments 2 and 3 of the current research used a step-by-step decision-making process that encouraged investigators to re-evaluate their beliefs after

each form of evidence. However, in the real world it is unlikely that police investigators would be prompted to evaluate their beliefs in this way. Rather, it is more likely that an end-of-sequence process is the norm, such that investigators only make an official decision regarding the suspect's guilt when the time comes to arrest the suspect or to pursue other evidence or other suspects. Nevertheless, even with end-of-sequence decision-making, people are often still vulnerable to order effects. For example, research in medical decision-making (Cunnington, Turnbull, Regehr, Marriott, & Norman, 1997) and juror decision-making (e.g., Kassin, Reddy, & Tulloch, 1990; Pennington, D. C., 1982; Moore and Gump, 1995) has found primacy effects using an end-of-sequence procedure.

Theorists also suggest that even though a task might be inherently end-of-sequence in design, people might still use step-by-step processing if the information that they are encountering is particularly complex. Therefore, a task that allows for end-of-sequence processing could result in either end-of-sequence processing or step-by-step processing because there is no mechanism to stop decision makers from spontaneously making step-by-step judgment revisions before being asked for the end-of-sequence decision (Hogarth & Einhorn, 1992). Therefore, given the often complex nature of criminal investigations, it is likely that investigators might be using more of a step-by-step process such that they are updating their beliefs regarding the likely guilt of their suspect with each new piece of evidence. If it is the case that people are spontaneously making step-by-step judgments in an end-of-sequence task, then one would expect to see the same types of recency effects as those found with step-by-step tasks (such as in Experiments 2 and 3). This was found to be the case in some medical diagnosis research

(e.g., Chapman, Bergus, & Elstein 1996) and jury verdict research (e.g., Kassin, Reddy, & Tulloch, 1990; Constabile & Klein, 2005).

Consequently, even though police investigations might be set up to reflect end-of-sequence processing, it is impossible to predict at this point whether investigators might be more likely to display primacy or recency effects in their decision-making during an investigation. If they are strictly using end-of-sequence decision-making then one might actually find the reverse of the recency effects found here such that evidence presented early in the investigation might actually have a larger impact (a primacy effect). However, if the case is extremely complex, with many different sources of evidence, the investigators might spontaneously re-evaluate their beliefs after each new piece of evidence, thereby engaging in step-by-step processing. If this is the case, then one would expect to see the same types of recency effects that were found in Experiments 2 and 3.

Constraints of the Paradigm

A number of factors might be present in real world investigations that could not be simulated with the current paradigm. For example, in Experiment 3 the investigators were presented with video-taped interviews with the eyewitness and alibi witness. As such, they did not have any control over the questions that were asked of the witnesses, nor did they have the ability to go back and ask the witnesses additional questions once they had received other evidence.

In addition, the paradigm used in this research took approximately thirty minutes from start to finish. In the real world, investigations likely take days, weeks, months, or even years. As such, the order effects that were found in this research could disappear over longer delay intervals or they could become even stronger over delay. Previous

research on serial position effects (e.g., Thapar & Greene, 1993) typically finds that with list learning, delay leads to stronger primacy effects (because people are not able to rely on their working memory for recall). However, to my knowledge there is no research in the jury decision-making field or the medical decision-making field that has examined the effects of delay and therefore could serve as a basis for hypothesizing what might occur with police investigators.

Further, an investigator most likely rarely works alone in the real world. Decisions regarding which suspects to pursue and whether to arrest a suspect or not are likely not made by one investigator who is operating independently from other investigators or supervisors. Research examining jury decision-making and order effects examined the individual decisions of each juror and not of the jury as a whole. Obviously in real legal trials the final verdict comes down to the decision made by the jury as a group. Without solid research it is hard to say whether order effects would influence final verdicts; however, research does show that most juries decide in favor of the initial majority decision (Visher, 1987). Therefore, if most jurors are engaged in the same processing style and are vulnerable to the corresponding bias (e.g., recency), then one would expect that these biases would affect subsequent group decisions.

However, research outside of the justice realm has found that making a decision as a group reduces the occurrence of recency effects (e.g., Kennedy, 1993). For example, Ahlawat (1999) found that when experienced auditors were asked to make auditing judgments, they were susceptible to recency effects when making the judgments individually, but the recency effect disappeared when they made the decision as a group. Therefore, group discussion and collaboration could serve to reduce or even eliminate

order effects in police investigators' decision-making.

Conclusions

This research serves to add considerably to three areas of psychological research. Along with the Dahl et al. (2006) studies, this research speaks to decision-making by participants who are involved in a simulated investigative experience and who become personally invested in the outcome of the investigation. Previous research examining participants in the role of investigators has not used such a paradigm. Therefore, in addition to adding to our knowledge of the decision-making of participants in the role of investigator, this research also serves as an excellent starting point for research with police investigators. Of interest is whether investigator training and expertise would result in police officers being less influenced by eyewitness decisions than participant investigators, and whether they would be less influenced by recency effects when dealing with contradictory information.

Given the order effects found in Experiments 2 and 3, this research is the first of its kind to propose that order effects might occur in police investigations. Order effects literature has not (to my knowledge) ever examined the occurrence of order effects with police decision-making. Research has been conducted examining mock jurors, and has found that recency effects can occur. However, one could argue that a juror's experience with a criminal case and the evidence presented in that case and a police investigator's experience would be quite different. Therefore, even though this research adds support for the occurrence of recency effects given contradictory evidence in a criminal case, it speaks to a qualitatively different experience for the decision-maker.

Finally, this research also adds to the current literature in the field of alibi

research. The results of Experiment 3 suggest that the effects of strong alibis found in previous jury research might be dependent upon the order in which the alibi is presented compared to the eyewitness identification. Further, although participant-investigators did not approach alibis with extreme skepticism in regards to the effect that the alibi had on their ratings of their suspect's guilt, they did generally rate the alibi provider as being less credible than the eyewitness and also rated the strong and weak alibis as less believable than in previous research (Olson and Wells, 2004) and in pilot studies. This suggests that the believability of alibis should be examined within the context of other evidence in the case rather than independently as in the Olson and Wells study.

In conclusion, these studies provide an important initial examination of the influence of order of presentation of evidence and alibi versus eyewitness decisions on participants' judgments regarding the guilt of their suspect, the credibility of the evidence provider, and their willingness to arrest their suspect based on the evidence that they have obtained. Although it would be premature to generalize to the real world at this point, this research suggests a dire need for an examination of real police investigative procedures and decision-making.

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Appendix A

Sample Database for Suspect John Gibbs

- Physical Description:
- DOB: Mar. 13, 1976
 - Height: 5'10
 - Build: medium
 - Eyes: blue
 - Hair: short, curly, brown
 - Caucasian
- Criminal Record:
- 2 arrests, break and enter, 1996, 1998,
 - 1 conviction, break and enter, 1999
 - Paroled Dec. 2001
- Additional Investigation:
- Alibi for duration of crime: Unknown, suspect's most recent address was in neighborhood where the crime took place.
 - Current employment: Unemployed
 - Vehicles Registered: Registered owner of a white Volkswagen Rabbit.

(Note: for ease of inclusion in the dissertation the format is different from the actual database.)

Appendix B

Strong Alibi

Interviewer (I): For the record, please state your name:

Alibi Provider (A): Erik Collins

I: What is your relationship with John Gibbs:

A: I've worked with him as a scuba instructor for about a year at Bill's Dive Shop.

I: Do you remember where you were on the day of the 12th?

A: John and I were attending a scuba convention in Tofino. We drove up the night of the 11th and were there until Monday morning, the convention was on all day Saturday and Sunday.

I: Could anyone else vouch for your whereabouts on the 12th?

A: There were lots of people at the convention, I'm sure you could track some of them down to ask if we were there.

I: Where did you stay while you were there?

A: We stayed at the Wickaninnish Inn, that's where the conference was.

I: Do you have any receipts or other evidence to show that that is where you were on the 12th?

A: We both have registration receipts from the conference, and John paid for the hotel with his credit card so he has a receipt for the hotel room.

Weak Alibi

I: For the record, please state your name:

A: Erik Collins

I: What is your relationship with John Gibbs:

A: We've been buddies since high school.

I: Do you remember where you were on the day of the 12th?

A: John and I were up in Tofino doing some surfing. We drove up the night of the 11th and were there until Monday morning. We surfed all day Saturday and Sunday.

I: Where did you stay while you were there?

A: I have a van so we just slept in the back.

I: Could anyone else vouch for your whereabouts on the 12th?

A: Not that I can think of, we just did our own thing.

I: Do you have any receipts or other evidence to show that that is where you were on the 12th?

A: No, I don't keep receipts.

Appendix C

Interviewer (I): For the record, please state your name:

Eyewitness (E): Ted MacIntyre

I: Where were you when you witnessed the crime?

E: I was in my office, it looks out over the back parking lot and the warehouse that shares the lot.

I: Describe what you witnessed on the day of the 12th:

E: I was working on the weekend because I had a big project due and around 1pm I noticed a small white car pull into the parking lot behind our building. The guy got out, he took a crowbar out of the trunk of his car and went over to the back door of the warehouse across the parking lot. He managed to jimmy open the door and went in. That's when I called the police. He brought out a bunch of boxes and put them in the back of his car and then drove off.

I: What was the culprit wearing?

E: He was wearing jeans and a green puffy vest.

I: Can you describe the culprit?

E: He was about 5'8-6'1, he had short dark curly hair, was Caucasian or maybe Hispanic. I'd say he was in his mid-twenties.

I: I am going to show you a photolineup, the person who committed the crime might not be in this lineup. If you do not think he is here please say not present. If you do think the culprit is here please say the number that corresponds to his picture.

E: not present, or

E: It's number 3.

Appendix D

Questionnaire

1. What is your estimate of the probability that the suspect (lineup member 3) committed the crime? Answer by writing a number between 0% (absolutely no chance that he is the thief) and 100% (complete certainty that he is the thief). _____

2. If this were a real case would you recommend that the suspect (lineup member 3) be charged and taken to trial for this crime? Yes No

If not, what additional information would you need to convince you to charge the suspect with the crime?

3. How confident do you feel about your decision to charge/not charge the suspect?
(circle one)

| | | | | | | | | | | |
|---|------------|---|---|---|-----------|---|---|---|----|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | not at all | | | | somewhat | | | | | extremely |
| | confident | | | | confident | | | | | confident |

Appendix E

Questionnaire 2

1. Which (if any) lineup member did the eyewitness choose? _____

2. Now that you have seen all the evidence, what is your estimate of the probability that the suspect you chose committed the crime? Answer by writing a number between 0% (absolutely no chance that your suspect is the thief) and 100% (complete certainty that your suspect is the thief). _____

3. What factors contributed to your rating of the suspect's guilt?

4. How confident are you that the witness is correct in his or her decision? (circle one)

| | | | | | | | | | | |
|---|------------|---|---|---|-----------|---|---|---|----|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | not at all | | | | somewhat | | | | | extremely |
| | confident | | | | confident | | | | | confident |

5. How credible or trustworthy do you think the eyewitness was?

| | | | | | | | | | | |
|---|------------|---|---|---|----------|---|---|---|----|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | not at all | | | | somewhat | | | | | extremely |
| | credible | | | | credible | | | | | credible |

6. How credible or trustworthy do you think the alibi provider was?

| | | | | | | | | | | |
|---|------------|---|---|---|----------|---|---|---|----|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | not at all | | | | somewhat | | | | | extremely |
| | credible | | | | credible | | | | | credible |

7. How credible or trustworthy do you think the alibi was?

| | | | | | | | | | | |
|---|------------|---|---|---|----------|---|---|---|----|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | not at all | | | | somewhat | | | | | extremely |
| | credible | | | | credible | | | | | credible |

8. Based on the information you have obtained so far, if this were a real case would you recommend that the suspect be charged and taken to trial for this crime? (circle one)

Yes No

If not, what additional information would you need to convince you to charge the suspect with the crime?

9. Rate the relative importance of each category of evidence in making that decision, by assigning a comparative percentage of importance. For example, if you thought that only one category was important in making that decision, you would assign that category 100% and each of the other categories 0%. On the other hand, if you thought that all of the categories were equally important, you would give them each 33.33% (100/3). You can divide up the 100% among the three categories of evidence in any way you wish, except that they **should add up to 100%**.

Database information _____

Alibi (whereabouts during crime) _____

Eyewitness decision _____