2008

Negotiating memorial and extra-memorial information: the effect of social information on eyewitness identification decisions

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Negotiating memorial and extra-memorial information:

The effect of social information on eyewitness identification decisions

by

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A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Psychology

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2008

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ABSTRACT

Recognition judgments, such as those involved in eyewitness identification, are often depicted as relatively pure products of memory processes and criterion setting, such as is depicted in the WITNESS model of eyewitness identification behavior. The presence of extra-memorial factors, such as social influence, however, necessitates a negotiation between memorial and extra-memorial information. Participants (N = 450) viewed a short video depicting a person planting a bomb down an airshaft. Before attempting lineup identifications, participants in Experiment 1 learned that an alleged co-witness made a "not there," plausible, or implausible identification decision with high or low confidence. Co-witness information dramatically influenced identification decisions in the direction of the co-witness's decision. Particularly important was the finding that there was a significant effect of co-witness information even for participants who learned that the co-witness identified an implausible lineup member. This latter finding cannot be explained by standard two-parameter models of recognition (such as the WITNESS model). Participants' confidence in their identification decisions tended to match that of their co-witness, regardless of whether the co-witness gave a "not there," plausible, or implausible identification decision. However, this confidence-matching effect was greater for participants who made the same decision as the co-witness than it was for participants who made a different decision than the co-witness. Experiment 2 participants (N=323) viewed the same crime video and then either viewed the lineup first or received the co-witness information (i.e., a "not there" or plausible identification decision) first. As in Experiment 1, co-witness information influenced identification decisions in the direction of the co-witness's identification, but the extent of the influence did not vary as a function of the presentation

order of a lineup and co-witness information. When asked later how they would have responded if they had never received the co-witness information, participants were able to somewhat correctly imagine the identification decision they would have made without the co-witness information, but this correction always underestimated the co-witness's influence. The results suggest a need for a third parameter, in addition to memory strength and decision criteria, when attempting to predict and explain eyewitness identification behavior in a real-world setting.

GENERAL INTRODUCTION

> My family and I were in Boston's North End, waiting for my cousin to pick us up in his car. After a short while, my aunt recognized his car, and the rest of us who were waiting followed her straight to the car. Meanwhile, the driver in the car behind the one we were about to enter started honking the horn obnoxiously, so we all jumped into the car as quickly as we could. Suddenly, my aunt, who had gotten in the front seat, noticed that it was not her son that was driving the car, but rather a middle-aged woman and her dog who were both exceedingly frightened because three strangers had jumped into her car. One by one we realized that we were in the wrong car and bolted out of the poor woman's car. We soon discovered that the driver of the car who was honking obnoxiously behind us was really my cousin, trying to alert us that the car that we thought we recognized as his was not. – True story from the author

Every day, people make countless recognition judgments, often without any conscious effort. Do you know the person who is approaching you and, if so, from where? Which purse or briefcase is yours? Is the car you are about to get into your relative's or a stranger's? How people make recognition decisions is often considered to arise from an assessment of two variables: how well the stimulus matches the memory of the object, and how well the stimulus must match the memory before a person will decide that he or she recognizes it, which is known as the decision criterion (Clark, 2003, 2005; Clark and Gronlund, 1996; Green & Swets, 1966; Haberlandt, 1997; McNicol, 1972).

The decision criterion a person sets for recognizing something may shift due to extra-memorial variables, such as context, social influences, and prior knowledge. For example, my aunt, who should have known what her son's car looked like, was the person who first mistakenly identified the middle-aged woman's car as her son's car. When she started walking towards the incorrect car, the rest of us did not pay much attention to how well the car matched our memory, and we blindly followed her. If any one of us had tried to recognize the car on our own, we would have had a higher criterion for deciding whether or not we recognized it and, therefore, verified our decision to enter the car by looking at the

driver before opening the door. Our erroneous decisions were a direct result of taking into account both memorial cues—our weak memories for the car—and extra-memorial cues—our aunt's decision to walk towards the car. It is each individual's combination of memorial and extra-memorial cues that bring about the recognition memory judgments that they make each and every day.

At times, memorial and extra-memorial information might be contradictory, and some uncertainty may arise about what pieces of information are correct. Signal detection theory takes into account this notion of uncertainty in reasoning and decision making when setting a decision criterion for recognizing an object (Green & Swets, 1966; Haberlandt, 1997; McNicol, 1972). Signal detection theory takes into consideration that when determining whether or not a target is present, there are typically four possible outcomes: a hit, a correct rejection, a miss, or a false alarm. The first two are correct decisions, but the second two are incorrect decisions. According to signal detection theory, the decision criterion that a person sets for detecting the target stimulus is based on a payoff matrix with specific weight given to each of the four outcomes.

How costly a false alarm is as opposed to a miss and how beneficial a hit is as opposed to a correct rejection are factors that determine the point at which a person makes a decision to detect a signal. For example, in a social situation, it is typically more costly to ask someone about her pregnancy and be incorrect (i.e., false alarm) than to not comment on the pregnancy at all (i.e., miss). A situation in which the relative weights of false alarms and misses are less clear is with eyewitnesses who have to determine whether it is more costly to mistakenly identify someone in a lineup as the perpetrator of a crime or to miss the perpetrator in a lineup entirely. Additionally, an eyewitness typically can identify one of six

people in a lineup, say that the perpetrator of the crime is not in the lineup or say that he or she does not know whether or not the perpetrator is in the lineup. The decision making process with lineups is more complex than saying that the perpetrator is present in the lineup or that he is not. Eyewitnesses must decide which person in the lineup, if any, is who they saw commit the crime.

The WITNESS model is a mathematical model designed to mimic how eyewitnesses decide to either make an identification or reject the lineup and how they decide which lineup member to identify as the culprit (Clark, 2003, 2005). The model is an example of global matching models, which take into account two parameters: how well a target item matches a person's memory for the item and the decision criterion a person sets for making a determination of whether or not the target item has been seen before (Clark & Gronlund, 1996). The identification decision rule in the WITNESS model is based on a weighted sum of two different judgments (Clark). One judgment is an assessment of the extent to which the best match in the lineup corresponds with the eyewitness's memory of the perpetrator. The other judgment is an assessment of the difference between the best and next-best match. If the sum of these two weighted measures is above the eyewitness's identification decision criterion, then the eyewitness will identify the best-match as the perpetrator of the crime. Therefore, an identification will be made if either the match is very high or if the best-next difference is high. Under the parameters of the WITNESS model, an eyewitness will say that the perpetrator is not in the lineup if the match value of all of the lineup members is under the eyewitness's rejection decision criterion. Additionally, an eyewitness will say that he or she does not know whether the perpetrator is in the lineup if the weighted sum of the best match plus the difference between the best and next-best match is not above the identification

decision criteria and if the individual lineup members are not all below the rejection decision criteria. Even though the WITNESS model and other direct-access matching models can explain whether somebody will choose to make a positive identification or reject the lineup, they cannot explain how an eyewitness might shift from one positive identification decision (e.g., identifying lineup member #5) to another (e.g., identifying lineup member #3) based on external social influences.

The current research is particularly focused on the question of if and when an eyewitness will make an identification of someone who is not the best match to the witness's memory of the perpetrator. Although it may seem counter-intuitive that an eyewitness would make a positive identification of someone other than the person who most resembles the perpetrator, imagine the following scenarios: If a person thought that number five in a lineup was the culprit based on his or her memory but also learned that there were reasons to believe that the culprit was number three, what would he or she do? What if number three was similar in appearance to number five? What if number three looked nothing like number five? What if the person acquired the extra-memorial information before he or she had a chance to study the lineup? What if the extra-memorial information came only after the person had already studied the lineup?

If there are multiple eyewitnesses to a crime and Eyewitness A learns of Eyewitness B's identification decision, will Eyewitness A always rely on his or her memory for the perpetrator or will information about Eyewitness B's decision influence Eyewitness A's identification decision? It is believed that how a witness will use extra-memorial information provided by a co-witness will depend in part on how likely the witness thinks it is that the co-witness is correct. In determining how much influence to allow a co-witness to have on a

recognition decision, it is assumed that the witness will take into account how good his or her own memory is for the event, how good he or she thinks the co-witness's memory is for the event, and how plausible the co-witness's recognition judgment is. These three factors are likely to play a role in a witness's identification decisions, given that the witness has an overriding goal of being correct.

In the current research, social influence effects that merely shift an eyewitness from making no identification to making an identification (or vice versa) can readily be handled with the WITNESS model and other models that posit the two parameters of signal strength—what the WITNESS model calls match—and decision criterion. However, any evidence that social influence can shift an eyewitness from selecting one lineup member to selecting a different lineup member cannot be accounted for by these two-parameter models. Accordingly, if effects such as these are found, the current research has the potential to force revisions of these types of models so that they can account for identification decision shifts that are neither the product of the match parameter nor the decision-criterion parameter.

Why Do People Use Extra-Memorial Information When Making Decisions?

One of the main assumptions made by social cognitive researchers is that an important, driving motive for humans is the motive to be accurate (Aronson, Wilson, & Akert, 2005; Fiske & Taylor, 1991; Markus & Zajonc, 1985; Nisbett & Ross, 1980). Because this is a powerful social motive, which probably had survival value, people are less concerned with keeping various informational input domains separate (e.g., using only memory or only external information) and instead use and combine whatever information they have to make an accurate judgment. In fact, people are likely to seek out extra-memorial

information, especially when a situation or decision is ambiguous, such as whether or not the perpetrator of a crime is in a lineup and, if he is, which person in the lineup is the perpetrator.

Another main assumption made by social cognitive researchers is that humans are motivated to maintain high self-esteem and present a favorable image of themselves to others (Aronson, 1992; 1998; Aronson, Wilson, & Akert, 2005; Baumeister, 1993; Harter, 1993; Kunda, 1990; Pyszczynski, Solomon, Greenberg, & Stewart-Fouts, 1995; Stone, 1998; Thibodeau & Aronson, 1992; Tice, 1993). This motive leads people to examine features in the environment that would cast them in a positive light to those around them. This may entail justifying past behavior by bringing thoughts and actions in line with an outward judgment or decision (Festinger, 1954; 1957; Festinger & Aronson, 1960; Festinger & Carlsmith, 1959) or bringing information that has been given to them about something that they may or may not have seen before and incorporating it into their memories (Ayers & Reder, 1998; Davis & Loftus, 2007; Loftus, 1975; 1991; Loftus, Miller & Burns, 1978; Roediger, Meade, & Bergman, 2001; Wright & Loftus, 1998). Because the motives to maintain high self-esteem and present a favorable image to others are inextricable from human action, any recognition judgment must be examined not only in terms of a comparison of a stimulus to a person's memory of the target, but also in terms of extra-memorial factors that might be available to the person (Clark, 2003, 2005).

Except in rare, contrived circumstances, such as when a person is in a psychology laboratory or taking a test, recognition decisions occur within a social milieu. As previously mentioned, humans have the need to be correct and to appear competent to others. Therefore, if there is extra-memorial information available, a person making a decision will take this information into account when attempting to arrive at the correct decision. This is true for

decisions ranging from deciding whether or not to identify a person from a lineup to which car to get into when being picked up on a crowded street, and it is especially true when people are highly motivated to be correct (Baron, Vandello, & Brunsman, 1996; Levine, Higgins, & Choi, 2000).

Eyewitnesses Use Extra-Memorial Information When Making Identification Decisions

An eyewitness identification situation is a particularly good dynamic in which to study the negotiation between memorial and extra-memorial information (Clark, 2003, 2005). This is because an eyewitness recognition judgment is a very consequential decision made in the real world in which a person is typically motivated to be accurate and will try to take in as much information as possible before making the judgment. The DNA exoneration cases underscore the dramatic impact that extra-memorial information can have on recognition memory judgments. One thing that stands out when examining the DNA exoneration cases that involved eyewitness identifications is that the mistaken identifications often do not tend to look like recognition memory errors in any pure sense.

For example, Anthony Michael Green was wrongfully convicted of rape and aggravated robbery. He spent 13 years in jail before DNA evidence exonerated him. Green's photograph can be seen on the left-hand panel in Figure 1. After Green's release, the true identity of the perpetrator was determined. A photograph of the perpetrator, Rodney Rhines, that was taken near the time of the assault can be found on the right-hand panel in Figure 1. Amazingly Green and Rhines look almost nothing alike, yet the victim-witness mistakenly identified Green as her rapist (*Green v. City of Cleveland*, 2001).

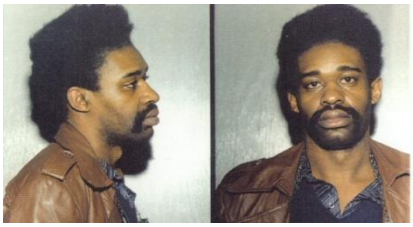
Another example of this phenomenon was displayed in *Newsome v. City of Chicago* (2003). The photograph displayed in the top panel of Figure 2 is of Dennis Emerson, the man

Figure 1. The photograph on the left is of Anthony Michael Green, a teenager who was mistakenly identified by an eyewitness who was raped and robbed by Rodney Rhines, the person in the photograph on the right.

who robbed a convenience store and brutally murdered the store clerk. The lineup that police showed to the three eyewitnesses of the murder is in the lower two panels of Figure 2. James Newsome, the man who is #3 in the lineup, was mistakenly identified by all three eyewitnesses as the perpetrator of the crime. Analyses have shown that there was only a 1 in 37,037 chance that all three eyewitnesses would have "naturally" (i.e., based on similarity alone) identified James Newsome as resembling the perpetrator. In the Discussion section of Experiment 1, I will describe the social influence that was operating on the three witnesses who mistakenly identified Newsome.

It is obvious in cases such as these that the eyewitness's identification decision cannot be purely based on memorial information, but instead also rests heavily on some external, extra-memorial influence. Additionally, oftentimes the eyewitnesses in DNA exoneration cases express being quite uncertain of their identifications at first, but during trial express very high confidence in the identification. For example, the victim-witness who mistakenly identified Charles Huchting as her rapist spent about 30 minutes viewing a lineup, hemming and hawing about whether or not the features of each of the men in the lineup matched her memory of the perpetrator at all. After this half-hour she stated, "Number Two that's him." At trial, however, she stated that she was "one hundred percent sure" of her identification (*Missouri v. Huchting*, 1996). When an identification of an innocent person is made under conditions such as these, it becomes exceedingly clear that eyewitness reports often demonstrate a negotiation between memorial and extra-memorial, in these cases social, pieces of information.

Figure 2. The top photograph is of Dennis Emerson, a man who murdered a convenience store clerk. Below are photographs of the lineup from which James Newsome (lineup member #3) was mistakenly identified as the perpetrator of the crime.



Conformity and Internalization

As has been shown in classic social psychological experiments, it is not difficult to induce individuals to comply under some form of social pressure (Asch, 1951; 1955; 1956; 1957; Blass, 1999; Bond & Smith, 1996; Milgram, 1963; 1974). In fact, a correct minority can be easily induced to conform to an incorrect majority (Asch, 1951; 1955; 1956; 1957). Many times people conform because of the underlying motive to present a favorable image of themselves to others. However, the current research does not seek to examine conformity to social pressure that is exuded by an authority or by one's peers, but rather it seeks to examine the process by which an eyewitness comes to accept and internalize the opinion of another as his or her own.

Acceptance, or internalization, is found most often when the correct answer to a question is ambiguous (Cialdini, 2000; Cialdini, Kallgren, & Reno, 1991; Deutsch & Gerard, 1955; MacNeil & Sherif, 1976; Sherif, 1936). In situations in which the correct judgment is not obvious, people look to other cues, especially social ones, in order to determine the correct answer. If peoples' beliefs about a stimulus do not agree with others' beliefs about the stimulus, they often reinterpret the stimulus to accommodate others' beliefs (Allen & Wilder, 1980). Instead of merely parroting the judgment of others, in some situations, people accept or internalize what others have said as the truth and believe it to be the correct answer (Sherif, 1936). It may be that when internalization occurs it affects memorial representations of the recognition object. Humans have a need for consistency and that this need pervades human thinking (Festinger, 1954; 1957; Festinger & Aronson, 1960; Festinger & Carlsmith, 1959). Therefore, once a judgment has been made explicitly, whether it is based on a person's memory alone or on the deduction that a person has made based on a combination

of memorial and extra-memorial information, the person's memory might be brought closer in line with that judgment than it had been before.

Collaborative Recall

Research on whether or not people will conform to the memory of another person during free recall sessions is not new. It has been found that free recall of an event following group collaboration decreases errors of omission but increases errors of commission when compared to free recall of an event by an individual alone (Alper, Buckhout, Chern, Harwood, & Slomovits, 1976; Warnick & Sanders, 1980). People who collaborate about their memory for an event also have higher confidence in the truth of their answers than people who report on their memory individually, regardless of the accuracy of these memorial reports (Allwood, Granhag, & Johansson, 2003; Stephenson, Abrams, Wagner, & Wade, 1986). Knowing that their memory is corroborated by others increases people's confidence in the veracity of their memory. This unsubstantiated confidence inflation due to collaboration can be lessened if witnesses think about their accounts of the event individually before discussing them with a co-witness (Stephenson, & Wagner, 1989).

When people are asked to recall information about an incident alone and then as a pair, overall more details are recalled between the members of the pair than when each member was alone; however, no new information emerges from the discussion (Meudell, Hitch, & Kirby, 1992). Therefore, combining the free-recall responses of two witnesses who recall an event individually and having two witnesses collaborate on their recall for an event produce the same number of correct details about the event. This is what would be expected from the "pooling of abilities" model that predicts that if one participant remembers five details: a, b, c, d, and e and another participant remembers five details: c, d, e, f, and g, then

together they remember seven details: a, b, c, d, e, f, and g (Lorge & Solomon, 1955). Therefore, they remember more items jointly than they would remember individually, even though no new information has emerged from the discussion.

Sometimes when groups collaborate on memory, however, they recall *less* information as a group than as individuals, and this phenomenon has been termed collaborative inhibition (Basden, Basden, Byrne, & Thomas, 1997; Finlay, Hitch, & Meudell, 2000; Weldon & Bellinger, 1997; Weldon, Blair, & Huebsch, 2000). This effect is posited to arise from one of two processes: retrieval interference or motivational factors. Retrieval interference arises because hearing a member of the group recall his or her memory can disrupt another's organizational and retrieval strategies (Basden et al.). However, collaborative inhibition appears less in small groups, such as pairs, than in large groups (Finlay et al.). The motivational factors present in collaborative inhibition tend to function like social loafing, which is when people exert less effort on group tasks than when working alone (Karau & Williams, 2001). Social loafing tends to arise from a sense of diminished personal responsibility, a perceived dispensability of effort, an attempt to achieve equity of effort, a diffusion of responsibility, evaluation apprehension, or some combination of these variables (Collaros & Anderson, 1969; Latané & Nida, 1981; Latané, Williams, & Harkins, 1979).

Because of retrieval interference and motivational factors, collaboration on recall tasks does not appear to be beneficial over and above the pooling of resources and can actually harm accuracy on recall tasks. In a situation in which a collaborator merely suggests that participant-witnesses have seen an object that they have not, the participant-witnesses will typically later report seeing an object that they, in fact, never saw (Gabbert, Memon, &

Allan, 2003). The co-witness information can be conceived of as post-event misinformation, which can interfere with retrieval of the original memory that a person has due to source monitoring errors (Ayers & Reder, 1998; Davis & Loftus, 2007; Loftus, 1975; 1991; Loftus et al., 1978; Roediger et al., 2001; Wright & Loftus, 1998). Source monitoring errors arise when people become confused about the source of their memory and are unsure whether their memory comes from watching an event or from information given to them later, either directly or indirectly, from a co-witness, an investigator, or an experimenter (Cronbag, Wagenaar, & VanKoppen, 1996; Johnson, Hashtroudi, & Lindsay, 1993; Lindsay, 1994; Lindsay & Johnson, 1991; Mather Shafir, & Johnson, 2000).

Collaborative Recognition

When individuals are asked to recognize information or objects in groups, the pattern is not as straight forward as it is for collaborative recall. For positive identifications— when a person says that an object was present in a previously-studied list or scene—peoples' hits are more accurate in pairs or groups than alone (Clark, Hori, Putnam, & Martin, 2000; Rajaram & Pereira-Pasarin, 2007; Schneider & Watkins, 1996; Skagerberg, 2007). Collaborative recognition does not tend to show a pattern towards collaborative inhibition as is the case with collaboration during recall, but rather tends to make collaborative recognition judgments more accurate than individual recognition judgments (Hinsz, 1990; Vollrath, Sheppard, Hinsz, & Davis, 1989), and this facilitation tends to go above and beyond that of just a pooling of resources (Clark et al.). Additionally, if there has been an *increase* in correct responses from when an individual attempted to recognize information alone and then in pairs, then there can be an increased proportion of hits to false alarms during later tests, even a week after the original studying of the words (Rajaram & Pereira-Pasarin, 2007).

Although this pattern seems encouraging, other researchers have found quite different results in collaborative recognition settings. In a few experiments, people were asked to recognize, in a multiple-choice test, information from a story that they had just read and were later given bogus feedback about the answers that other participants in the study had chosen (Betz, Skowronski, & Ostrom, 1996; Wright, Matthews, & Skagerberg, 2005). These people tended to conform to the answers that the majority of the other participants had chosen (Betz et al.), especially for items that they had not originally seen (Wright et al.). This conformity effect continued, even when the participants were told that the information they were given about the other participants' answers was bogus (Betz et al.). Additionally, the answers provided by other people who have studied the same list of words or have seen the same scene tend to persevere (Shaw, Garven, & Wood, 1997). The new information seems to become incorporated into a person's memory, competing with the accurate information that a person has, even two days after the event and initial questioning, much like what occurs with post-event misinformation.

Additionally, when being asked to state whether or not an object was present in a previously-studied list or set of pictures, people tend to conform to the answers of their partner, regardless of whether the answers are correct or incorrect (Schneider & Watkins, 1996; Wright, Self, & Justice, 2000). However, the level of conformity is greatly reduced if the partner who goes first states that the object was not present (i.e., gives a negative answer) in the studied list. This happens regardless of whether the object was actually present or not in the studied list (Schneider & Watkins, 1996). Because "it is easier to present an argument as to why one should believe that an event happened than an argument as to why one should believe that an event did not happen" (Clark et al., 2000, p. 1586), the facilitation for

recognition memory in groups breaks down when it comes to rejecting distractors. Therefore, the facilitation of recognition memory through collaboration tends to decrease if the target is not present in the stimuli for the recognition task.

Collaborative Memory Among Eyewitnesses

The majority of work on collaborative memory has been done with recall or recognition of items such as words, leaves, or cars (e.g., Finlay et al., 2000; Lima , Jaswal, & Dodson, 2007; Meudell et al., 1992; Rajaram & Pereira-Pasarin, 2007; Roediger et al., 2001; Schneider & Watkins, 1996; Weldon et al., 2000). A situation in which collaborative memory occurs in the real world that can have extreme consequences is when people witness a crime and later attempt to identify the perpetrator of the crime in a lineup. However, research that has examined collaborative memory with eyewitnesses has not typically focused on facial recognition, (e.g., Allwood et al., 2003; Alper et al., 1976; Gabbert et al., 2003; Shaw et al., 1997; Stephenson & Wagner, 1989; Warnick & Sanders, 1980, but see Loftus & Greene, 1980 for post-event information about facial features and Skagerberg, 2007, for one study about collaboration on facial recognition). The current research will examine the influence that information about a witness's identification decision about a target-absent lineup can have on another's identification decision and confidence in that decision.

Eyewitness Confidence

A person who expresses confidence in his or her memory tends to appear more knowledgeable about that event than a person who does not express confidence in his or her memory. Typically, the more knowledge a person is perceived to have, the more valuable he or she will be as a guide to others, especially in a situation in which the answer is ambiguous

(Allison, 1992; Bickman, 1974; Cialdini & Trost, 1998), such as is the case in lineups. The current research will test the power of confidence in a memory to persuade a person to conform by presenting participant-witnesses with information about a co-witness who has made an identification decision with either high or low confidence in that decision.

Effects of eyewitness confidence on independent observers. Eyewitnesses who express high confidence in their identifications are believed to be more accurate than eyewitnesses who express low to moderate confidence in their identifications (e.g., Bradfield & Wells, 2000; Brigham & Bothwell, 1983; Cutler, Penrod, & Dexter, 1990; Fox & Walters, 1986; Wells, Ferguson, & Lindsay, 1981; Wells, Lindsay & Ferguson, 1979). The reason that people more readily believe confident eyewitnesses is a presumption of calibration (Tenney, MacCoun, Spellman, & Hastie, 2007). Triers of fact believe that people will be highly confident in a judgment when they are correct and not very confident in a judgment when they are incorrect. In fact, if a highly confident witness makes a mistake and that mistake is discovered by triers of fact, then the entire testimony by that witness is undermined (Tenney, et al.). However, in general, an independent observer who has not viewed the same scene as a witness trusts a confident witness's identification decision more than a non-confident witness's identification decision.

If participant-witnesses learn that their co-witness is confident in his or her identification decision, then it is possible that they will accept the decision as accurate until proven otherwise. When people see, hear, or learn a piece of information, they tend to take it at face value and assume it to be true, and it is only after accepting the veracity of a fact that they can go through the effort of deciding whether it might be false and un-accept this information if necessary (Gilbert, 1991; Gilbert, Krull, & Malone, 1990; Gilbert, Tafarodi, &

Malone, 1993; Krull & Dill, 1996). This is because people have a tendency to look for ways to confirm their hypothesis (Mynatt, Doherty, & Tweney, 1977; Nickerson, 1998; Wason, 1960) and because once a hypothesis has been formed, it is difficult to change, even in the face of disconfirming evidence (Anderson, Lepper, & Ross, 1980; Anderson & Lindsay, 1998; Ross, Lepper, & Hubbard, 1975).

Effects of eyewitness confidence on observers who have viewed the same scene as the eyewitness. There is considerable experimental evidence that confident eyewitnesses are believed more readily than are non-confident eyewitnesses (e.g., Bradfield & Wells, 2000; Brigham & Bothwell, 1983; Cutler et al., 1990; Fox & Walters, 1986; Tenney et al., 2007; Wells et al., 1981; Wells et al., 1979). Nevertheless, the people who evaluated the eyewitnesses in these experiments did not have their own, independent memories of the event. There is some evidence that people with an independent recollection may not pay much attention to the extent to which a co-witness should have a better or worse memory for the event than them. Manipulations of how long a view a co-witness had versus how long a view a participant had did not have much of an effect on whether or not the participant relied on the co-witness when making a recognition judgment (Lima et al., 2007). However, the length of time that a supposed co-witness had to view an event might not convey to the participants that the co-witness has a better or worse memory than them for the event because participants might not believe that the length of time they have to view the event would be calibrated with accuracy. A better test of this might be to manipulate the supposed quality of the view of the co-witness or the distance that the co-witness was from the event.

In the current research, it is predicted that the confidence with which a co-witness makes an identification decision will influence the participant-witnesses. This is because, as

discussed earlier, an eyewitness who inherently has a strong drive to be accurate should take into account as many memorial and extra-memorial variables as possible when making an identification decision. Therefore, eyewitnesses may be very susceptible to information from others. When negotiating the perceived validity of the memorial and extra-memorial factors, the discrepancy between the co-witness's expressed confidence and the participant-witness's internal confidence in the identification decision should be a determining factor in the participant-witness's decision.

Plausibility

Plausibility of an opinion. The plausibility of a co-witness's identification decision is another factor that is hypothesized to affect the extent to which the co-witness's decision is taken into consideration by the participant-witness. A person's opinion, such as who, if anybody, in a lineup looks like the perpetrator of a crime, provides a starting point for his or her latitude of acceptance (Fazio, Zanna, & Cooper, 1977; Sherif, Sherif & Nerbergall, 1965). An opinion that is not very discrepant from a person's own opinion, such as a plausible identification decision, might fall within his or her latitude of acceptance about that opinion, and an opinion that is extremely discrepant from a person's own opinion, such as an implausible identification decision, might fall within his or her latitude of rejection. Additionally, the more plausible an identification is, the more likely it is to fall in a witness's latitude of acceptance, but the less plausible an identification is, the more likely it is to fall in a witness's latitude of rejection. Information about a target that falls into a person's latitude of acceptance has the potential to influence that person's later opinions about that target (Sherif et al.). Therefore, information about a co-witness who makes a plausible identification decision that falls into a witness's latitude of acceptance might influence a

witness to shift his or her initial decision to either come closer to or match the co-witness's decision. However, information about a target that falls into a person's latitude of rejection should not influence that person's later opinions about the target. Therefore, information about a co-witness who makes an implausible identification, falling outside of a witness's latitude of rejection, should be rejected by the witness and, therefore, not impact the witness's identification decision.

What would happen if a very implausible identification were expressed by a very credible source? The implausibility of an opinion that a person expresses cannot exceed his or her credibility, otherwise that person's opinion will be dismissed (Aronson, Turner, & Carlsmith, 1963). An interaction exists between the perceived credibility of a person and the degree to which an extreme opinion or decision by that person will serve to influence others. Aronson and his colleagues presented participants with a mediocre poem that was supposedly evaluated by either T.S. Elliot—a credible source about poetry—or Miss Agnes Sterns—a student at Mississippi State Teachers College. The larger the discrepancy between the T.S. Elliot's and the participant's opinion, the greater the participant's opinion change toward the opinion of the T. S. Elliot. However, Miss Agnes Stern's evaluation of the poem only induced opinion change up to a point. When the mildly-credible evaluator's position was very extreme or discrepant from the participant's view, participants did not change their opinion much at all. This is because Miss Agnes Stern was not considered a credible enough source on poetry to convince participants to conform to an opinion that was extremely discrepant from their own opinion.

Plausibility of a co-witness's identification. The current research manipulated the discrepancy of the co-witness's identification decision from the participant-witness's

memory by varying the plausibility of the co-witness's identification decision. The co-witness was said to identify a plausible lineup member, an implausible lineup member, or reject the lineup. Past research has shown that witnesses who, after making an identification, are given feedback about a co-witness who has chosen an implausible other lineup member, have a significant increase in their confidence in their original identification (Luus & Wells, 1994). This demonstrates that the plausibility of a co-witness's identification decision matters to the participant-witness, even after both witnesses have made an identification decision. This is probably because the participant-witnesses are engaging in some form of negotiation of the extra-memorial information with their memorial information. The participant-witnesses in the study by Luus and Wells were obviously being discriminating about whether or not they would consider the co-witness's identification when determining their own answers to testimony-relevant questions. When the co-witness's identification was implausible, the participant-witnesses clearly dismissed the implausible identification decision.

EXPERIMENT 1

INTRODUCTION

This research is based on persuasion to make a particular recognition judgment, as opposed to the research by Aronson and colleagues (1963) that was done on opinion persuasion. Therefore, part of the question in the current study is whether or not the classic work on the interaction between credibility and position extremity will apply to the co-witness situation. In the case of a witness who learns that a co-witness allegedly identified a person who looks extremely different than the witness's memory and is therefore implausible, only a highly confident co-witness might have a chance to have an impact on the witness's decision. A condition in which a co-witness expresses high confidence in an identification but the identification is an implausible one is included in the current experiment. It is one of the more interesting conditions because this is where the greatest conflict exists between the memorial and extra-memorial information.

If a co-witness makes an implausible identification and does so without much confidence in the decision, then the co-witness should not have much influence on the identification decision of the participant-witness. Given the above-mentioned findings by Luus and Wells (1994), the participant-witnesses who find out that a co-witness has made an implausible identification may even increase their confidence in their own identification decisions. However, if a co-witness makes an implausible identification but does so with high confidence, then the participant-witnesses may conform to the highly implausible identification of a highly credible co-witness. Therefore, both the identification that the co-witness makes and the confidence that the co-witness expresses in this decision are expected to have an effect on the identification decision and confidence level of a participant-witness.

One important design feature in the current experiments is that, in plausible identification conditions, the co-witness's choice is manipulated between two different members of the lineup. This allowed me to see whether any increase in the identifications of one of the plausible lineup members was accompanied by a decrease in "not there" decisions or accompanied by a decrease in identifications of a different plausible lineup member. Consider, for example, that #3 is one plausible identification and #6 is the other plausible identification. Participants who receive plausible co-witness information were randomly assigned to be told that the co-witness identified #3 or #6. A decrease in the rate of "not there" identification decisions when participants are told that the co-witness identified either plausible lineup member would indicate a potential criterion shift as a function of this co-witness information. However, participants who lower their decision criterion after being told that a co-witness identified a plausible lineup member, might just identify the best-match. Participants who have a low enough decision criterion to make an identification decision without receiving information about the co-witness might have a good memory for the perpetrator and identify the best-match. However if there are two best-matches and co-witness information about one of the best-matches pulls identification decisions from the other best-match, then it would be indicative of something other than a decision criterion shift influencing participants' identification decisions.

Recognition judgments, especially those made by eyewitnesses, are influenced by both memorial and extra-memorial information. This research examined the extent to which different types of extra-memorial information would affect the ultimate identification judgments made by eyewitnesses. This study looked at the extent to which a participant-witness conformed to a co-witness's confident or non-confident identification decision about

a target-absent lineup. Additionally, this study examined how the plausibility of the co-witness's identification affected this potential co-witness conformity. This experiment is a 2(Confidence: high, low) x 3(Identification decision: plausible, implausible, not-there) between-subjects design, with an additional control condition in which participants were not be given any information about the co-witness's identification decision.

METHOD

Five hundred and four students from a large Midwestern university received partial course credit for their participation in this study. The participants were told by the experimenter that the study was designed to examine how accurate two people could be about an identification decision without explicitly speaking to one another. Participants were ostensibly yoked with another participant who viewed or would view the crime on the computer to which they were assigned. However, they did not know whether they were the first or second person of the pair that would be run in the study. The remainder of the study was completed on the computers utilizing MediaLab software.

Participants watched a video of a simulated crime that lasted approximately 60*s*. The scene was shot from the perspective of a person entering an office that has a window overlooking an attached roof. In the video, the perpetrator was seen on the roof, putting an object in an airshaft, and the person was filmed from approximately 15*ft* (6*m*) away from the camera. After the cameraman ostensibly realized that the activity on the roof was suspicious, the camera zoomed in to 6*ft* (1.8*m*) away from the perpetrator's face. Once the perpetrator noticed that he was being watched, he dropped the object down the airshaft and ran through a rooftop door. The video then continued in the hallway of the building. There the viewer caught a glimpse of the perpetrator running down the hallway and glancing briefly at the camera before running down a flight of stairs out of view. The perpetrator of the crime was a 21-year-old male with short, dark hair, medium build, and no facial hair.

After viewing the video, participants were told:

> In a moment you will see a group of photos and be asked: 'Which of these people, if anyone, was the person you saw commit the crime today?' The person who committed the crime may or may not be included in the group of photos. Keep in

> mind that things like hair styles, beards, and mustaches can be easily changed and that complexion colors may look slightly different in photographs.

Participants were then told that the names of each member of the pair who made an accurate identification decision would be put into a drawing for $20. This was done in order to ensure that participants felt a sense of connection with their fictitious partner and to enhance their motivation to provide an accurate identification decision. Before viewing a lineup, participants in the experimental group were told the identification decision their partner made and the confidence with which their partner made that decision.

Participants were randomly assigned to one of three conditions: a "not there" decision, a plausible identification decision, or implausible identification decision. In the "not-there" decision condition, participants saw that their partner said that the perpetrator was not present in the lineup. In the plausible identification condition, participants saw that their partner identified a member of the lineup who very nearly resembles the perpetrator of the crime. The plausible identifications were split between two plausible lineup members (#3 and #6). In the implausible identification conditions, participants saw that their partner identified a member of the lineup who looked very little like the perpetrator of the crime. The plausible and implausible lineup members were selected based on pilot data indications that they were the two lineup members who were most likely to be mistakenly identified as the perpetrator. Additionally, participants were randomly assigned to learn that their partner was either highly confident (98%) or moderately confident (55%) in his or her decision. An additional group of participants did not receive information about the identification that the co-witness made or the confidence with which the co-witness made that decision, and this group served as the control condition. After viewing the identification decision and the

confidence with which their partner made the identification decision, participants were shown the lineup and were asked to indicate their identification decision and their confidence in that decision.

The control condition was designed to determine the base rate for each identification decision without co-witness influence and a large number of participants in this condition would serve to stabilize this base rate information. Although the 504 previously-mentioned participants were randomly assigned to one of the four experimental conditions or the control condition in this experiment, an additional 64 participants were run in the control condition in Experiment 2. The stability of the base rate for the control condition is important because difference scores from the control condition were repeatedly made with the planned contrasts. Hence, there was an interest in collapsing the control conditions for the two experiments. Because of the slight differences in the timing and methodology of data collection between the two groups of individuals run in the control condition, a comparison was made of the identification decisions made by the control condition participants in the two experiments. There was not a significant difference between the control conditions in the rate at which each identification decision was made, $X^2(5, N = 129) = 4.721$, $p = .451$. Therefore, the two control groups were collapsed for all subsequent analyses in order to increase the stability of the base rate information.

RESULTS

It was hypothesized that information about a co-witness's identification decision and confidence in that decision would affect participants' own identification decisions and their confidence in those decisions. Therefore, I compared the rates at which participants made the seven possible identification decisions (i.e., identified numbers 1, 2,…6, or said "not there") across the experimental conditions. I then compared the proportion of participants in each experimental condition who made the same identification decision as the co-witness to the proportion of participants in the control condition who made that identification decision. Additionally, I examined the level of confidence the participants expressed in their identification decision as a function of the identification decision of the co-witness, the confidence of the co-witness, and whether or not the participant made the same identification decision as the co-witness.

Of the 568 participants run in the study, 54 were excluded from analysis because they had taken a class in which eyewitness variables were discussed or had seen the "crime" video and lineup at some point before participating in the experiment. Therefore, data analyses are based on 514 participants.

Identification Response Data

Control Identification Rates

A One-way Chi-Square test across the seven choice possibilities (lineup members 1-6 and "not there") revealed, as expected, that choices were not evenly distributed across the seven possibilities in the control condition, $X^2(5, N = 129) = 57.00$, $p < .001$. A "not there" response was the correct identification decision, and 37.2% of the participants in the control condition gave a "not there" response. (See Figure 3.) The two plausible lineup members (#3

and #6) exceeded the average "other" filler choices by approximately 10%. They were chosen by 22.4% and 11.6% of the participants, respectively, with an average identification rate of 17.0%. Lineup Member #1 received 15.5% of the identifications in the control condition, but this lineup member was not designated a priori as one of the plausible lineup members. This is because pilot data indicated that Lineup Members #1, #3, and #6 were mistakenly identified in the lineup at approximately equal rates. Two of the lineup members were chosen based on a judgment made by the author about which of the three most resembled the perpetrator. The implausible lineup member, #2, was truly implausible, and no participants in the control condition identified him as the perpetrator of the crime.

Overall Identification Rate Change in Experimental Conditions

Did the manipulated variables affect the distribution of choice responses across the seven choice possibilities? A three-way hierarchical loglinear analysis by backward elimination was carried out to determine associations between co-witness choice (four categories: not there, plausible #1, plausible #2, implausible) and co-witness confidence (two levels: high and low) on witness choices (seven categories: identify 1, 2,…6. or "not there"). The interaction between co-witness choice and co-witness confidence was not significant, $X^2(18, N = 385) = 20.66, p = .30$. Although there were significant combined main effects for co-witness choice and co-witness confidence, $X^2(27, N = 385) = 96.12, p < .001$, the generating class of the final model only included the main effect of co-witness decision on participants' identification choices. Because confidence was not a moderating variable of the participants' identification decisions, subsequent analyses of identification rates were collapsed across co-witness confidence levels.

Figure 3. Proportion of participants in the control condition making each identification decision.

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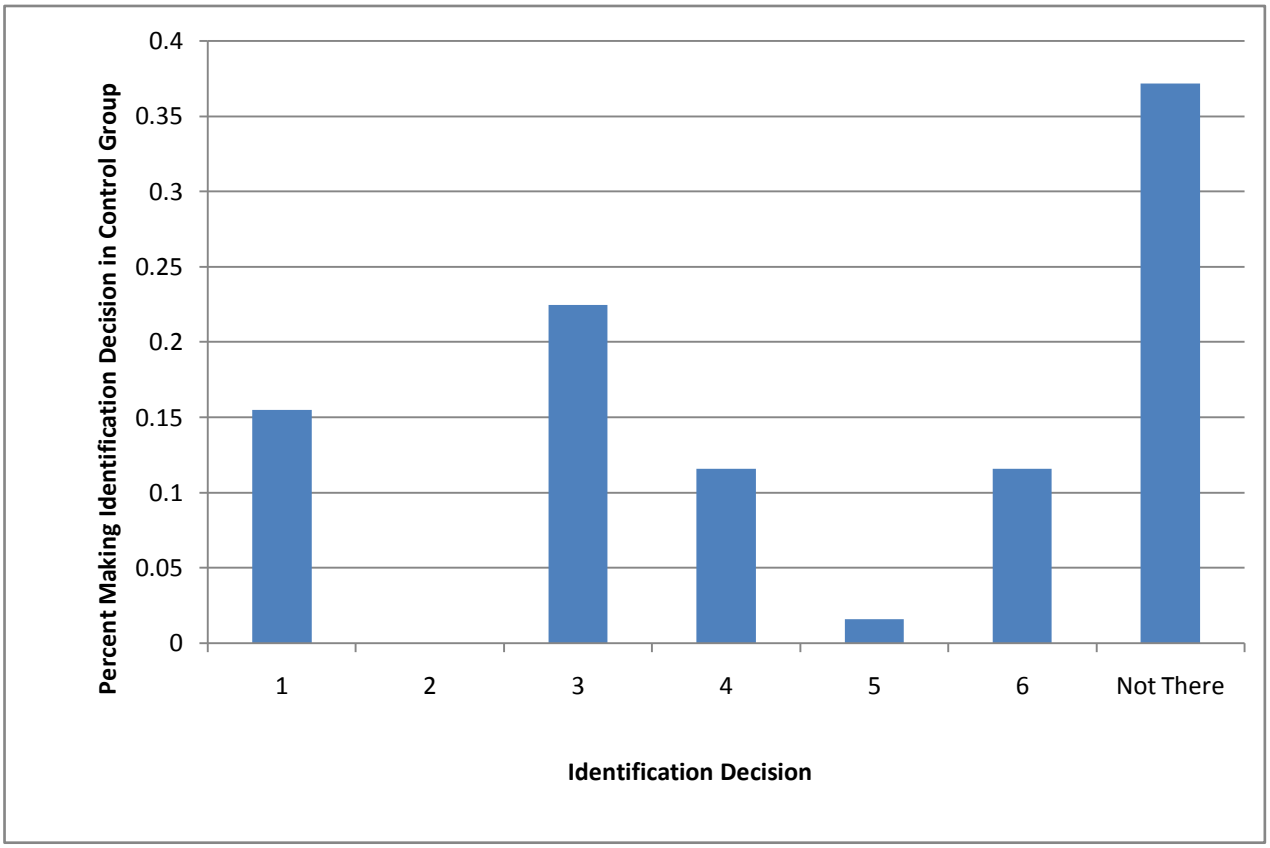


Although the co-witness's identification appears to have had an effect on the participants' identification decisions, differences across these decisions might merely be a result of different base rates for each of the possible identification decisions. As can be seen in Figure 3, control rates for the critical identification decisions (Not there, Lineup Member #3, Lineup Member #6, and Lineup Member #2) ranged from 0% to 37%. Therefore, subsequent analyses are composed of contrasts using *z*-tests of proportions on differences (changes) in proportions between the control condition and the experimental conditions.

Identification Rate Change From Control in Each Condition

Change in the direction of the co-witness's decision. Co-witness identification choices had differential impact on the identification choices of participants. However, was this merely due to the differing base rates for the identification decisions that the co-witness made? Participants who were told that their co-witness said the perpetrator was not in the lineup gave a "not there" response more often than did those in the control condition, $z = 3.999$, $p < .001$. As can be seen in Table 1, the participants who learned that the co-witness correctly rejected the lineup significantly increased the rate at which they also said that the perpetrator was not in the lineup by 25.0%[1]. Similarly, participants who were told that their co-witness identified Lineup Member #3, a plausible identification choice, increased the rate at which they also identified Lineup Member #3 by 16.3%, $z = 2.413$, $p = .016$. Even participants who were told that their co-witness made an identification of Lineup Member #2, an implausible identification choice, significantly increased their identification of Lineup Member #2 by 14.8%, $z = 4.547$, $p < .001$. Participants who learned that their co-witness

[1] A table with increases from the control condition in the proportion of participants giving the same responses as the co-witness separated by confidence level of the co-witness can be found in Appendix A.
[2] A table with percent increases from the control condition in participants giving the same responses as the co-

identified Lineup Member #6, another plausible identification choice, were only 6.8% more likely to identify Lineup Member #6 than were the participants in the control condition, an effect that was not statistically significant, $z = 1.298$, $p = .194$.

Because identification rates for Lineup Member #6 did not significantly differ between the experimental and control conditions, some questions arise about the validity of the "plausible" and "implausible" labels. Lineup Member #6 was only identified as the perpetrator 11.6% of the time, a mere 4.4% more than the average lineup member not identified a priori as "plausible". Therefore, it is possible that Lineup Member #6 was not actually a plausible identification option because to be a plausible option he would have to be chosen at a significantly higher than average rate in the control condition. However, even the implausible lineup member received a significant boost in identification rates when participants were told that a co-witness identified him.

Change from control in identification rates across conditions. Did the co-witness conditions (i.e., not there, plausible, or implausible) have differential magnitudes of impact on the participants' identification decisions? In order to answer this question, a comparison was made across conditions of z-scores that represent the amount of change in proportions between the control condition and the experimental conditions. Information about a co-witness who identified an implausible lineup member increased the identification rate of that lineup member more than information about a co-witness who identified the plausible lineup members, Lineup Member #3 and Lineup Member #6, increased the identification rate of those lineup members, $z = 2.134$, $p = .033$; $z = 3.249$, $p = .001$, respectively. However, there was not a significant difference in the increase from control in the same identification

decisions as the co-witness for an identification of the implausible lineup member and a "not there" decision, $z = .548$, $p = .583$. Remember that although a co-witness's identification of

Table 1. Increases from control condition in the proportion of participants giving the same responses as the co-witness.

Condition	% change from control	*z*-score	*p*-value	95% CI
Co-witness says "not there"	.245	3.999	<.001	(.131, .369)
Co-witness says #3 (plausible)	.163	2.413	.016	(.026, .300)
Co-witness says #6 (plausible)	.068	1.298	.194	(-.041 .178)
Co-witness says #2 (implausible)	.148	4.547	<.001	(.087, .210)

Lineup Member #3, a plausible lineup member, resulted in a significant increase from the control group of identifications of Lineup Member #3; the same was not true for Lineup Member #6, the other plausible lineup member. However, there was not a significant difference between how much influence a co-witness's identification of each of these plausible identifications had on the increase in identification rates for each, $z = 1.115$, $p = .265$. Additionally, there was not a significant difference between the influence that a co-witness who said the perpetrator was not in the lineup and influence a co-witness who says the perpetrator is Lineup Member #3, a plausible lineup member, on the rates of participants making the same decision as the co-witness, $z = 1.586$, $p = .113$. However, a co-witness who said the perpetrator was not in the lineup had a greater influence on the rates of participants making the same decision as the co-witness, than a co-witness who said the perpetrator was Lineup Member #6, a plausible lineup member, , $z = 2.701$, $p = .006$.

Identification rate change from control for the potentially influenced participants. Although the absolute change in identification rates is one way to examine the influence that a co-witness has on participants' identification decisions, this does not take into consideration that the percentage of participants who have the potential to be influenced in each condition is different. What role should the base identification rate play in the estimation of the influence of co-witness information? In the control condition, 37.2% of participants said that the perpetrator was not present in the lineup. Therefore, only 62.8% of participants who received information that the co-witness said the perpetrator was not present in the lineup could have been influenced. Therefore, the increase of 25.0% of "not there" decisions for participants who learned that their co-witness rejected the lineup underestimates the influence of the co-witness. Considering that only 62.8% of the participants who learned

that the co-witness said that the perpetrator was not in the lineup had the potential to be influenced, it is estimated that 39.8% (25.0% of the 62.8%) of those who could have been affected by the co-witness information were in fact affected.

A similar result occurs when identifications of Lineup Member #3, a plausible lineup member, are examined. In the control condition, Lineup Member #3 was identified by 22.5% of the participants, leaving only 77.5% of participants who received information that the co-witness identified Lineup Member #3 to have the potential to be influenced. Therefore, the identification rate increase of 16.3% of Lineup Member #3 for participants who learned that their co-witness identified Lineup Member #3 underestimates the influence of the co-witness. Of those who could have been affected by the co-witness information about Lineup Member #3, approximately 21.0% (16.3% of the 77.5%) were.

As the baseline identification rate of the person the co-witness identified decreases, the increase in identification rates by those participants who have the potential to be influenced diminishes. Lineup Member #6, a plausible lineup member, was only identified 11.6% of the time in the control condition. Therefore, a full 88.4% of the participants who learned that Lineup Member #6 was identified by the co-witness could have been influenced. Although the increase in identifications of Lineup Member #6 is 6.8% when all participants who were told that their co-witness identified Lineup Member #6 are examined, it is estimated that the increase in identifications of Lineup Member #6 was 7.7% (6.8% of 88.4%) when only the participants who had the potential to be influenced are examined. Because no participants in the control condition identified Lineup Member #2, the 14.8% increase of identifications of Lineup Member #2 when the participants are told that a co-witness identified Lineup member #2, is an accurate estimation of the extent to which

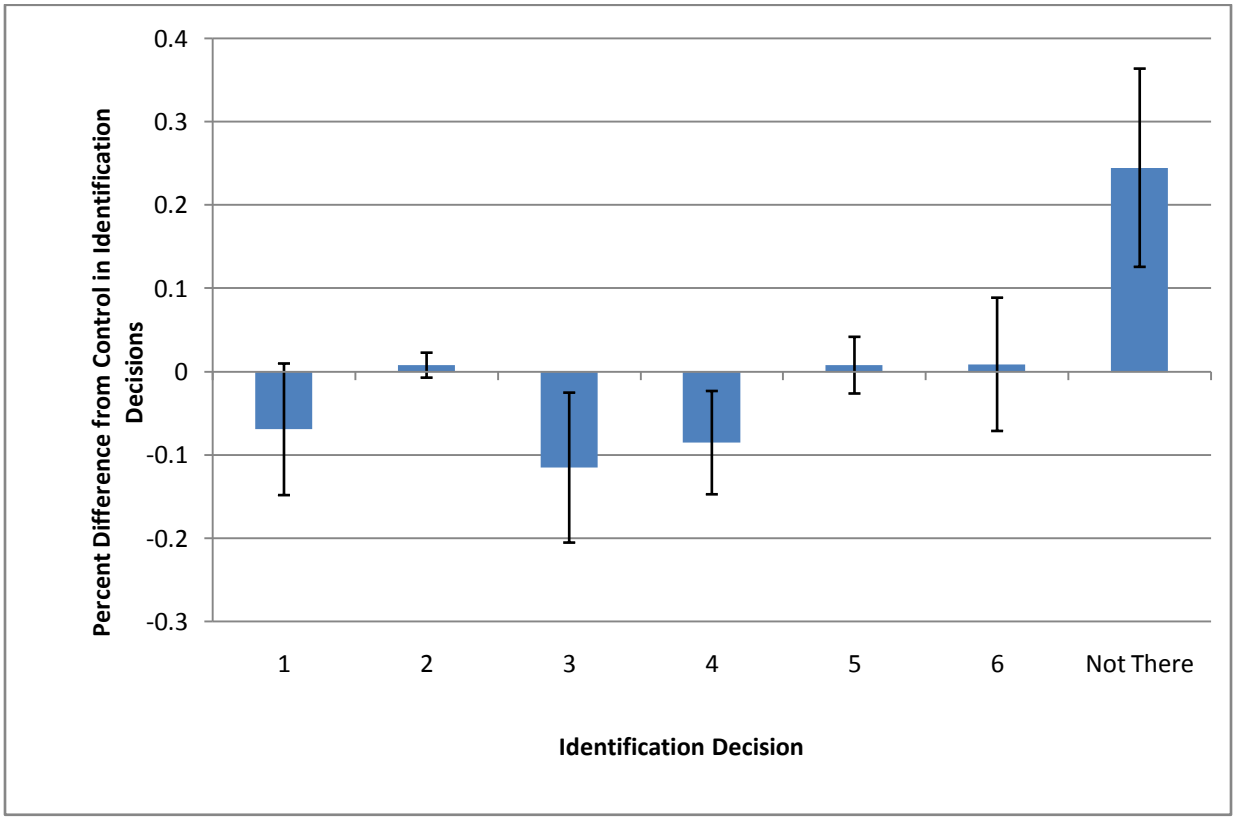
participants who had the potential to be influenced in this condition were affected by that co-witness information.

A somewhat more dramatic pattern emerges when the baseline percentage of participants who have the potential to be influenced is taken into account than when only the absolute increase in identification rates is examined. When only the participants who have the potential to be influenced are taken into consideration, it is estimated that the co-witness who said that the perpetrator was not in the lineup influenced 39.8%, the co-witness who said that the perpetrator was Lineup Member #3 influenced 21.0%, the co-witness who said that the perpetrator was Lineup Member#2 influenced 14.8%, and the co-witness who said that the perpetrator was Lineup Member #6 influenced only 7.7% of the potentially influenced participants.

Identification rate change for other identification decisions across conditions. Because responses across the seven possible response categories must total 100%, an increase in rates of identification that are in agreement with the co-witness must be accompanied by an equal decrease in the sum of the other six possible responses. Hence, for each analysis of increases in agreement with the co-witness, I also examined decreases in responses for each of the other six possible responses (again, decreases relative to the control). Figure 4 displays the change in identification rates from the control group for each of the identification decisions when the participant is told that the co-witness says that the perpetrator was not present in the lineup.

Along with the significant increase in participants who said that the perpetrator was not in the lineup, there was a significant decrease in the identification rate of Lineup Members #3 and #4, $z = 2.479$, $p = .013$, and $z = 2.605$, $p = .009$, respectively. Lineup

Figure 4. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was not in the lineup.



Member #3 was identified 22.5% of the time in the control group but only 10.9% of the time when the co-witness said that the perpetrator was not present in the lineup. Lineup Member #4 was identified 11.6% of the time in the control group but only 3.1% of the time when the co-witness said that the perpetrator was not present in the lineup. This result, showing most of the increase in "not-there" responses coming from Lineup Member #3, is not surprising because Lineup Member #3 received most of the choices in the control condition. Therefore, more participants can be moved from their identification choice of Lineup Members #1, 3, and 6 than, for instance, Lineup Members #2 and 5 because there were no choices of Lineup Member #2 and few choices of # 5 in the control condition.

As can be seen in Figure 5, the 20.3% increase in identifications of Lineup Member #3 for participants who learned about a co-witness who identified Lineup Member #3 was accompanied by a marginally significant decrease in identifications of Lineup Member #1, $z = 1.931$, $p = .053$. In fact, even though Lineup Member #1 received 20.0% of the identification choices in the control condition, less than 6% of participants who learned that the co-witness made an identification of #3 went on to identify Lineup Member #1 as the perpetrator of the crime. This significant decrease in identifications of Lineup Member #1 when participants learned that the co-witness identified Lineup Member # 3 is a particularly important result because the two parameter models (such as the WITNESS model) cannot accommodate such a result.

Participants who were told that their co-witness identified Lineup Member #6, a plausible identification, did not show a significant increase from control in the rate of identifications of Lineup Member #6. Accordingly, there was also not a significant decrease in any of the other identification choices from the control identification rates. (See Figure 6.)

Figure 5. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #3.

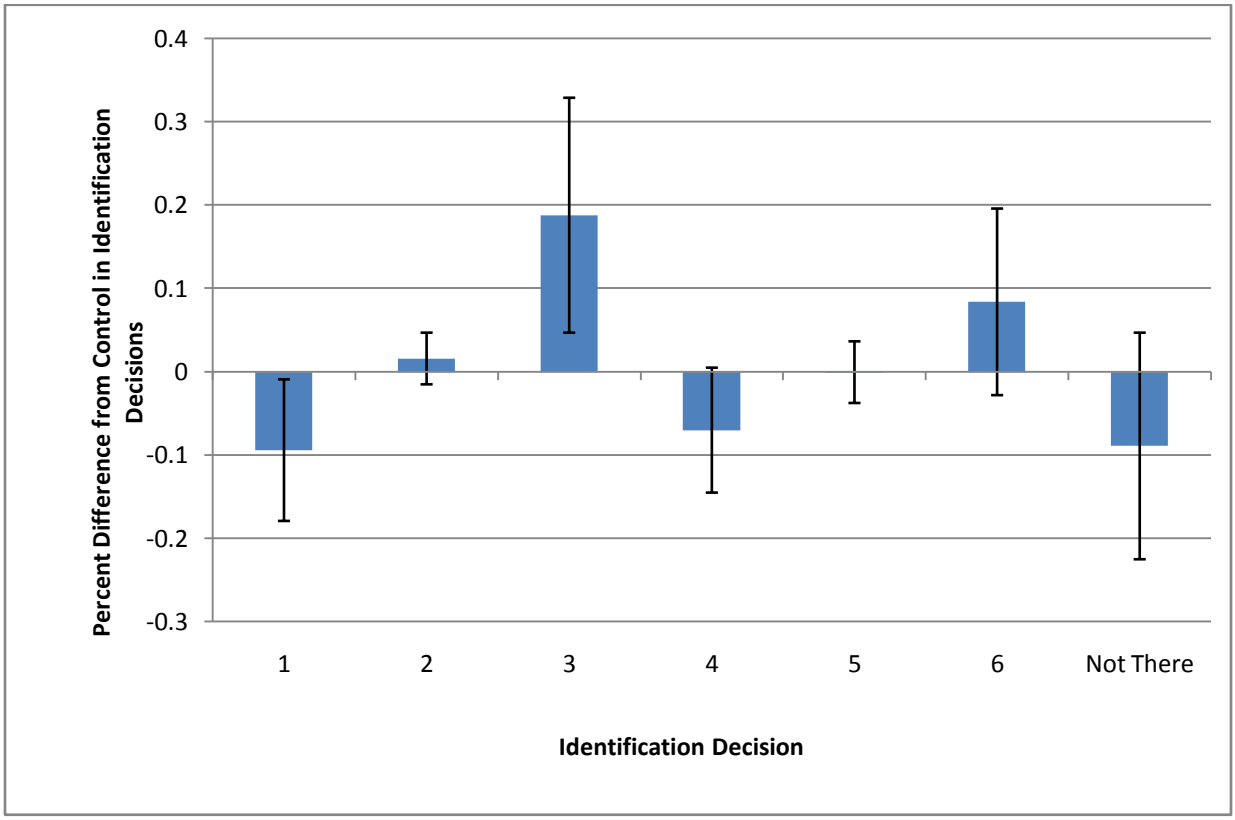


Figure 6. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #6.

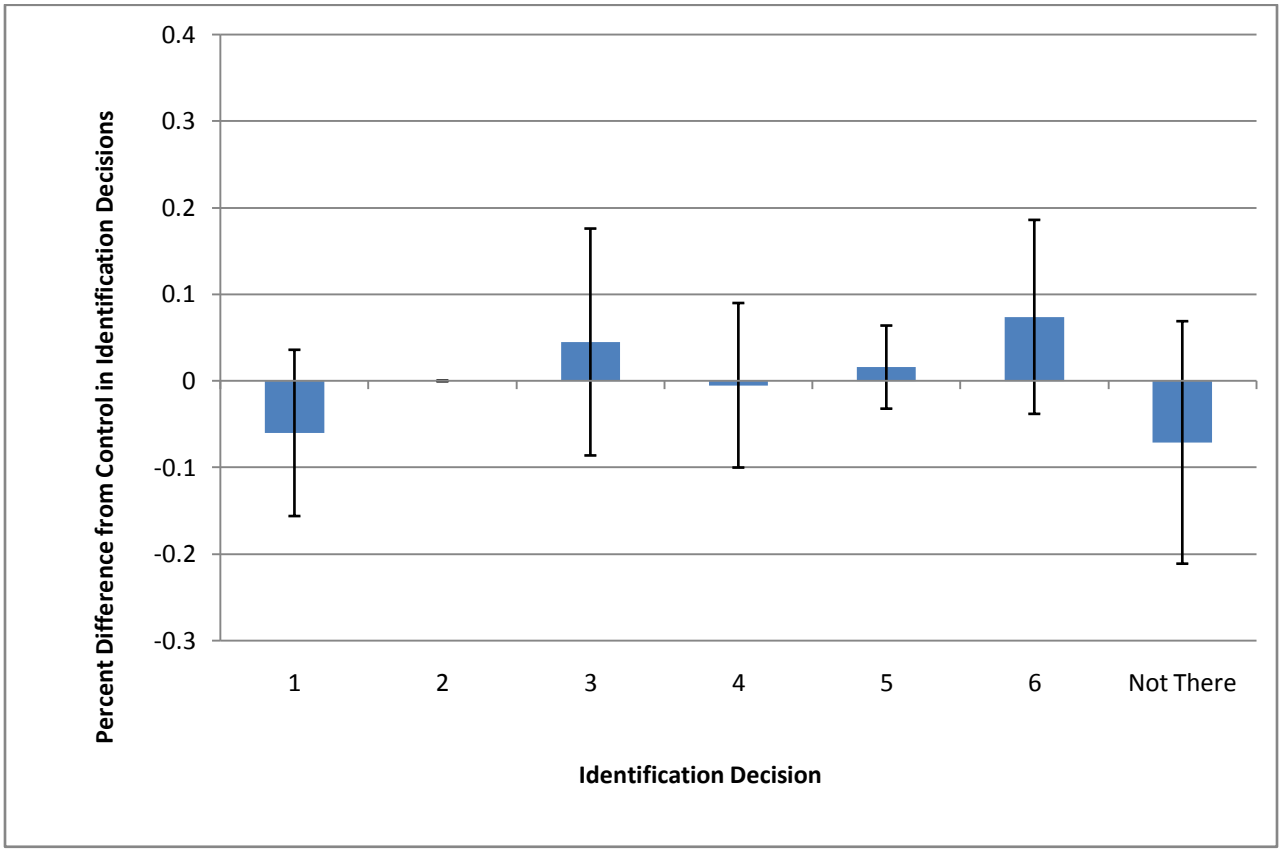
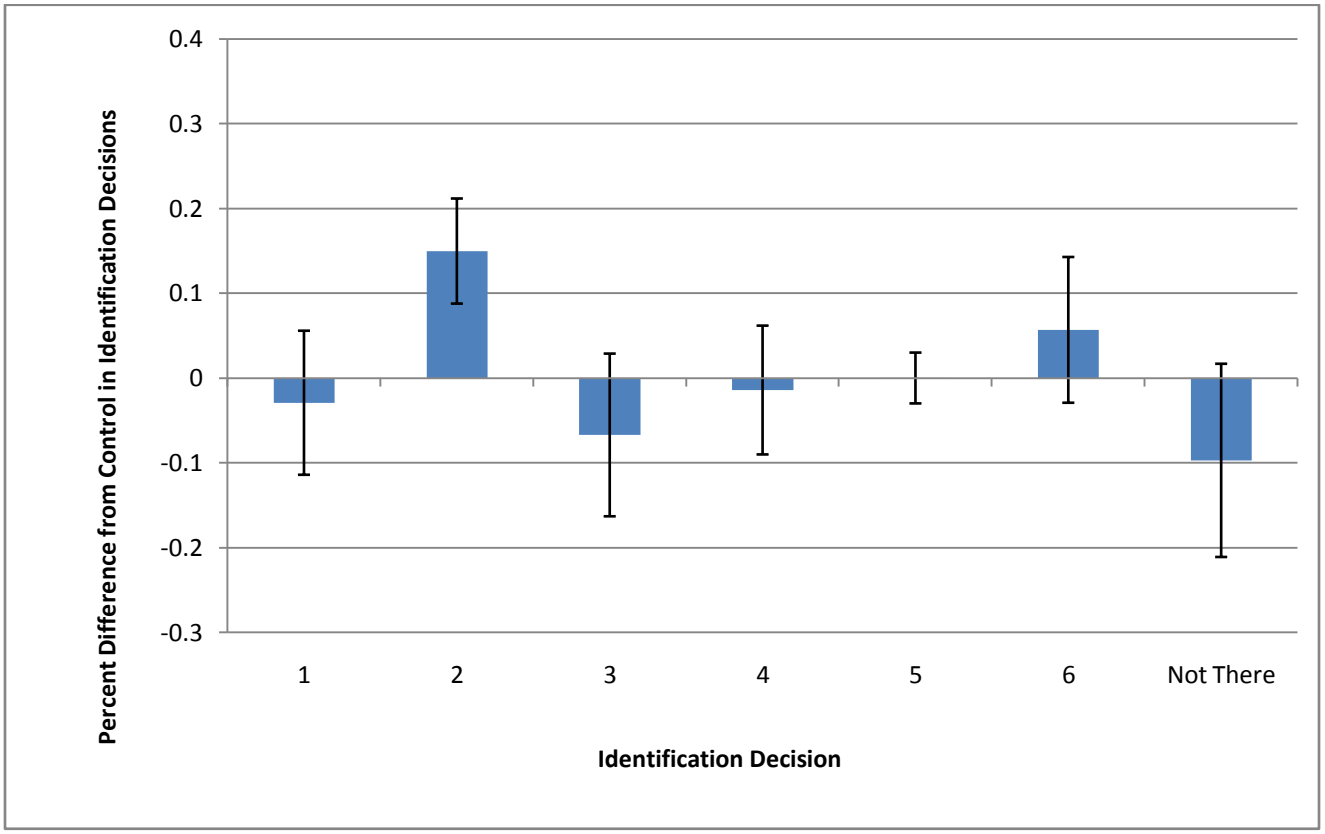


Figure 7. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #2.

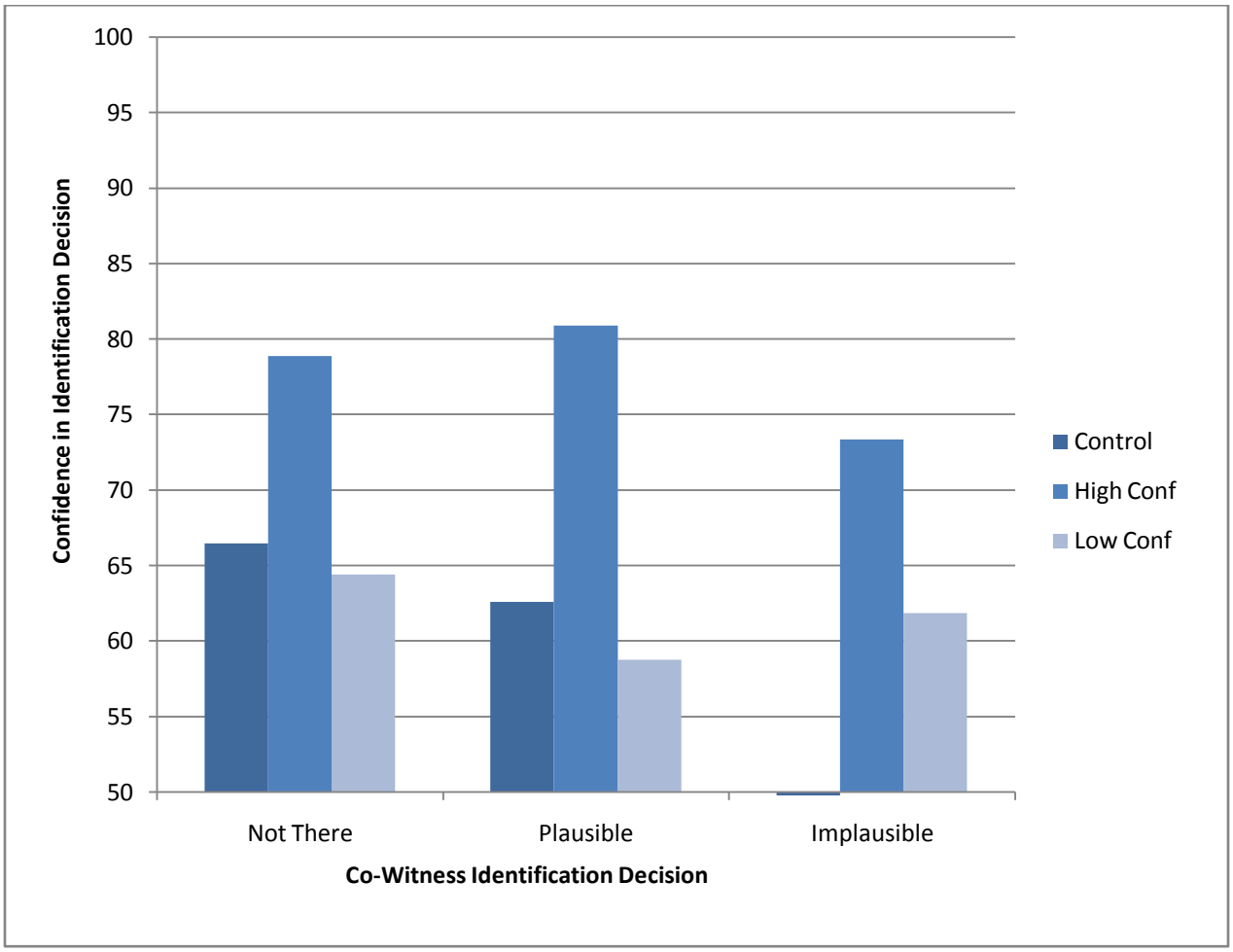


As can be seen in Figure 7, there was a significant increase in identifications of Lineup Member #2, the implausible lineup member, for participants who were told that the co-witness identified Lineup Member #2. Although this increase in identifications of the implausible lineup member was not accompanied by a significant decrease from the control identification rate in the proportion of participants who made any specific other identification decision, most of this effect appears to be a result of decreases in rates of those who would have made "not there" decisions and those who would have identified Lineup Member #3.

Confidence Response Data

Would the confidence of participants in their identification decisions be influenced by the information about the co-witness's identification behavior and whether or not the participants made the same decision as him or her? A 3(co-witness choice: four categories: not there, plausibles, implausible) x 2(co-witness confidence: high, low) x 2(participant identification: same as co-witness, different than co-witness) ANOVA was conducted in order to answer this question. The identification decision that the co-witness made (not there, plausibles, or implausible) did not significantly influence how confident participants were in their identification decisions, $F(2,373) = 1.66$, $p = .19$, Cohen's $f = .002$. However, participants who learned about a co-witness who made an identification decision with high confidence expressed significantly more confidence in their identification decision than those who learned that the identification decision was made with low confidence, $F(1,373) = 88.01$, $p < .001$, Cohen's $f = .24$. (See Figure 8.) Additionally, participants were more confident in their identification decision of they made the same identification as the co-witness than if they made a different identification than the co-witness, $F(1,373) = 88.01$, $p < .001$, Cohen's $f = .24$. Because there were no significant differences in the results when the

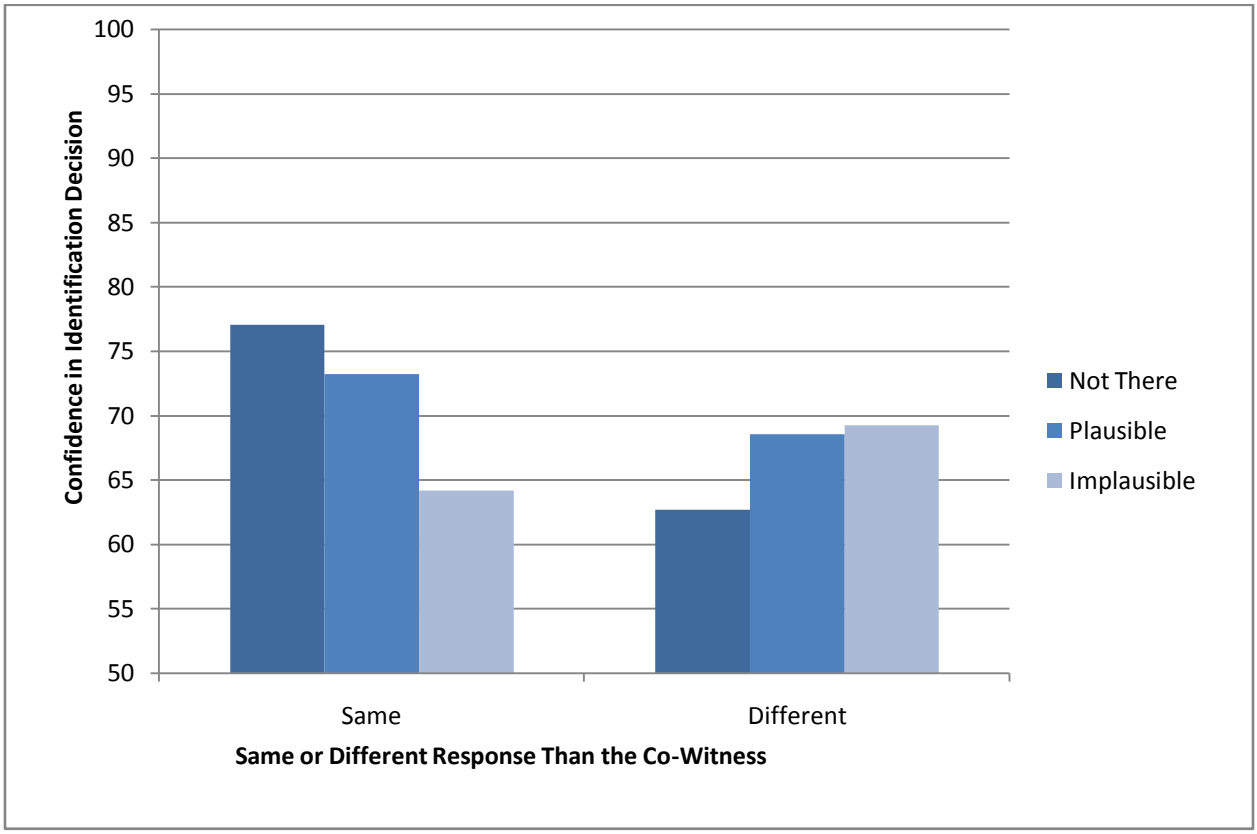
Figure 8. Participants' confidence in their identification decisions, regardless of identification decision.



plausible identification choices were combined or separated, they have been combined for the purposes of subsequent analyses.

The confidence participants expressed about their identification varied as a function of the identification decision the co-witness made and whether or not the participant made the same decision as the co-witness, $F(2,373) = 9.57$, $p < .001$, Cohen's $f = .05$. (See Figure 9.) A one-way ANOVA for participants who made the same decision as their co-witness revealed that these participants were more confident in the identification if they agreed with the co-witness that the perpetrator was not present in the lineup or that the perpetrator was a plausible lineup member, than if they agreed with the co-witness that the perpetrator was an implausible lineup member, $F(2,133) = 3.83$, $p = .02$. However, a one-way ANOVA on participants who made different decisions than their co-witness revealed that these participants did not significantly differ in their confidence in their identification decision, regardless of who the co-witness identified, $F(2,246) = 2.66$, $p = .07$. Contrary to the hypothesized pattern, there was not a significant interaction between the co-witness's identification decision and the co-witness's confidence or between the co-witness's identification decision and whether participants made the same or different decision than the co-witness on participant confidence, $F(2,373) = 2.23$, $p = .11$, Cohen's $f = .01$; $F(1,373) = .468$, $p = .49$, Cohen's $f < .001$, respectively. Additionally, the three-way interaction amongst co-witness identification decision, co-witness confidence, and whether or not participants made the same decision as the co-witness was not significant, $F(2,373) = .930$, $p = .40$, Cohen's $f = .07$.

Figure 9. Participants' confidence in their identification decision as a function of making the same or different identification decision as a co-witness who made a "not there," plausible, or implausible identification decision.



DISCUSSION

The WITNESS model is the dominant computational conceptualization of eyewitness identification behavior and is designed specifically to describe eyewitness choices in lineups (Clark 2003, 2005). The WITNESS model is a traditional model of recognition behavior, similar to signal detection models of recognition judgments, which incorporates two parameters: signal strength and decision criterion. According to the model, an eyewitness will make an identification if the weighted sum of the best match and the difference between the best match and next-best match is above the eyewitness's identification decision criterion. Additionally, according to the model an eyewitness will say that the perpetrator is not present if each of the individual lineup members' match values is below the eyewitness's rejection decision criterion.

Although the match and decision-criterion parameters appear to do a reasonable job of accommodating many of the eyewitness identification studies in the literature, the data from Experiment 1 challenge the WITNESS model and any other conceptualization that relies solely on these two parameters. In particular, neither the match parameter nor the decision-criterion parameter appears able to explain how the implausible co-witness condition led to a significant increase in choices of that implausible lineup member. The data from the control condition are compelling in showing that no one naturally selects this implausible lineup member and that it is the other lineup members instead who have the best match characteristics. Regardless of whether this increase in choices of the implausible lineup member were being drawn from "not there" participants (which some appear to be, see Figure 7) or from one of the plausible lineup members (some are coming from Lineup

Member #1, see Figure 7), neither the decision criterion parameter nor the match parameter can predict or explain this finding.

Additionally, a problem exists for the WITNESS model in explaining why there was a significant decrease in identifications of Lineup Member #1 when participants learned that the co-witness identified Lineup Member # 3. The criterion-shift parameter of the WITNESS model could explain why there might be a decrease in "not-there" responses when the co-witness identified Lineup Member # 3, but why would this manipulation reduce choices of Lineup Member #1? There is nothing in the WITNESS model (or other global matching models) that would allow the match parameter to accommodate this finding either, because the match parameter is, in effect, a judgment of perceptual similarity between the witness's memory and the lineup member. . It is clear that the WITNESS model and other two-parameter recognition models must be reworked in order to include a third, social influence variable.

The phenomenon of an eyewitness identifying a clearly implausible lineup member appears similar to what is observed in some of the proven cases of mistaken identification. James Newsome was identified by three separate eyewitnesses as the perpetrator of an armed robber crime. However, if the eyewitnesses had been using the decision-making process described in the WITNESS model, there would be only a 1 in 37,037 chance that all three eyewitnesses would have identified him as resembling the perpetrator. Although the WITNESS model may be able to predict whether or not eyewitnesses will attempt an identification, the model is unable to account for eyewitnesses who do not identify the lineup member that best matches their memory of the perpetrator. Obviously, in cases such as Newsome's, there is a third parameter playing a role in the decision-making process that is

missing from the WITNESS model. According to the testimony of the lone surviving witness in the Newsome case, who testified at the civil suit after the exoneration of Newsome, he did not think anyone in the lineup was the murderer but the Chicago Police Detectives told him that he must choose number two in the lineup (Newsome) and he complied with that demand.

The Newsome case appears to be an example of one kind of social influence, namely compliance or obedience to authority. In the case of Experiment 1, however, obedience to authority is not the type of social influence that is involved (the co-witness is not an authority figure or someone who has power over the participant). Instead, the observed effect in Experiment 1 appears to be what is typically called conformity. Conformity can be due to normative influences or informational influences. Normative influence—in which a person conforms in order to be accepted by the group—does not appear to play a role in this experiment because participants made their identification decisions while in cubicles by themselves, they were led to believe that their co-witness had already been run in the experiment, and there was no reason for them to believe that they would encounter their co-witness in the future. Therefore, information influence—in which a person conforms because he or she believes the influencer is correct—is the more descriptive of the type of conformity occurring in this paradigm.

The extent to which the eyewitnesses internalized their identifications is indicative of whether normative or information influence played a role in the participants' conformity to the co-witness's identification decisions. Internalization can be examined by looking at the confidence they expressed in their identification decision. Eyewitnesses who made the same identification decision as their co-witness expressed higher confidence in that identification than did eyewitness who made a different identification decision than their co-witness.

Additionally, of the participants who made the same identification as their co-witness, those who said the perpetrator was not in the lineup and those who said the perpetrator was a plausible lineup member had higher confidence in their identifications than those who said the perpetrator was an implausible lineup member. Participants who identified the implausible lineup member after learning that their co-witness identified that lineup member were 64% confident in that decision, which was similar to the average confidence (67%) people in the control condition expressed in their identification decisions of the plausible lineup members. Because no participant in the control condition identified the implausible lineup member, it can be assumed that the confidence that they would have had that the implausible lineup member was the perpetrator would be much lower than that the average confidence level. This is because participants who made identification decisions based on similarity alone made the decision in which they had the most confidence. If the implausible lineup member was never identified by people in this group, then they were all more confident that the perpetrator was either not in the lineup or was another lineup member, than they were that the implausible lineup member was the perpetrator.

In general, everyone seemed to look to the co-witness somewhat for cues on how to respond to the questions about their identifications and their confidence in their identifications. This is evidenced by the way in which, regardless of the identification decision the co-witness made or whether or not people made the same decision as the co-witness, those that learned that their co-witness expressed high confidence in his or her decision had higher confidence in their own decision than those who learned that their co-witness expressed low confidence in his or her decision. However, this confidence-matching activity appears to be the only influence that the co-witness's confidence in his or her

identification decision had on participants' identification decisions and confidence in those decisions.

It was somewhat surprising that the implausible co-witness information led to a significant increase in choices of the implausible lineup member, and this was equally true regardless of the confidence of the co-witness. This suggests that the participants probably had quite weak memories for the perpetrator. More will be said about this in the final discussion section, but the fact that a 55% confident co-witness can have as much effect as a 98% confidence co-witness, even to the point of leading a significant proportion of participants to select an implausible lineup member, is not something that would be expected from participants who have a reasonable independent recollection of the perpetrator. The fact that a majority of the participants in the control condition made a positive identification even though the actual perpetrator was not in the lineup (and yet were warned that he might not be present) also suggests a very weak memory for the perpetrator. At the same time, memory for the perpetrator was good enough in the control condition for participants to avoid selecting the implausible lineup member. Because the confidence of the co-witness had no influence in Experiment 1, co-witness confidence was not manipulated in Experiment 2.

Would these findings be different if the eyewitnesses were asked to think about the identification decision they would make before ever receiving the co-witness information? It is possible that the eyewitnesses follow their co-witnesses' identification decisions because they have not yet made an identification on their own. Therefore, once they view the lineup, they only look to confirm the identification hypothesis provided by the co-witness. Experiment 2 examined this potential memorial trace moderator of co-witness conformity.

EXPERIMENT 2

INTRODUCTION

In Experiment 1 the participant-witnesses were given information about their co-witness's identification decision before the participants ever viewed the lineup. Experiment 2 examined whether or not the order in which participants accessed their memorial information and received extra-memorial information would moderate the co-witness conformity effect. Due to the anchoring and adjustment phenomenon (e.g., Chapman & Johnson, 2002; Epley & Gilovich, 2006; Jacowitz & Kahneman, 1995; Tversky & Kahneman, 1974), the order in which people encounter information that is self-generated or other-generated (i.e., whether the first piece information is memorial or extra-memorial) is hypothesized to moderate the co-witness conformity effect.

Prophylactics of Social Influence on Memory

It has been found that having people recall an image on their own before collaborating with a co-participant nearly eliminates the confidence bolstering that results from collaborative recall (Stephenson & Wagner, 1989). Additionally, research on the post-identification feedback effect has shown that if people who make an identification merely think about how confident they are in their decision and how they would answer other testimony-relevant variables before receiving confirming feedback, then the effect of the feedback on their subsequent answers to testimony-relevant questions is nearly eliminated (Wells & Bradfield, 1999). Simply thinking about how they would respond, without actually responding yet to the questions, acts as a prophylactic against the influence of the feedback. It is hypothesized that this occurs because people are unaware of how they would respond to the testimony-relevant questions until they are actually asked to consider them. Thinking

about how they would respond to the questions, without explicitly answering them, allows the eyewitnesses to anchor their subsequent responses on their true answers to these questions. Therefore, when given the influencing information about the accuracy of their identification, there is little to no inflation of eyewitnesses' estimates of their views on testimony-relevant questions.

Anchoring and Adjustment

In general, people make estimates by starting at an initial value and adjusting from that value to arrive at the final answer. However, the adjustments tend to be insufficient, thereby producing a final answer that is biased towards the initial value. Consequently, the initial value has been termed an anchor (Chapman & Johnson, 2002; Epley & Gilovich, 2006; Jacowitz & Kahneman, 1995; Tversky & Kahneman, 1974) because it restricts the extent to which a person will make adjustments from that anchor based on new information or further thought. The starting point can either be provided to or generated by the person who ultimately must provide an estimated answer.

Classic work done by Tversky and Kahneman on the anchoring and adjustment phenomenon has included both arbitrary, other-generated and non-arbitrary, self-generated anchors (Tversky & Kahneman, 1974). In one study, participants were asked provide an estimate in terms of percentages. Before providing the estimate, participants spun a wheel that was numbered from 0 to 100. They then had to state whether the final answer was higher or lower than the number on the wheel. The number on the wheel provided a clearly arbitrary other-generated anchor for the participants, and their final estimates tended to be somewhat biased towards this anchor.

In another study, participants were asked to provide an estimated answer to a numerical expression that was written on a blackboard, but they were not given enough time to fully solve the problem (Tversky & Kahneman, 1974). One half of the participants were asked to estimate the answer to 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8 and the other half were asked to estimate the answer to 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1. The median estimate for the ascending computation was 512, but the median estimate for the descending computation was 2,250. The correct answer is 40,320. For these problems, participants created their own, non-arbitrary anchors by making a sort of incomplete computation by computing the answer for the first few terms in the equation before giving their estimated answer to the problem. The participants who viewed the descending computation had a higher overall estimate for the answer to the problem because they began by multiplying 8, 7, and 6 whereas participants who viewed the ascending computation began by multiplying 1, 2, and 3.

Part of the reason for insufficient adjustment from an anchor is that the existence of an anchor, especially a self-generated, non-arbitrary anchor, results in increased accessibility of anchor-consistent information (e.g., Mussweiler & Strack, 1999; 2000; 2001b). Because of peoples' tendencies to confirm their original hypotheses (e.g., Bressan & Dal Martello, 2002; Darley & Gross, 1983; Kelley, 1950), the resulting estimation or judgment tends to be disproportionately consistent with the anchor. Additionally, adjustments tend to be insufficient because people stop adjusting as soon as they reach the end of some implicit range of plausible values (Epley & Gilovich, 2006; Mussweiler & Strack, 2001a); thereby adjustment stops toward the anchor side of a range of plausible values.

Anchors have to be considered plausible estimates before they can serve as an anchor (Epley & Gilovich, 2001). Self-generated anchors will typically be considered plausible,

although other-generated anchors might not. The reason is that some other-generated anchors, such as a number generated by spinning a wheel, may appear arbitrary, whereas self-generated anchors, such as one that is reached by making a partial computation to a problem, are automatically non-arbitrary or meaningful. In the case of a co-witness whose identification decision serves as an other-generated anchor, this decision should not be considered arbitrary. This is because participants will not assume that their co-witness is spinning a wheel in order to reach his or her decision but rather that the decision reflects the co-witness's beliefs. Therefore, this other-generated anchor will continue to have anchoring characteristics on the participant-witnesses' identification decisions.

Additionally, the processes by which people evaluate and adjust from other-generated and self-generated anchors appear to be quite different, resulting in self-generated anchors being much more powerful than other-generated anchors (Epley & Gilovich, 2006). Responses to estimates that are given following other-generated anchors tend to fall towards the center of the range of plausible values for an estimate—those within a latitude of acceptance—rather than be very biased towards the anchors. Adjustments from self-generated anchors, however, tend to be insufficient because people stop the adjustment process once a plausible value is reached, but if they are willing and able to search for a more accurate estimate, then they will continue to adjust from the initial self-generated anchor.

In Experiment 1, the identification decision that the co-witness made was provided to the participants before they had a chance to view the lineup themselves. In Experiment 2, some participants were given information about the co-witness's identification only *after* they viewed the lineup themselves. Because my interest is in the differential negotiation process utilized by the participant-witnesses who view the lineup first or receive co-witness

information first, I only utilized the most powerful co-witnesses—those who make plausible identification decisions with high confidence. This experiment was a 2(Order: lineup first, co-witness information first) x 2(Identification decision: plausible, correct rejection) between-subjects design with an additional control condition in which participants were not given any information about the co-witness's identification.

If, as hypothesized, the order in which participants received information about their co-witness's identification decision and view the lineup moderates the co-witness conformity effect, then this would provide information about the process by which people negotiate memorial and extra-memorial information. If people really are using the discrepancy between the memorial information and extra-memorial information that they have when making a recognition decision, then the order in which they receive, or access, those two sets information should define which of these pieces of information the anchor is.

Counterfactual Assessments of Influence

One aspect of the identification process that may be presented to triers of fact is the extent to which an eyewitness believes that he or she has been influenced by a prejudicial variable. This is often assessed during a pre-trial hearing in which the admissibility of the eyewitness identification is discussed. Typically during such a hearing, an eyewitness is asked whether or not a prejudicial variable had any influence on him or her, and the majority of the time the eyewitness will say that it did not. Recently, a counterfactual paradigm has been developed to find out if people can determine the extent to which a variable has influenced their identification decision and if they can mentally "undo" the influence of that variable (Charman & Wells, 2008). In the counterfactual-estimation paradigm, eyewitnesses are asked how they would have responded to particular questions had they not been exposed

to a specific contaminating variable. In order to determine how well the eyewitness is able to correct for this influence, another group of eyewitnesses is exposed to the exact same situation, but without that particular contaminating variable. Then, the counterfactual answer that the influenced eyewitnesses provided is compared with the answer that the non-influenced eyewitnesses provided to the same question. If the influenced eyewitnesses are able to undo the contamination, then these two answers should be similar.

There have only been two studies (one article) conducted so far that have used this counterfactual-estimation paradigm (Charman & Wells, 2008), and the authors concluded that, at least in regard to lineup instructions and co-witness, post-identification feedback, eyewitnesses are able to determine that these contaminating variables had an influence on their identification decision. Additionally, the eyewitnesses were able to somewhat correct for the influence. However, at times they overcorrected and other times they under-corrected for the influence, and these corrections appear to represent guesses, rather than introspective access to what the witnesses were thinking before they received the contaminating information.

Congruent with the findings of previous research on counterfactual thinking (Dunning & Parpal, 1989), it was found that people are able to see more of an impact from mentally adding a form of influence to a situation than they do from mentally subtracting that same influence from a situation. Accordingly, underestimation of the influence of a prejudicial factor occurs when people attempt to subtract the influence that the factor has had on them. All of the counterfactual estimates in this study were subtractions of influence. Based upon the findings in the counterfactual literature (Charman & Wells, 2008; Dunning & Parpal), it was predicted that participants who receive information about their co-witness identification

decision before viewing the lineup themselves will be unable to fully subtract the influence of this information. However, participants who view the lineup before receiving information about their co-witness's identification decision should be able to accurately estimate how they would have responded to the identification question had they not been given information about their co-witness. This is because participants who view the lineup first should know how they would have responded to the lineup had they not received information about the co-witness's identification, and should, therefore, be able to mentally undo any influence that the co-witness has on them.

METHOD

Three hundred and sixty participants from a large Midwestern university received partial research course credit for their participation in this experiment. Participants in Experiment 2 watched the same video and were told of the existence of a co-witness in the same way as were participants in Experiment 1. However, after viewing the video-taped crime, participants were randomly assigned to a lineup first or co-witness information first condition. Participants who were in the lineup first condition viewed the target-absent lineup for 15s and were asked to think about the identification decision that at they would make when given an opportunity to make a decision. They were then were given information about the co-witness's identification decision for 15s. Participants who were in the co-witness information first condition were given information about the co-witness's identification for 15s, and then they were asked to look at a lineup and think about the identification decision they would make when given the opportunity to make a decision for 15s. The co-witness information that participants received was either a plausible identification (of which there were two) or a "not there" response. In Experiment 2, the lineup members utilized as the plausible lineup members were #1 and #3 because these two lineup members had the highest identification rates in the control condition in Experiment 1. All participants were told that the co-witness's identification decision was made with 98% confidence.

At this point, all participants saw a new screen on which they were asked to indicate their identification decision and their confidence in the decision, as were participants in Experiment 1. Participants in the experimental conditions were then told that the experimenters were also interested in whether or not the information from the co-witness influenced their identification decision. Therefore, they were asked to indicate the

identification decision they would have made had they not received information about the co-witness's identification decision. They were also asked to indicate the confidence they would have made this identification had they not received any information about the co-witness's identification or confidence in the identification.

The control condition was designed to determine the base rate for each identification decision without co-witness influence and a large number of participants in this condition would serve to stabilize this base rate information. Although the 360 previously-mentioned participants were randomly assigned to an experimental condition or the control condition in this experiment, an additional 65 participants were run in the control condition in Experiment 1. Recall that following a non-significant test of the differences between the control conditions in Experiment 1 and Experiment 2, that data were collapsed for all subsequent analyses in order to increase the stability of the base rate information. (See Figure 3.)

RESULTS

It was hypothesized that the order in which participants received information about their co-witness's identification decision and viewed the lineup would moderate the co-witness conformity effect. Therefore, I compared the rates at which participants made different identification decisions across the experimental conditions. I then compared the proportion of participants in each experimental condition who made a particular identification decision to the proportion of participants in the control condition who made that identification decision. It was also hypothesized that participants who saw the lineup first would be better able to estimate how they would have performed without the information from the co-witness than participants who received the co-witness information first. Therefore, I compared participants' counterfactual estimates of the identification decision they would have made had they not been given information about the co-witness's decision to the proportion of participants in the control condition who made that decision and to the proportion of participants in the experimental condition who made that decision.

Of the 425 participants, 37 were excluded from analysis because they had taken a class in which eyewitness variables were discussed or had seen the "crime" video and lineup at some point before participating in the experiment. Therefore, data analyses are based on 388 participants from a large Midwestern university who received partial research course credit for their participation in this experiment.

Actual Identification Response Data

Overall Identification Rate Change in Experimental Conditions

Did the manipulated variables affect the distribution of identification responses across the seven choice possibilities? A three-way hierarchical loglinear analysis by backward

elimination was carried out to determine associations between co-witness choice (three categories: not there, plausible #1, plausible #2) and information order (two levels: lineup first, co-witness information first) on witness choices (seven categories: identify 1, 2,…6. or "not there"). The interaction between co-witness choice and information order was not significant, $X^2(12, N = 259) = 7.82$, $p = .80$. However there were significant combined main effects for co-witness choice and information order, $X^2(20, N = 3259) = 44.71$, $p = .001$. The generating class of the final model only includes the main effect of co-witness decision on participants' identification choices. Because information order was not a significant moderating variable of the participants' identification decisions, subsequent analyses of identification rates were collapsed across information order.

Overall Identification Rate Change in Experimental Conditions

Although the co-witness's identification appears to have had an effect on the participants' identification decisions, differences across these decisions might merely be a result of different base rates for each of the possible identification decisions. As can be seen in Figure 3, control rates for the critical identification decisions (Not there, Lineup Member #1, and Lineup Member #3), ranged from 15.5% to 37.2%. Therefore, subsequent analyses are composed of contrasts using z-tests of proportions on differences (changes) in proportions between the control condition and the experimental conditions.

Identification Rate Change From Control Across Conditions

Participants who were told that their co-witness said the perpetrator was not in the lineup had an increased rate at which they also said that the perpetrator was not present in the

lineup from those in the control condition by 18.9%, $z = 3.055$, $p = .002$. (See Table 2.)[2] When participants learned that their co-witness identified Lineup Member #1, a plausible lineup member, they were more likely to identify him as the perpetrator of the crime than were participants in the control condition, $z = 2.076$, $p = .038$. However, participants who learned that their co-witness identified Lineup Member #3, a different plausible lineup member, did not identify Lineup member #3 at a rate significantly different from the control condition, $z = .333$, $p = .740$.

Change From control in identification rates across conditions. Did the co-witness conditions (i.e., not there, plausible, or implausible) have differential magnitudes of impact on the participants' identification decisions? In order to answer this question, a comparison was made across conditions of z-scores that represent the amount of change in proportions between the control condition and the experimental conditions. Participants who were told that the co-witness said the perpetrator was not present in the lineup, had a greater increase from control in the proportion of participants who made that identification than did participants who were told that the co-witness said the perpetrator was Lineup Member #3, a plausible identification, $z = 2.722$, $p = .007$. The increase from control in the proportion of participants who identified Lineup Member #1 after learning that the co-witness identified Lineup Member #1 was not significantly different, however, from the increase from control in the proportion of participants who made the same identification as the co-witness after learning that the co-witness said that the perpetrator was "not there" and participants who

[2] A table with percent increases from the control condition in participants giving the same responses as the co-witness separated by the order in which participants viewed the lineup and received the co-witness information can be found in Appendix B.

Table 2. Increases from control condition in the proportion of participants giving the same responses as the co-witness.

Condition	% change from control	z-score	p-value	95% CI
Co-witness says "not there"	.189	3.055	.003	(.070, .309)
Co-witness says #1 (plausible)	.126	2.076	.038	(-.001, .253)[3]
Co-witness says #3 (plausible)	.021	0.333	.740	(-.106, .148)

[3] Because the z-test assumes that the null hypothesis is true and the 95% CI does not assume that the null hypothesis is true, this CI includes 0 even though the z-score indicates that the difference is significant at the .038 level.

were told that the co-witness said the perpetrator was Lineup Member #1, a plausible identification, $z = .979$, $p = .328$ and $z = 1.743$, $p = .081$, respectively.

Identification rate change from control for the potentially-influenced participants. A report of the 21.8% average increase from control in participants saying that the perpetrator was not in the lineup after hearing that the co-witness had done so underestimates the extent to which participants were influenced by the co-witness information. Because in the control condition 37.2% of the participants said that the perpetrator was not in the lineup, only 62.8% of the participants who were told that the co-witness said the perpetrator was "not there" had the potential to be influenced by the co-witness information. Of these participants that had the opportunity to be influenced, an estimated 33.8% (21.8% of 62.8%) decided to say that the perpetrator was not present in the lineup even though they would not have made that decision without information from the co-witness.

A similar result occurs when identifications of Lineup Member #1, a plausible lineup member, are examined. In the control condition, Lineup Member #1 was identified by 15.5% of the participants, leaving only 84.5% of participants who received information that the co-witness identified Lineup Member #1 to have the potential to be influenced. Therefore, the identification rate increase of 17.2% of Lineup Member #1 for participants who learned that their co-witness identified Lineup Member #1 underestimates the influence of the co-witness. Of those who could have been affected by the co-witness information about Lineup Member #1, approximately 20.4% (17.2% of the 84.5%) were.

Lineup Member #3, a plausible lineup member, was identified 22.5% of the time in the control condition, which leaves 77.5% of the participants who learned that Lineup Member #3 was identified by the co-witness to have the possibility of being influenced.

However, the rate at which participants identified Lineup Member #3 increased by 2.1% when participants were told that their co-witness identified Lineup Member #3. Therefore, the participants that had the opportunity to be influenced, an estimated 2.7% (2.1% of 77.5%) decided to say that the perpetrator was Lineup Member #3 even though they would not have made that decision without information from the co-witness.

Identification rate change for other identification decisions across conditions. Because responses across the seven possible response categories must total 100%, an increase in rates of identification that are in agreement with the co-witness must be accompanied by an equal decrease in the sum of the other six possible responses. Hence, for each analysis of increases in agreement with the co-witness, I also examined decreases in responses for the other six possible responses (again, decreases relative to the control). Figure 10 displays the change in identification rates from the control group for each of the identification decisions when the participant is told that the co-witness says that the perpetrator was not present in the lineup. There was a significant increase in the percentage of participants saying that the perpetrator was "not there" for participants who were told that the co-witness said that the perpetrator was not in the lineup. However, this was not accompanied by a significant decrease from the control identification rate in the proportion of participants who made any other identification decision.

As can be seen in Figure 11, the 17.2% increase in identifications of Lineup Member #1 for participants who learned about a co-witness who identified Lineup Member #1 was not accompanied by a significant decrease in any other identification decision.

Figure 10. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was not present in the lineup.

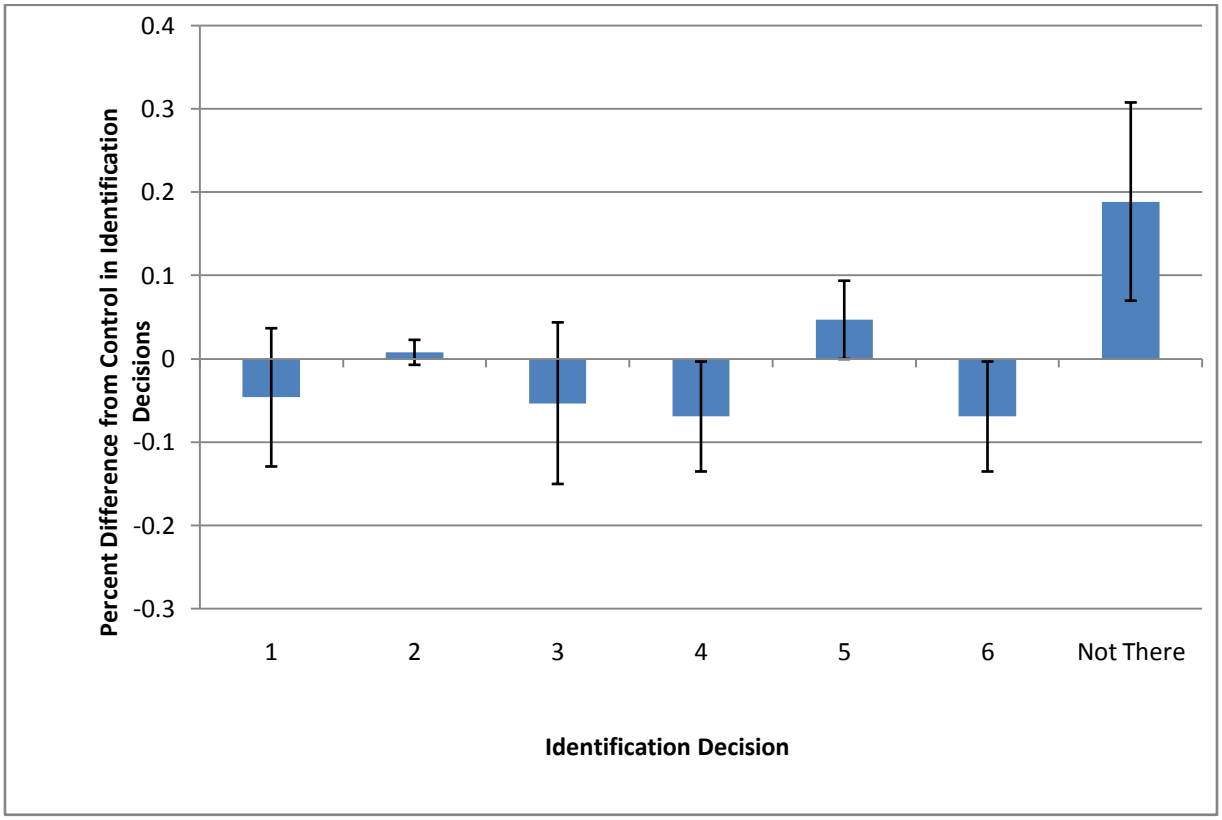


Figure 11. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #1.

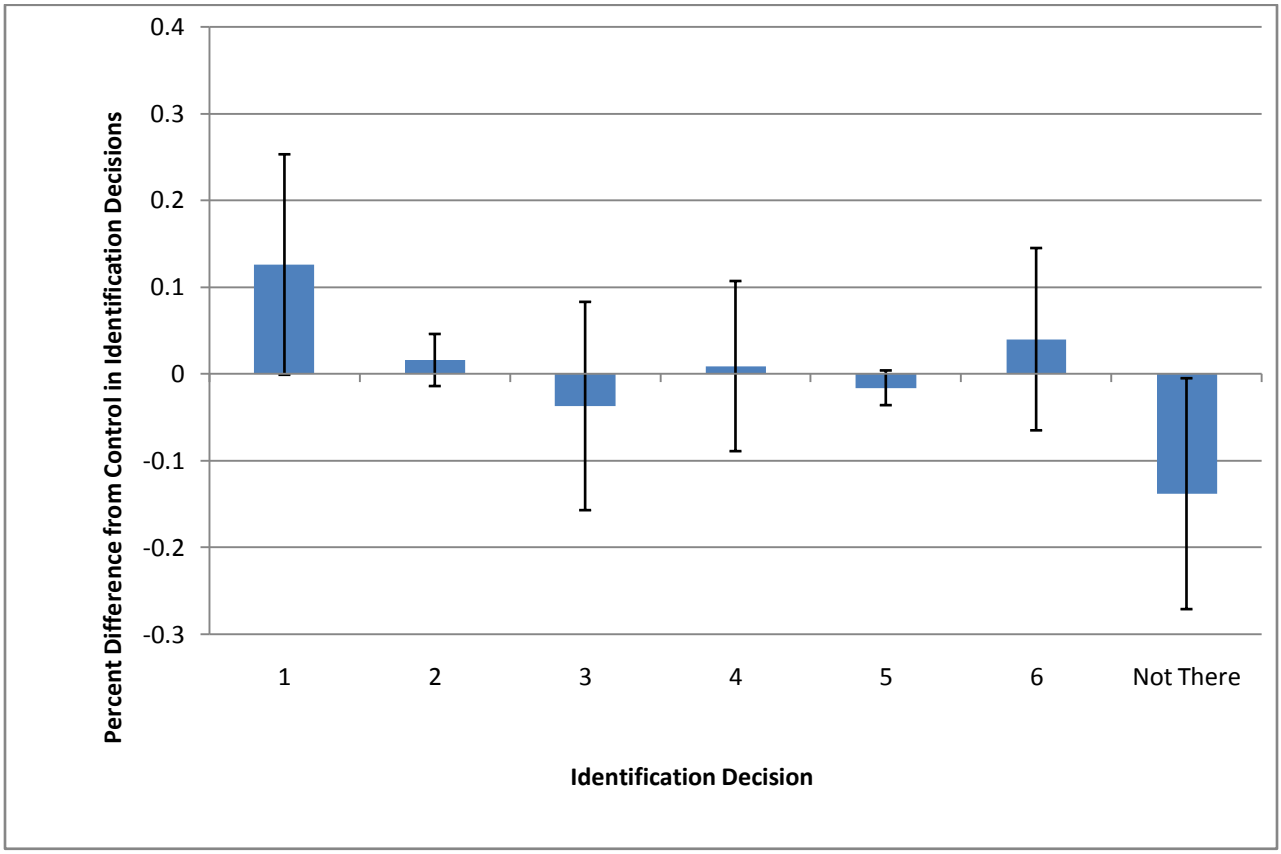
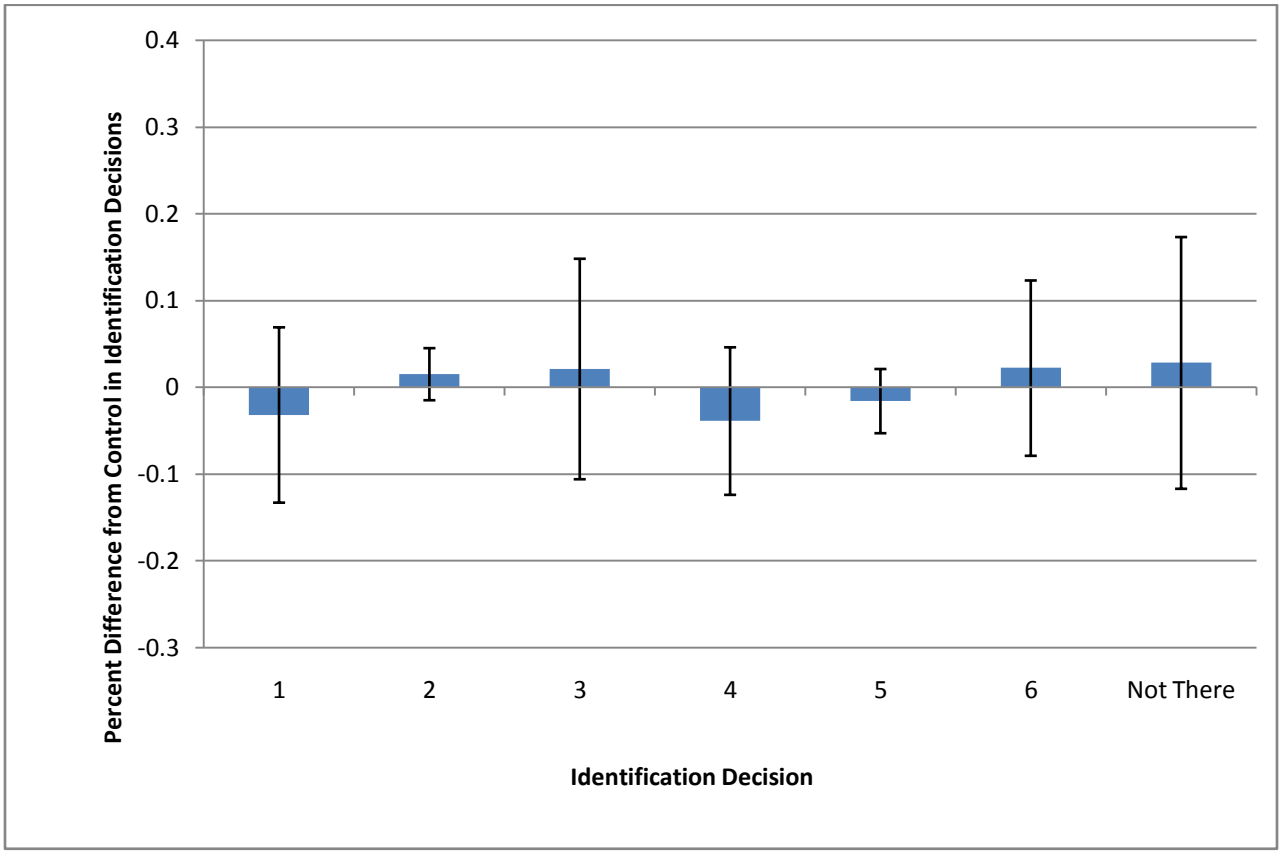


Figure 12. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #3.



Participants who were told that their co-witness identified Lineup Member #3, a plausible identification, did not show a significant increase from control in the rate of identifications of Lineup Member #3. Accordingly, there was also not a significant decrease in any of the other identification choices from the control identification rates. (See Figure 12.)

Identification Confidence Response Data

Would participants' confidence in their identification decisions be influenced by a) whether they learned about a co-witness who said the perpetrator was not in the lineup or that the perpetrator was a plausible lineup member, b) whether they viewed the lineup first or the co-witness information first, or c) whether they made the same decision as the co-witness or a different decision than the co-witness? Only one of the three above-mentioned factors significantly influenced the confidence participants expressed in their identification decisions. Participants who made the same identification decision as their co-witness had higher confidence in that decision (M = 84.98) than participants who made a different decision than their co-witness (M = 71.81), $F(1,251) = 26.00$, $p < .001$, Cohen's $f = .32$. No other factors either alone or in combination with others significantly influenced the participants' confidence in their identification decisions so they are not reported here.

After making their identification decisions and answering the confidence question, participants in the co-witness conditions (but not in the control condition) were asked to make their identification decision and state their confidence again under the (counterfactual) assumption that they had not learned of the decision of the co-witness prior to making their identification. Almost three quarters (74.5%) of participants gave the same counterfactual identification decision as their actual identification decision. A 2(Confidence in

identification: actual, counterfactual) x 2(Co-witness identification: not there, plausible) x 2(View first: lineup, co-witness information) x 2(Decision: same as co-witness, different than co-witness) ANOVA, with confidence in the identification as a repeated measure was performed for participants who made the same actual and counterfactual identification decisions. Participants who gave different actual and counterfactual identification decisions were excluded from this analysis because it was unclear which identification decision (actual or counterfactual) this sub-group was rating.

The identification decision that the co-witness made (not there, plausible #1, or plausible #2) and the order in which the participants saw the lineup and saw the co-witness information did not significantly influence how confident participants were in their identification decisions, $F(1, 243) = 2.103$, $p = .15$, Cohen's $f = .09$ and $F(1, 243) = .216$, $p = .64$, Cohen's $f = .03$, respectively. However, participants who made the same identification decision as their co-witness expressed more confidence in that identification than participants who made a different decision than their co-witness, $F(1, 243) = 9.18$, $p = .003$, Cohen's $f = .19$. (See Figure 13.) Additionally, participants' counterfactual estimations of their confidence in their identification were lower than were participants' actual confidence levels, $F(1, 243) = 6.62$, $p = .01$, Cohen's $f = .17$. Because there were no significant differences in the results when the plausible identification choices were combined or separated, they have been combined for the purposes of subsequent analyses.

Among the four variables of interest (actual v. counterfactual, co-witness identification, information order, same v. different identification) there was only one significant interaction. That interaction was between participants' confidence (actual v. counterfactual) and whether or not participants made the same identification decision as their

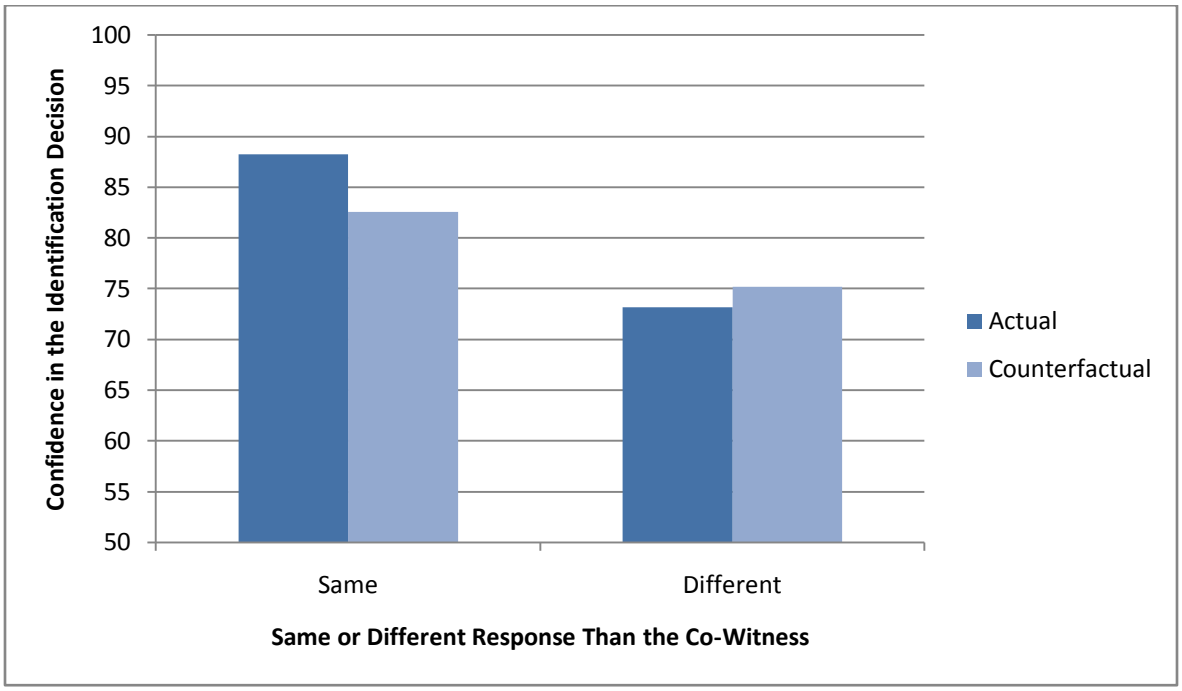
co-witness, $F(1,185) = 26.88$, $p < .001$, Cohen's $f = .38$. On one hand, participants who made the same identification decision as their co-witness thought they would have been less confident in their decision had they not received information from their co-witness, $t(64) = 4.80$, $p < .001$, $d = .85$. On the other hand, participants who made a different identification decision than their co-witness thought they would have been more confident in their decision had they not received information from their co-witness, $t(127) = 2.15$, $p = .03$, $d = .27$.

Counterfactual Identification Response Data

After making their identification decisions and answering the confidence question, participants in the co-witness conditions were asked to make their identification decision and state their confidence again under the (counterfactual) assumption that they had not learned of the decision of the co-witness prior to making their identification. Based on the logic articulated by Charman and Wells (2008), if the participants were able to mentally subtract the influence fully, then their new counterfactual choices ought to closely resemble the choice patterns of the control (no co-witness) conditions.

The majority of the participants (74.5%) gave the same counterfactual response as their original response. This was especially true for participants who gave an original response that was different than the co-witness. Among participants who originally gave a different identification decision than the co-witness, 84.2% gave the same counterfactual response as their original response whereas 60.4% of those who originally gave the same response as the co-witness gave the same counterfactual and original response, $X^2(1, N = 259) = 11.21$, $p < .001$. This makes sense because those who gave a different response than the co-witness did so *despite* the opinion of the co-witness, so they surely would have made that same response if they had not learned of the co-witness's response. Hence, the dilemma

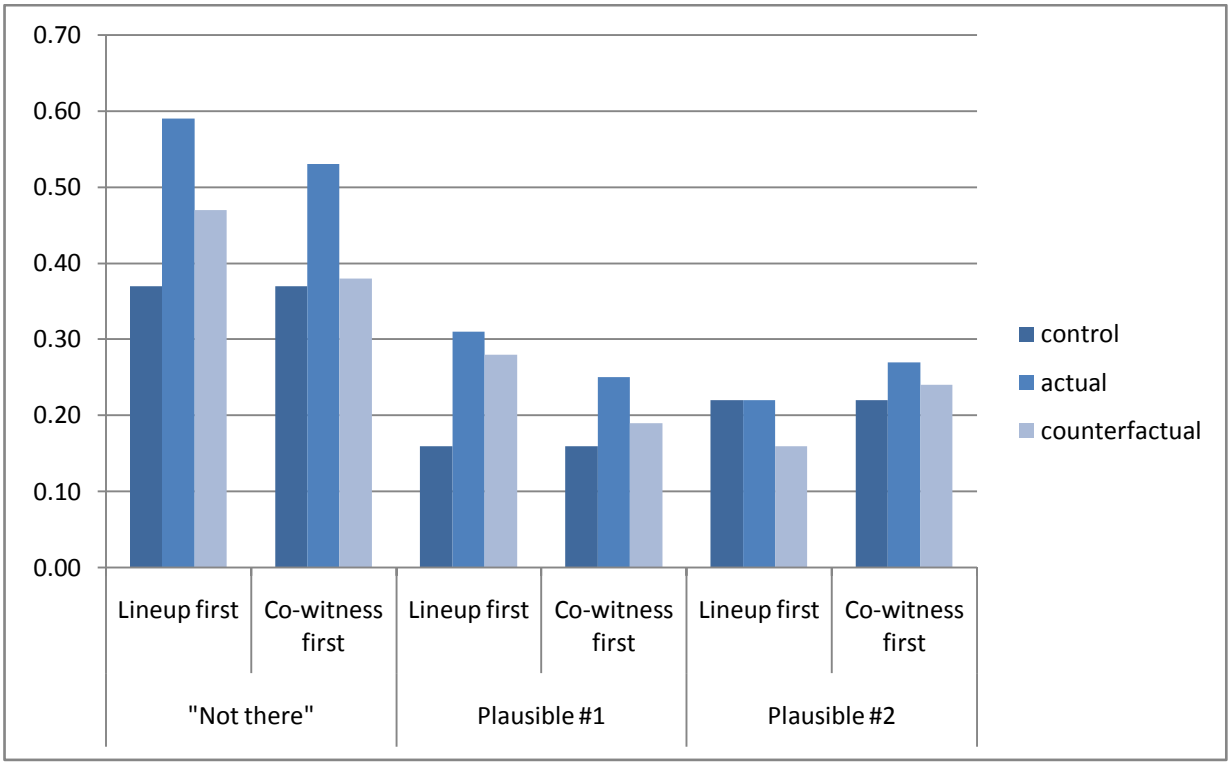
Figure 13. Participants' actual and counterfactual confidence in their identification decision as a function of making the same or different identification decision as their co-witness.



for participants (as to whether they think that they would have responded differently had they not received the co-witness information) is restricted almost exclusively to those who gave a response that matched the co-witness information. And, many of those participants would have given the same response had they not received the co-witness information. Hence, the metric for assessing whether participants could mentally remove the co-witness influence requires a comparison of their counterfactual responses to the responses of those in the control condition.

Figure 14 displays the proportion of control condition participants who said the perpetrator was not in the lineup; identified Lineup Member #1, a plausible identification decision; or identified Lineup Member #3, the other plausible identification decision. Additionally, Figure 14 includes the proportion of participants who made the same identification decision when the co-witness made that decision (labeled "actual"), and the proportion of participants who continued to indicate (under the counterfactual assumption) that they would have made that same identification decision (labeled "counterfactual"). These proportions are reported separately for participants who viewed the lineup first (before co-witness information) and those who received co-witness information first (before viewing the lineup). In both the plausible #1 condition and the "not-there" condition, participants' counterfactual estimates are somewhat lower than their actual rates of identification (indicating some correction for the co-witness information) but neither fully return to the level of the control condition (indicating under-correction). Plausible # 2 indicates a different pattern, one that suggests over-correction. But, there was not a significant co-witness information effect for the plausible # 2 condition in the first place, so it is unclear what is happening in this condition.

Figure 14. Proportion of participants who made each identification decision after receiving information about the co-witness's plausible or "not there" identification decision either before or after viewing the lineup, and proportion of participants who think they would have made each identification decision had they not received information about the co-witness's decision, compared with control identification rates.



In order to determine whether the counterfactual responses showed complete correction for the co-witness information, a difference score was calculated between participants' counterfactual estimates and the control condition for each of the three co-witness conditions as a function of whether participants viewed the lineup first or received the co-witness information first. The prediction was that these counterfactual estimate scores would be lower (closer to full correction) when participants viewed the lineup first than when participants received the co-witness information first. Table 3 displays the difference scores between participants' counterfactual answers and the control condition along with tests of the differences in proportions. A lower number indicates a closer approximation to the control condition.

As indicated in Table 3, only one of the contrasts indicated that participants' counterfactual estimates remained significantly higher than the control condition. Contrary to the hypothesis, this significant failure to fully correct for the co-witness information occurred in a lineup-first condition. In fact, except for the Plausible # 2 co-witness information conditions, correction appeared to be more complete for the lineup-first conditions than for the co-witness first conditions.

Despite the fact that counterfactual estimates significantly differed from control conditions for only one of the six relevant contrasts, it is also apparent from Figure 14 that counterfactual estimates also remained fairly close to the actual scores in the co-witness conditions. In order to determine whether the counterfactual responses showed significant correction from actual responses, a difference score was calculated between participants' counterfactual estimates and their actual responses for each of the three co-witness conditions as a function of whether participants viewed the lineup first or received the co-witness

Table 3. Difference from control condition in the proportion of participants who would make each identification decision when participants counterfactually estimate their identification decisions.

Condition	% difference from control	z-score	p-value	95% CI
Co-witness says "not there"				
Lineup First	.098	1.314	.189	(-.049, .244)
Co-witness Info First	.003	.039	.969	(-.142, .148)
Co-witness says #1 (plausible)				
Lineup First	.126	1.663	.096	(-.042, .294)
Co-witness Info First	.032	.447	.655	(-.117, .181)
Co-witness says #3 (plausible)				
Lineup First	-.063	-.851	.395	(-.214, .076)
Co-witness Info First	.018	.215	.829	(-.145, .181)

information first. Negative scores indicate greater amounts of correction in the proper direction. As can be seen in Table 4, regardless of who they were told the co-witness identified and the order in which they received this information and viewed the lineup, participants did not significantly estimate that they would have made any different identification decisions than they actually did. On average, participants did (non-significantly) correct in the proper direction, which is toward the control condition (again, with the exception of the Plausible #2 condition). However, the pattern does not indicate any support for the hypothesis that participants who viewed the lineup first were better able to correct for the co-witness influence than were those who received the co-witness information first.

Table 4. Difference from experimental condition in the proportion of participants who would make each identification decision when participants counterfactually estimate their identification decisions.

Condition	% difference from actual	z-score	p-value	95% CI
Co-witness says "not there"				
Lineup First	-.121	1.395	.163	(-.290, .048)
Co-witness Info First	-.156	1.776	.076	(-.327, .014)
Co-witness says #1 (plausible)				
Lineup First	-.031	.274	.784	(-.255, .192)
Co-witness Info First	-.062	.605	.545	(-.265, .139)
Co-witness says #3 (plausible)				
Lineup First	-.063	.641	.522	(-.253, .128)
Co-witness Info First	-.030	.281	.778	(-.241, .181)

DISCUSSION

The results of Experiment 2 generally mirrored those of Experiment 1. It was hypothesized, however, that having the participants view the lineup before they received the co-witness information would moderate the effect of the co-witness information. This prediction was based largely on the notion of anchoring and adjustment. However, if anything, the opposite of this effect occurred. Participants tended to be influenced more when they viewed the lineup first than when they received the co-witness information first.

Why did having participants view the lineup on their own first not lead to the hypothesized prophylactic effect? It is possible that by letting the witnesses see the lineup without co-witness information, they realized how difficult it is to make an identification decision from a lineup. In fact, when people view a target absent lineup, as opposed to a target present lineup, they say that they did not have as good of a view of the crime, were not paying as much attention to the crime, and overall report having a worse memory for the perpetrator (Bradfield & Wells, 1998). Hence, having witnesses view the lineup before learning the co-witness information might have merely made them lose confidence in their ability to make an accurate decision. In other words, viewing the lineup first might have actually promoted their uncertainty and made them more receptive to external influence. Alternatively, or in addition, all witnesses in this experiment knew before ever viewing the lineup that they would receive information about their co-witness's identification before having to make an identification decision. Therefore, the participants may have waited to receive information about the co-witness's decision before making a decision of their own. Witnesses who received the co-witness information first, in contrast, knew who their co-witness identified when they viewed the lineup for the first time, and they merely had the

task of checking to see whether or not they agreed with the co-witness. Therefore, people who received information about the co-witness's identification first were not as readily influenced by the co-witness's identification as were witnesses who did not get information about their co-witness's identification until after viewing the lineup. These are speculative interpretations and, it should be remembered that the order effect was not statistically significant, but the direction of the means suggests that the failure to obtain the prophylactic effect was not due to lack of power.

The counterfactual results showed that participants gave counterfactual responses that were not significantly different from their original response in any condition. Although the direction of this non-significant change was always correct (moving toward the control condition), counterfactual estimates clearly did not show full correction. Furthermore, this ability to partially correct for the influence of a co-witness was not better for participants who viewed the lineup first than it was for participants who viewed the co-witness information first. The prediction was that the lineup-first participants should be better able to perform the counterfactual task because they should have had some memory trace for their lineup decision preference prior to having received the co-witness information. This failure to find an effect for the order manipulation on the counterfactual correction scores is consistent, perhaps, with the above-mentioned idea that participants who viewed the lineup first did not form clear impression of how they would have responded on their own (even though they were given the opportunity to learn this by viewing the lineup alone first).

In the counterfactual estimation paradigm laid out by Charman and Wells (2008), there is a distinction between two types of counterfactual directions. In one type, people are exposed to an influential factor and asked to try to imagine how they would have responded

had they not received that factor, thereby mentally subtracting that factor. In another type, people are not exposed to an influential factor and asked to imagine how they would have responded had they received that factor, thereby mentally adding that factor. Charman and Wells showed that people are better at adding an influence than they are at subtracting an influence, which has been termed asymmetric counterfactual correction. Past research has shown that people are partially able to correct for post-identification feedback and biased pre-lineup instructions. However, the extent of the counterfactual correction depends on whether they are adding or subtracting these influences. Subtraction is always less complete than addition.

In the current research, participants were always asked to subtract an influence, and consistent with the asymmetric counterfactual correction, they were unable to completely subtract for the influence of the co-witness information[4]. The counterfactual estimations of identification behavior without co-witness information always moved in the direction of the control group, but there were not any significant decreases from the actual identification behavior.[5] However, there was only one condition—when the participant viewed the lineup and then was told that the co-witness identified Lineup Member #1, a plausible choice—in which participants' counterfactual estimates differed from the control identification rates. Therefore, although participants did not seem to be able to fully subtract the influence of the

[4] Consideration was given to including addition conditions in the counterfactual estimates. Addition conditions would have meant asking the control (no influence) participants to estimate how they would have responded had they received co-witness information. However, there were multiple co-witness conditions and this would have required multiple additional control conditions for proper comparison.

[5] Information about a co-witness's identification of Lineup Member #3, the second plausible lineup member, did not have an effect on identification rates of Lineup Member #3. Participants were apparently not influenced by this information and, therefore, it would be unreasonable to see if they could subtract the influence of this co-witness information.

co-witness information, they were able to somewhat correct for this influence to an extent that was almost equivalent control group.

There are two interpretations of the asymmetric counterfactual correction that appear in the counterfactual thinking literature (Dunning & Parpal, 1989). The first is that people can more easily mentally simulate an influence that has not happened than they can imagine not having received an influence. The second is based in hindsight bias and is that people cannot imagine themselves without information once they have it (Mynatt et al., 1977; Nickerson, 1998; Wason, 1960). For example, when people receive a pre-lineup instruction that the perpetrator may or may not be present in a lineup, this idea seems obvious to them (Charman & Wells, 2008). Subsequently, they have the illusion that they would have thought of the possibility that the perpetrator may or may not have been present in the lineup regardless of whether or not they had received that instruction. However, when people who never received this instruction are asked to estimate how they would have responded to the lineup had they been given this instruction, they realize that this instruction is not intuitive and are better able to guess the influence the instruction would have had on them.

CONCLUSIONS

GENERAL DISCUSSION

Eyewitnesses rely on both memorial and extra-memorial information when making recognition judgments. The extra-memorial information not only influences whether or not eyewitnesses will make a positive identification, but also whether or not they will identify the person in the lineup who is the best-match to their memory of the perpetrator. This finding runs counter to the two-parameter models of recognition, such as the WITNESS model, that include only signal strength and decision criterion as determinates of what recognition decision a person will make (Clark, 2003, 2005). According to the WITNESS model, people who decide to make a positive identification from a lineup will identify the best-match lineup member. However, in Experiment 1, witnesses' identification decisions were not only influenced by co-witnesses who made plausible identification decisions but also by co-witnesses who made very implausible identification decisions. When told that a co-witness identified a very implausible lineup member, 15% of the participants in Experiment 1 chose to identify this lineup member with reasonably high certainty in their identifications even though no participants made that identification on their own (i.e., in the control condition). This cannot be explained by criterion shift because criterion shift should merely shift eyewitnesses from "not there" to one of the plausible lineup members. Additionally, in Experiment 1 the shift from Lineup Member #1, the person identified most in the control condition, to Lineup Member #3, one of the plausible lineup members that was identified by a co-witness, is not explainable by two-parameter models.

In many ways, no one will be shocked to learn that these critical conformity effects (the two mentioned above) occur. But, to date, no one has shown such effects and noted that

the WITNESS model and other models of its type cannot accommodate such findings. Because the WITNESS model is a computational model, instead of a processing theory, it probably would not be difficult to simply add a third parameter. How one describes that parameter (e.g., what it is called), however, is not exactly clear at this point. The term co-witness influence is too specific because that represents only the particular operationalization that was used here. Other situations, such as the one experienced by witnesses in the Newsome case, were forms of social influence that emanated from the detectives, not from a co-witness. Clearly, the broader term would be social influence, but is this influence always social? What if the lineup members' photo stood out because it had a background of a different color and the witness reasoned that the same-color background photos must be fillers and the different-color background must be the suspect? Is that social influence? Perhaps. In any case, if such a manipulation affects preferences among lineup members (rather than merely affecting willingness to attempt an identification) and does not change match characteristics (similarity to the witness's memory), then the two-parameter models are insufficient to account for the witness's behavior toward the lineup when such variables are present.

Eyewitnesses appear to compartmentalize the way in which co-witness information will influence them. Information about a co-witness's identification decision influenced witness's own identification decisions, and information about a co-witness's confidence in his or her identification influenced a witness's confidence in his or her own identification decision, regardless of whether the eyewitness made a decision that was the same as or different than that of the co-witness. However, eyewitnesses were not always aware of whether or not information from a co-witness has influenced them. Therefore, they were not

able to fully take into account the co-witness's influence on their identification decision and correct for that influence with their counterfactual estimations.

This research only scratches the surface of the conditions under which eyewitnesses are affected by extra-memorial, social information. One fruitful avenue of future research might be to examine the moderating role of memory strength. The recently-postulated competition/corroboration conceptualization of eyewitness identification argues that external information typically engages a deliberative process that, when inconsistent with automatic recognition-memory processes, produces response competition (Charman & Wells, 2007). When memory strength is high, deliberative processes tend to play a lesser role in determining the response. In the current experiments, it could be argued that memory strength was relatively low. After all, participants were told that the perpetrator might not be present in the lineup, and although he was not present in the lineup only 40% in the control condition were able to detect his absence, the remaining 60% made an identification of someone. If memory strength were higher than it was in these particular experiments, then participants would not need to rely on co-witness information when making an identification decision.

FINAL REMARKS

One of the most interesting aspects of many DNA exoneration cases involving mistaken identification is that the mistakenly-identified person often does not resemble the actual perpetrator of the crime. In fact, alternative people in the original lineup—fillers—often look more similar to the perpetrator of the crime than they do to the person who was accused of the crime. Clearly, these are not cases of coincidental resemblance, a common way that people think about mistaken identification, or "best match" (which the WITNESS model would use to explain the mistake). Why would this phenomenon occur? It certainly is not signal strength or decision criteria. There must be another influence playing a role in the identification behavior. The data from the current experiments are consistent with the idea that such cases can be explained in terms of social influence.

Some social influence variables can influence match characteristics and decision criteria. For example, in one experiment witnesses viewed a photograph of a clean shaven man and received co-witness information that included either a comment about the man in the photograph having a mustache or no information about the man's facial hair. Nearly 70% of the witnesses who received co-witness information that mentioned a mustache later identified a person with a mustache in a target absent, 12-person lineup, as opposed to 13% of witnesses in the control group (Loftus & Greene, 1980). In this case the social information seemingly changed the match characteristics of the witnesses. Additionally, witnesses who learn that a co-witness made a positive identification are more likely than witnesses who learn that a co-witness rejected the lineup to make an identification (Levett & Driest, 2008). In this case, knowledge of co-witness behavior probably changed the decision criteria of witnesses when viewing the lineup.

Results of the current experiments, however, suggest that social influence variables do not have to change either the match parameter or the decision criterion parameter to influence identification behaviors. In a case in which a witness learns that his or her co-witness made an implausible identification decision and the witness then chooses to identify that same implausible lineup member, such as occurred in Experiment 1, this cannot be explained by social influence on match value or decision criterion. Therefore, despite the fact that a third social-influence parameter might be difficult or awkward to attempt to define and put into a mathematical model, it is a form of variation that is present in some real-world eyewitness identification situations. Any model that attempts to explain eyewitness behavior both inside and outside of a laboratory must take this third parameter into account.

Instead of claiming a necessity of the inclusion of a third parameter, one might argue that the system should take strides to jettison social influences in eyewitness identification behavior. This could be done by putting guidelines in place for the construction of fair lineups and for the lineup to be conducted double blind—where neither the witness nor the lineup administrator knows who the suspect in the lineup is. Additionally, investigators can keep witnesses separated and ask that the witnesses not speak to one another about the crime. In fact, guidelines such as these have already been put into place in a variety of jurisdictions across the United States (Wells, 2006). However, guidelines such as these will never be able to completely eliminate social influence in eyewitness identification behavior. This is because the system can only control witness interaction after the case is being handled by the police.

Imagine viewing an armed robbery in a convenience store with two other customers and a store clerk. Once the burglar leaves the scene, certainly witnesses will talk about what

happened with the other people present before police arrive. Or imagine having viewed that same crime and not speaking to co-witnesses about the crime, but watching the news later that night and seeing a picture displayed of the person who has been arrested for the crime. Witnesses would still be asked to make an identification from the lineup, but having seen the person who was arrested shows the witnesses who the other witnesses think robbed the store.

Social influence can never be completely extricated from real-world eyewitness memory and identification behavior. Although some social influence can be controlled for once the crime is being investigated, there is always a possibility of social influence occurring outside of the police station, which calls for a reworking of any global matching model of recognition decisions in the real world, such as the WITNESS model. Any model that claims to model eyewitness identification behavior in the real world must include a separate, third parameter that is qualitatively different than signal strength and decision criteria.

APPENDICES

APPENDIX A

Increases from Control Condition in the Proportion of Participants Giving the Same Responses as the High- or Low-Confident Co-Witness for Experiment 1.

Condition	% change from control	z-score	p-value	95% CI
Co-witness says "not there"				
High Confident Co-Witness	.279	3.636	<.001	(.134, .423)
Low Confident Co-Witness	.222	2.917	.004	(.075, .368)
Co-witness says #3 (plausible)				
High Confident Co-Witness	.244	2.772	.006	(.057, .431)
Low Confident Co-Witness	.089	1.093	.274	(-.080, .259)
Co-witness says #6 (plausible)				
High Confident Co-Witness	.071	1.071	.284	(-.075, .217)
Low Confident Co-Witness	.066	1.000	.317	(-.077, .208)
Co-witness says #2 (implausible)				
High Confident Co-Witness	.190	5.120	<.001	(.094, .287)
Low Confident Co-Witness	.108	3.796	<.001	(.032, .183)

APPENDIX B

Increases from Control Condition in the Proportion of Participants Giving the Same Responses as the Co-Witness When They View the Lineup First or View the Co-Witness Information First for Experiment 2.

Condition	% change from control	z-score	p-value	95% CI
Co-witness says "not there"				
Lineup First	.219	2.909	.003	(.074, .364)
Co-witness Info First	.159	2.106	.035	(.011, .307)
Co-witness says #1 (plausible)				
Lineup First	.157	2.048	.041	(-.015, .330)[6]
Co-witness Info First	.095	1.269	.205	(-.068, .356)
Co-witness says #3 (plausible)				
Lineup First	-.006	-.074	.941	(-.166, .154)
Co-witness Info First	.048	.580	.562	(-.120, .216)

[6] Because the z-test assumes that the null hypothesis is true and the 95% CI does not assume that the null hypothesis is true, this CI includes 0 even though the z-score indicates that the difference is significant at the .041 level.

APPENDIX C

Exact Numbers and Sample Sizes for all Figures Included in the Text

Figure 3. Proportion of participants in the control condition making each identification decision. (*n* = 129)

Identification Decision						
#1	#2	#3	#4	#5	#6	Not There
.200	.000	.185	.077	.015	.123	.400

Figure 4. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was not in the lineup. (*n* = 128)

Identification Decision	% change from control	z-score	p-value	95% CI
Lineup Member #1	-.069	-1.701	.089	(-.148, .010)
Lineup Member #2	.008	1.006	.315	(-.007, .023)
Lineup Member #3	-.115	-2.479	.013	(-.206, -.025)
Lineup Member #4	-.085	-2.605	.009	(-.148, -.022)

Lineup Member #5	.008	.460	.645	(-.026, .042)
Lineup Member #6	.009	.215	.830	(-.071, .088)
"Not There"	.250	3.999	<.001	(.131, .369)

Figure 5. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #3. (n = 67)

Identification Decision	% change from control	z-score	p-value	95% CI
Lineup Member #1	-.095	-1.931	.053	(-.180, -.011)
Lineup Member #2	.015	1.391	.164	(-.141, .044)
Lineup Member #3	.163	2.413	.016	(.026, .300)
Lineup Member #4	-.072	-1.644	.100	(-.146, .003)
Lineup Member #5	-.001	.031	.975	(-.036, .035)
Lineup Member #6	.078	1.475	.140	(-.032, .187)
"Not There"	-.089	-1.239	.215	(-.225, .048)

Figure 6. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #6. (*n* = 63)

Identification Decision	% change from control	z-score	p-value	95% CI
Lineup Member #1	-.060	-1.137	.256	(-.156, .036)
Lineup Member #2	.000	.000	.999	(.000, .000)
Lineup Member #3	.045	.686	.492	(-.086, .176)
Lineup Member #4	-.005	-.106	.916	(-.101, .090)
Lineup Member #5	.016	.740	.459	(-.032, .065)
Lineup Member #6	.068	1.298	.194	(-.041, .178)
"Not There"	-.071	.962	.336	(-.211, .070)

Figure 7. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #2. (*n* = 127)

Identification Decision	% change from control	z-score	p-value	95% CI

Lineup Member #1	-.029	-.669	.504	(-.114, .056)
Lineup Member #2	.148	4.547	<.001	(.087, .210)
Lineup Member #3	-.067	1.369	.171	(-.163, .029)
Lineup Member #4	-.014	-.357	.721	(-.090, .062)
Lineup Member #5	<.001	.016	.987	(-.030, .031)
Lineup Member #6	.057	1.296	.195	(-.029, .143)
"Not There"	-.097	1.649	.099	(-.211, .018)

Figure 8. Participants' confidence in their identification decisions, regardless of identification decision.

	Co-witness says		
Co-witness confidence	"not there"	#3 or #6 (plausibles)	#2 (implausible)
Control	66.46 (*n* = 52)	62.59 (*n* = 40)	n/a (*n* = 0)
Co-witness has high confidence	78.87 (*n* = 63)	80.91 (*n* = 65)	73.35 (*n* = 63)
Co-witness has low confidence	64.40 (*n* = 65)	58.78 (*n* = 65)	61.86 (*n* = 64)

Figure 9. Participants' confidence in their identification decision as a function of making the same or different identification decision as a co-witness who made a "not there," plausible, or implausible identification decision.

Participant identification	Co-witness says "not there"	Co-witness says #3 or #6 (plausibles)	Co-witness says #2 (implausible)
Same as co-witness	77.03 (*n* = 79)	73.19 (*n* = 38)	64.16 (*n* = 19)
Different than co-witness	62.69 (*n* = 49)	68.55 (*n* = 92)	69.24 (*n* = 108)

Figure 10. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was not present in the lineup. (*n* = 128)

Identification Decision	% change from control	z-score	p-value	95% CI
Lineup Member #1	-.046	-1.080	.280	(-.128, .037)
Lineup Member #2	.008	1.006	.315	(-.007, .023)
Lineup Member #3	-.053	-1.064	.287	(-.150, .044)
Lineup Member #4	-.069	-2.039	.042	(-.136, -.003)

Lineup Member #5	.047	1.948	.051	(<-.001, .094)
Lineup Member #6	-.069	-2.031	.042	(-.136, -.003)
"Not There"	.189	3.055	.002	(.070, .309)

Figure 11. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #1. (*n* = 64)

Identification Decision	% change from control	z-score	p-value	95% CI
Lineup Member #1	.126	2.076	.038	(<-.001, .253)
Lineup Member #2	.016	1.423	.155	(-.015, .046)
Lineup Member #3	-.037	.597	.551	(-.157, .082)
Lineup Member #4	.009	.176	.860	(-.089, .107)
Lineup Member #5	-.016	-1.001	.317	(-.037, .006)
Lineup Member #6	.040	.780	.436	(-.065, .145)
"Not There"	.138	-1. 921	.054	(-.271, .005)

Figure 12. Change from control with 95% confidence intervals in the proportion of participants who made each identification decision when told that their co-witness said that the perpetrator was Lineup Member #3. (*n* = 65)

Identification Decision	% change from control	z-score	p-value	95% CI
Lineup Member #1	-.032	-.598	.550	(-.133, .069)
Lineup Member #2	.015	1.412	.158	(-.015, .045)
Lineup Member #3	.021	.333	.740	(-.106, .148)
Lineup Member #4	-.039	-.851	.395	(-.125, .046)
Lineup Member #5	<-.001	.006	.995	(-.037, .037)
Lineup Member #6	.022	.443	.658	(-.078, .123)
"Not There"	.028	.378	.756	(-.118, .173)

Figure 13. Participants' actual and counterfactual confidence in their identification decision as a function of making the same or different identification decision as their co-witness. 259

Participant identification	Actual Confidence	Counterfactual Confidence
Same as co-witness (*n* = 107)	88.24	85.51

Different than co-witness (*n* = 152)	73.14	75.17

Figure 14. Participants' confidence in their identification decision as a function of viewing the lineup first or receiving co-witness information first with a co-witness who made a "not there," plausible identification decision.

	Co-witness says	
Information order	"not there"	#1 or #3 (plausibles)
Lineup first	82.49 (*n* = 66)	75.24 (*n* = 64)
Co-witness information first	78.27 (*n* = 64)	89.95 (*n* = 65)

Figure 15. Proportion of participants who made each identification decision after receiving information about the co-witness's plausible or "not there" identification decision either before or after viewing the lineup, and proportion of participants who think they would have made each identification decision had they not received information about the co-witness's decision, compared with control identification rates.

Condition	Control	Actual	Counterfactual

Co-witness says “not there”			
Lineup First	.37 (*n* = 88)	.59 (*n* = 39)	.47 (*n* =31)
Co-witness Info First	.37 (*n* = 88)	.53 (*n* = 34)	.38 (*n* = 24)
Co-witness says #1 (plausible)			
Lineup First	.16 (*n* = 26)	.31 (*n* = 10)	.28 (*n* = 9)
Co-witness Info First	.16 (*n* = 26)	.25 (*n* = 8)	.19 (*n* = 6)
Co-witness says #3 (plausible)			
Lineup First	.22 (*n* = 24)	.22 (*n* = 7)	.27 (*n* = 5)
Co-witness Info First	.22 (*n* = 24)	.27 (*n* = 9)	.24 (*n* = 8)

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