Lineups and Eyewitness Identification

Amy-May Leach,[1] Brian L. Cutler,[1]
and Lori Van Wallendael[2]

[1] University of Ontario Institute of Technology, Oshawa, Ontario, Canada L1H 7K4;
email: amy.leach@uoit.ca

[2] Department of Psychology, University of North Carolina, Charlotte, North Carolina 28223

Key Words

eyewitness memory, wrongful convictions, showups, eyewitness
confidence, suggestive lineups

Abstract

Research on eyewitnesses has led to the development of a knowledge
base about the factors that influence eyewitness identification accuracy
and to changes to criminal justice policies concerning the collection
of eyewitness identification evidence. In this review, we provide an
overview of the field of eyewitness identifications and suggest future
directions for research. First, we provide the context for the study of
eyewitness identifications. Second, we review a sample of factors that
affect the accuracy of eyewitness identifications, with attention to both
the conditions under which crimes occur and the manner in which iden-
tification tests are conducted. Third, we review several findings about
which there is some contemporary debate or controversy. Finally, we
highlight opportunities for further research on eyewitness identifica-
tions by drawing upon basic research in social and cognitive psychology
and lessons from actual cases.

INTRODUCTION

Although the criminal justice system is understandably preoccupied with controlling crime and enhancing public safety, the lesser-known problem of wrongful conviction of innocent citizens has a long history and is a growing concern. In 1932, law professor Edwin Borchard authored *Convicting the Innocent*, a collection of 65 stories of innocent citizens who were erroneously convicted of crimes in the United States and Britain. The title of his first story in the book foretells the theme of this article: "Seventeen Witnesses Identified Him." Nearly 100 years ago, Herbert Andrews, a cashier for a large store in Boston, MA, was charged with passing bad checks. "Seventeen witnesses, men and women, took the stand and identified Andrews as the man who had passed the checks upon them. Many of them were positive in their identifications and there was little that the defendant could do but deny all knowledge of or connection with the checks, and deny that he had ever seen any of the witnesses who testified against him" (Borchard 1932, p. 3). Andrews, a husband and father of a baby, was found guilty and sentenced to 14 months in a house of corrections. Continuing investigations of bad checks led to the arrest of Earle Barnes, who later confessed to the crime of which Andrews was accused. Andrews was exonerated. The assistant district attorney, Thomas Lavelle, wrote about his experience ten years later: "As the two men [Andrews, Barnes] stood at the bar I wondered how so many persons could have sworn that the innocent man was the one that had cashed the bad checks. The two men were as dissimilar in appearance as could be. There was several inches difference in height and there wasn't a similarity about them. To this day I can't understand the positiveness of those witnesses. I know that they felt they were swearing to the truth. I know that the police felt that the man was guilty. So this was a case where 'seeing was not believing,' as the reverse of the old adage goes" (quoted in Borchard 1932, p. 5). We find it ironic that, in confessing his puzzlement about the mistaken identification, Lavelle exposed some of the very factors that we now know increase the risk of false identification and inflate eyewitness confidence. The role of mistaken identification in the Andrews case was not unique in Borchard's collection of cases. Neither is mistaken identification unique to Borchard's research. Mistaken identification commonly emerges as a leading cause of conviction of the innocent. For example, the Innocence Project concluded that mistaken identification is the "single greatest cause of wrongful convictions nationwide, playing a role in more than 75% of convictions overturned through DNA testing" (Innocence Project 2009).

This article is divided into four general sections. In this introductory section, we contextualize eyewitness research within the broader field of psychology, briefly discuss research methods that are used in eyewitness research, and provide an overview of the application of research to the justice system. In the second section, we review a selective sample of relatively well-accepted findings from eyewitness research. In the third section, we review research on three eyewitness issues that are of high contemporary interest to the research and practice communities, but in which the findings are controversial or ambiguous. In the final section, we suggest future directions for research.

Eyewitness Research in Context

Eyewitness research is typically conducted by cognitive and social psychologists who draw upon their respective expertise in human memory and social influence. Although there is eyewitness research dating back to the 1900s (Wells et al. 2000), the vast majority of eyewitness research was generated in the 1970s and beyond. A search of a scholarly database will reveal hundreds of refereed journal articles on the topic. Not only is research on eyewitness memory published in specialized journals, such as *Applied Cognitive Psychology*, *Law and Human Behavior*, and *Psychology, Public Policy, and Law*, but it also appears in general psychology journals that focus on basic (i.e., nonapplied) research.

Moreover, it has been the topic of scores of books, book chapters, special issues of journals, and conference presentations (e.g., American Psychology–Law Society, Society for Applied Research on Memory and Cognition).

Eyewitness research addresses a wide variety of issues. For example, researchers have examined the suggestibility of adults and children; factors influencing recall, identification, voice recognition, and confidence; methods of improving the accuracy of recall and identifications; the knowledge and decision making of attorneys, judges, and jurors in eyewitness cases; and the need for, and effect of, expert testimony on eyewitness memory. In this article, we restrict our review to eyewitness identification. For recent, more comprehensive reviews of research on other topics in eyewitness memory, readers may consult the recently published two-volume *Handbook of Eyewitness Psychology* (Lindsay et al. 2007, Toglia et al. 2007) and the *Encyclopedia of Psychology & Law* (Cutler 2008).

Perhaps resulting from a combination of the common use of eyewitness evidence in criminal cases, the growing recognition of mistaken identification in wrongful conviction cases, and the maturation of eyewitness science, eyewitness research is becoming increasingly known and used in the criminal justice and judicial systems. The application of eyewitness research occurs in several ways. First, the U.S. Department of Justice, several states (New Jersey, North Carolina), and many police departments in the United States have either revised their protocols for lineups and photoarrays or are in the process of reform (Wells et al. 2006). We discuss the specific lineup reforms below in our review of the lineup research. Second, in cases that hinge on eyewitness identification, it is increasingly common for the defense to introduce expert testimony on the psychology of eyewitness memory (Kassin et al. 2001; see Cutler 2009 for a review of the issues surrounding this form of expert testimony). Third, eyewitness research is becoming a common area of education in the justice system. Such education takes place in some law school classes, continuing education for lawyers and judges, and trial advocacy publications.

Research Methods in Eyewitness Research

Research on eyewitness identification draws from cognitive and social psychology and uses research methods that are common to these subdisciplines. Investigators rely heavily on laboratory research and experimental and quasi-experimental methods. Research methods vary from simple, one-way designs to complex mixed factorial designs. In typical research, the investigator simulates the witnessing of a crime by exposing witnesses (often college students) to innocuous, staged events or videotaped enactments of crimes. The investigator manipulates independent variables of interest, such as the conditions under which witnesses view the crime or the methods used to obtain eyewitness identifications. Some time later, the investigator shows the witnesses lineups (for ease of exposition we use the term lineups to refer to both live lineups and photoarrays) and has them identify the perpetrators from the crime simulations. The primary dependent variables are identification performance and confidence in the identification decision. One common feature in modern eyewitness identification research is the use of perpetrator-present and perpetrator-absent lineups. The former simulates the scenario in which the suspect is guilty of the crime, and the latter the scenario in which the suspect is innocent. Use of both conditions enables researchers to examine the impact of independent variables on both correct and false identifications. Many of the findings have been subjected to replication efforts and meta-analytic review. More recently, however, there is a growing body of research on actual cases (e.g., Behrman & Richards 2005, Odinot et al. 2008) and great interest in conducting more such research (e.g., Mecklenburg et al. 2008, Wells 2008).

In sum, eyewitness science is thriving as a field of scholarship within psychology. It draws upon traditional psychological theories and

research methods, meets rigorous publication standards, and is widely disseminated in general and specialty journals and books. Increasingly, research findings are being used to improve practices within the criminal justice and judicial systems. We now turn to a review of selected areas of eyewitness research.

REPRESENTATIVE FINDINGS FROM EYEWITNESS IDENTIFICATION RESEARCH

Wells (1978) first suggested that eyewitness factors could be divided into two groups: estimator and system variables. We use the estimator-system variables distinction to guide this review.

Estimator Variables

Estimator variables are factors over which the justice system has no control because they tend to occur at the time of the crime. Thus, these variables can only be used to estimate the reliability of eyewitness identifications. In this section, we discuss the effects of exposure time, change in appearance, race, attention, retention interval, eyewitness confidence, stress, the presences of weapons, and the speed of identification on eyewitness identification accuracy.

Exposure time. The amount of time that the perpetrator is in view should affect identification accuracy. Specifically, witnesses who are exposed to the perpetrator for a longer period of time should be better able to encode and recall details about that individual. Shapiro & Penrod's (1986) meta-analysis of face recognition and eyewitness identification studies supported this hypothesis. Longer exposure times were associated with higher hit rates (69% long versus 57% short). However, the length of exposure did not affect false alarms (34% versus 38%). In addition, when the similarity between the target and test faces is low, recognition memory is no longer consistently aided by longer exposure time (Read et al. 1990).

Change in appearance. Clever perpetrators may modify their appearances to decrease their likelihood of being identified. These changes can occur in anticipation of committing the crime (e.g., wearing a disguise) or after the event (e.g., growing a beard). Alternatively, other changes in appearance (e.g., hairline, weight) can occur naturally when an extended amount of time has elapsed between the event and apprehension. The encoding specificity principle suggests that recognition will be best when there is a high degree of similarity between memory and information presented during retrieval (Tulving & Thomson 1973). Generally, research has shown that changes in a perpetrator's appearance (e.g., age, hairstyle, glasses) between the crime and the lineup adversely affect eyewitness identification accuracy (e.g., Maass & Brigham 1982, Pozzulo & Balfour 2006, Read 1995, Read et al. 1990). A few studies have reported similar reductions in accuracy when the perpetrator's hairline is obscured by a hat (Cutler 2006). Shapiro & Penrod's (1986) meta-analysis revealed that correct identifications were lower when the target wore a disguise than when no disguise was used (54% versus 75%). The presence of a disguise also increased incorrect identifications (30% versus 22%). These findings may suggest that it is imperative for lineup administrators to warn witnesses that the perpetrator's appearance could have changed; however, Charman & Wells (2007) found that appearance change instructions had no effect on correct identifications and actually increased false identifications. Thus, even though changes in the perpetrator's appearance reduce eyewitness accuracy, making witnesses aware of that fact may do more harm than good.

Cross-race effect. The cross-race effect (also known as the own-race bias or other-race effect) is the notion that people are more accurate at identifying members of their own race than members of another race. Meissner & Brigham's (2001) meta-analysis found that own-race correct identifications were higher and false identifications were lower than other-race identifications. Specifically, participants were

1.4 times more likely to correctly identify a member of their own race (versus other race); they were 1.56 times more likely to make a false identification when viewing a member of a different race. However, this effect was moderated by exposure time: The longer the witness had to view the perpetrator, the smaller the cross-race effect. Overall, results suggest that eyewitness accuracy will be lower when the perpetrator and the witness are not from the same race. One explanation for the cross-race effect is reduced contact. Meissner & Brigham's (2001) meta-analysis substantiated that there was a small, but reliable, inverse relationship between contact and the cross-race effect.

Attention. Witnesses may be asked to make an identification after a crime occurs unexpectedly (e.g., the event was initially innocuous or they are interviewed after a delay). Thus, they may not have been paying full attention to the event or the individuals involved. General memory research suggests that divided attention significantly impairs recognition memory (e.g., Jacoby et al. 1989). In studies involving eyewitnesses, this pattern of results is also observed: Correct identifications are higher when more attention is paid to the perpetrator (e.g., Maass & Brigham 1982). Thus, distracted witnesses are less accurate witnesses.

Retention interval. The amount of time between the crime and the identification can vary considerably. However, decreases in memory occur rapidly after an event before leveling off (e.g., Wixted & Ebbesen 1991). Recently, Deffenbacher et al. (2008) conducted a meta-analysis of 53 studies of facial memory. As predicted, longer retention intervals were associated with lower identification accuracy. These findings suggest that it is imperative to have witnesses make identifications soon after witnessing an event to preserve accuracy.

Eyewitness confidence. Intuitively, confident witnesses should be more accurate. In fact, jurors are highly influenced by eyewitness confidence (see Penrod & Cutler 1995 for a review). Sporer et al.'s (1995) meta-analysis revealed that there was only a moderate correlation between eyewitness accuracy and confidence ($r = 0.29$). However, there were several moderator effects, among the largest of which was lineup decision. Witnesses who made a positive identification exhibited a higher confidence-accuracy correlation ($r = 41$) than witnesses who rejected lineups ($r = 0.12$). The confidence-accuracy correlation is also known to be weaker in the presence of other estimator variables that inhibit identification accuracy (the optimality hypothesis; Deffenbacher 1980) and in the presence of postidentification feedback (see below). Some researchers have examined alternative methods for describing the relationship between confidence and identification, such as overconfidence and calibration indices (see Brewer & Weber 2008 for a review). Given the modest correlation between confidence and identification accuracy, the tendency for witnesses to be overconfident in their decisions (Brewer & Wells 2006), and the factors that further suppress the confidence-accuracy relation, confidence is of questionable utility in the assessment of eyewitness identification accuracy.

Stress. Witnesses to a crime may be active victims rather than passive observers. Thus, they could be experiencing elevated levels of stress and arousal. In Deffenbacher et al.'s (2004) meta-analysis of the effects of stress on eyewitness memory, eyewitnesses who experienced high levels of stress made significantly fewer correct identifications than witnesses who experienced low levels of stress (0.39 versus 0.59). However, there was no effect of stress on false identifications. These findings suggest that the accuracy of real-life victims of crime might be substantially impaired. (For a compelling field test of the relation between stress and identification accuracy, see Morgan et al. 2004.)

Weapon focus. Contending with an armed perpetrator may also affect memory. Researchers have noted that witnesses look at a weapon longer, and more often, during an event

(e.g., Loftus et al. 1987); as a result, they may pay less attention to other details. Steblay's (1992) meta-analysis revealed that identification accuracy was lower when a weapon was present. The presence of a weapon could increase a witness's stress, which, as discussed, can negatively affect memory. However, researchers have suggested that the presence of a weapon can cause a narrowing of perceptual focus even in the absence of stress (e.g., Loftus et al. 1987). If a witness's attention is drawn to the weapon rather than to peripheral details, proper encoding of these details will not occur and memory will suffer. More recently, researchers have argued that it is not the weapon per se that causes the effect, but the presence of an unusual object. When witnesses view people holding unusual objects (e.g., celery, raw chicken), their memory of surrounding details decreases significantly and, in some cases, more than if they viewed a weapon (Mitchell et al. 1998; Pickel 1998, 1999). These findings suggest that it is the unexpectedness of the weapon that causes the effect. In fact, when weapons are consistent with a particular context (e.g., a shooting range) or occupation (e.g., police officer), their presence does not impair memory (Pickel 1999).

Speed of identification. Intuitively, decision time should be an indicator of eyewitness identification accuracy. In fact, the faster a witness makes an identification, the more likely that it is correct (Dunning & Perretta 2002; Smith et al. 2000, 2001; Sporer 1992, 1993; Weber et al. 2004). Although earlier research (Dunning & Perretta 2002) suggested that accuracy rates were highest within a 10- to 12-second time boundary (referred to as the 10–12 second rule), this hypothesis has not been supported by a large-scale analysis (Weber et al. 2004). Instead, the time boundary appears to be inconsistent, inaccurate, and potentially much broader than originally posited. Thus, although quick identifications are more likely to be accurate, more research is needed before a rule can be implemented by justice officials.

System Variables

System variables can be directly manipulated by justice system officials to increase identification accuracy. In this section, we discuss the effects of lineup instructions, filler selection, lineup size, and postidentification feedback on identifications.

Lineup instructions. Before an eyewitness views the lineup, the lineup administrator provides a set of instructions for completing the task. However, if these instructions are biased, the witness's identification accuracy can suffer (e.g., Malpass & Devine 1981). Unbiased instructions allow for a no-choice option: Witnesses are told that the perpetrator may or may not be in the lineup. Conversely, biased instructions suggest that the perpetrator is in the lineup or otherwise discourage rejections of the lineup by failing to provide a no-choice option (Steblay 1997). Thus, biased instructions imply that witnesses should make an identification, which could increase their willingness to choose someone from the lineup—even when the perpetrator is not present. In Steblay's (1997) meta-analysis of studies on lineup instructions, witnesses who were exposed to biased instructions (featuring leading and/or pressure instructions) were more likely to make a false identification than were those who received unbiased instructions (60% versus 35%). However, when the perpetrator was in the lineup, receiving biased (versus unbiased) instructions had no impact on correct identifications (54% versus 53%, respectively)—a finding challenged by Clark (2005). Given the risk for false identifications, modern guidelines recommend the use of unbiased instructions.

Filler selection. A critical component of lineup construction is deciding who else to place in the lineup with the suspect. These individuals are called fillers (or foils or distractors). Luus & Wells (1991) have suggested that the inclusion of fillers serves several important purposes. First, these lineup members are known to be innocent. Thus, a filler selection is a known error

and can serve as a measure of the witness's credibility. Second, fillers ensure that the witness relies on his or her memory for the perpetrator rather than deduction or guessing. In a poorly constructed lineup—in which the suspect has an identifying characteristic that is not shared by fillers—the witness can easily deduce the identity of the suspect. However, an unbiased lineup should protect the suspect and force the witness to rely on memory for the actual perpetrator when making an identification. In addition, the probability of choosing the suspect from an unbiased lineup by chance is $1/N$ (where N is the number of lineup members); thus, the presence of fillers helps to protect against witness guessing. Finally, fillers move the lineup from a test of recall to a test of recognition.

There are two filler selection strategies that have been tested: similarity-to-suspect and match-to-description-of-culprit (Luus & Wells 1991). In the similarity-to-suspect approach, people who closely resemble the suspect serve as fillers in the lineup. In the match-to-description approach, fillers are chosen based on how closely they resemble the witness's original description of the perpetrator. One problem associated with the similarity-to-suspect strategy is deciding the extent to which fillers and suspects must resemble each other. If fillers perfectly matched the suspect, a lineup of clones would be produced; however, it is unclear which characteristics are necessary for optimal similarity (Luus & Wells 1991). By definition, members of similarity-to-suspect lineups are more similar to one another than individuals in match-to-description lineups. Clark & Tunnicliff (2001) have reported that the similarity-to-suspect strategy can create a backfire effect. The suspect will look most like the witness's description of the perpetrator because only the suspect's selection was based on that description. In turn, witnesses are more likely to falsely identify innocent suspects. The match-to-description strategy protects against an identification that is due to memory for the original description of the perpetrator (Luus & Wells 1991). Relevant characteristics from the witness's description appear in all fillers while preserving natural variability. Thus, subtle features that are unique to the suspect (e.g., shape of the mouth), but would not have been provided in the description, can cue a witness's memory. If all of the suspect's unique features were to be matched to fillers, the identification task would be more difficult for the witness. In fact, correct identification rates are higher in match-to-description lineups compared with similarity-to-suspect lineups (Wells et al. 1993). However, Lindsay et al. (1994) have suggested that the match-to-description strategy may be fallible because witnesses' descriptions are often incomplete or vague. These researchers showed that biased match-to-description simultaneous lineups, in which the fillers matched a limited description and varied considerably on omitted characteristics, resulted in higher false identification rates compared with similarity-to-suspect and unbiased match-to-description lineups. Thus, the prevailing view is that fillers should primarily match the witness's description and, as a secondary consideration, match the suspect.

Lineup size. Although the average lineup contains six people, the required size varies according to jurisdiction (e.g., Wogalter et al. 2004). As previously discussed, having more fillers in the lineup should protect against a false identification. For example, if there are 100 lineup members, the chance of an innocent suspect being selected would amount to 1/100 (versus 1/6 with 6-person lineups). Levi (1998, 2006, 2007) has tested larger lineups (e.g., the multiple-choice, sequential, large lineup), in which lineup size varies from 13 to 160 members. Although he has reported that larger lineups have proven to be superior to traditional lineups, this assertion has not been supported by other researchers. For example, Beaudry (2004) found that using a 40-person lineup reduced false and correct identifications compared with 6-person lineups.

Postidentification feedback. As suggested by its name, postidentification feedback is any statement that the lineup administrator makes

after the witness identifies the suspect from the lineup (Wells & Bradfield 1998). Confirmatory feedback can imply that the witness made a correct decision either explicitly (e.g., "Good, you got the guy") or in more subtle ways (e.g., "The other witness also chose that guy"). A recent meta-analysis by Douglass & Steblay (2006) revealed that postidentification feedback effects were robust. Witnesses who received confirmatory feedback expressed more confidence in their identifications. In addition, they reported better witnessing conditions (e.g., clearer view, more attention paid to the event), stronger identification performance (e.g., ease, speed), and better memories (e.g., for strangers' faces). Perhaps unsurprisingly, witnesses who receive feedback also appear more credible to mock jurors (Luus & Wells 1994). Because postidentification feedback influences confidence but not accuracy, it also further reduces the relation between confidence and accuracy (Bradfield et al. 2002). These results suggest that witnesses' confidence statements should be obtained before any feedback is provided. Wells & Bradfield (1998) have found that this procedure protects witnesses from many of the reported feedback effects; thus, they dubbed it the confidence prophylactic effect. However, the confidence prophylactic effect is time limited; one week later, feedback effects return (Neuschatz et al. 2007). Thus, the most prudent solution appears to be to assess and document confidence before providing witnesses with feedback about their decisions.

The system variables reviewed above have generally consistent findings and practical applications. Unbiased lineup instructions, lineup sizes of 6 or 8 persons, fillers that match the witness's description of the perpetrator, and the assessment of confidence uninfluenced by postidentification feedback are noncontroversial recommendations that have been adopted in sets of contemporary guidelines for lineups (e.g., Wells et al. 1998). Several additional system variables, however, are more controversial, and we devote more attention to them below.

CONTEMPORARY CONTROVERSIES IN EYEWITNESS RESEARCH AND PRACTICES

Despite there being considerable agreement about the effects of the majority of estimator and system variables on eyewitness identification, there remain a few contemporary controversies in the field. In this section, we discuss the opposing views regarding the impact of administrator knowledge (single-blind versus double-blind administration) and the method of presentation of targets (simultaneous versus sequential lineup presentation, showups versus traditional lineups).

Single-Blind versus Double-Blind Administration

Often, the police officer who administers the lineup knows the identity of the suspect (Wells & Seelau 1995). In fact, the lineup administrator—who may be charged with constructing the lineup, providing unbiased instructions to witnesses, asking questions, and recording witness decisions—might also be an officer who is closely involved with the investigation. A lineup administrator who knows the location of the suspect in the lineup might advertently or inadvertently influence the witness to make an identification. The use of blind lineups, in which the lineup administrator does not know which lineup member is the suspect, serves as a safeguard against influence; however, adopting double-blind administration procedures has been the subject of disagreement in law enforcement and scientific circles.

Across several areas, researchers have shown that experimenters can subtly and unconsciously cue participants—and even animals—to their hypotheses (e.g., Rosenthal 2002). When that occurs, it is difficult to ascertain whether participants were behaving naturally or in accordance with what they thought that the experimenter wanted. Double-blind testing is an essential component of scientific research; making the experimenter blind

to the condition significantly reduces experimenter expectancy effects. In keeping with the lineup-as-experiment analogy, these same double-blind standards should be applied to the administration of lineups (e.g., Wells & Luus 1990).

Reports of investigator bias indicate that administrators who know the suspect's identity can engage in behaviors that influence witnesses to choose the suspect. Phillips et al. (1999) found that the administrator's knowledge of the suspect's identity in sequential lineups led to more false identifications of the suspect when an observer was present. In other research, increased contact between witnesses and a knowledgeable administrator increased false identifications only when a simultaneous lineup was shown (Haw & Fisher 2004). Correct identifications of the suspect occurred more often when the administrator was not blind to the suspect's identity—regardless of lineup type. Other researchers have suggested that the administrator's knowledge increases correct and false identifications when simultaneous lineups feature biased instructions (Greathouse & Kovera 2009). It is evident that administrators' expectancies can influence witnesses' choices; however, biasing effects of single-blind lineups are not universally obtained (Russano et al. 2006). More recent research (Greathouse & Kovera 2009) holds promise for distinguishing the conditions under which bias is most likely to occur.

The effects of single-blind administration extend beyond identification performance. Witnesses who make decisions that are consistent with the administrator's expectations express more confidence in those decisions (Garrioch & Brimacombe 2001). However, the type of administration (single- versus double-blind) does not appear to affect witnesses' perceptions of the pressure to make an identification or the fairness of the procedure (e.g., Phillips et al. 1999). Knowledgeable administrators do reveal subtle cues to witnesses (e.g., Greathouse & Kovera 2009). However, this influence is not detectable by jurors—all

witnesses are judged to be equally credible (e.g., Garrioch & Brimacombe 2001).

In sum, the general research on expectancy effects and the eyewitness research on procedures converge on the conclusion that single-blind procedures have potential biasing effects on lineup identifications and that double-blind procedures should be adopted as a safeguard. However, this recommendation is controversial within law enforcement groups because it conflicts with well-established investigatory procedures and suggests a lack of trust among police and prosecutors (Wells et al. 2000).

Simultaneous versus Sequential Lineup Presentation

Although there are many different ways to administer a lineup, simultaneous and sequential presentations are the most common. In the simultaneous lineup, all of the lineup members are presented at the same time. The witness decides which of the lineup members (if any) was the perpetrator. In the sequential lineup, a witness views one lineup member at a time and makes an identification (yes/no) for each of the members as they are presented (Lindsay & Wells 1985). There are procedural variations within the research, such as whether witnesses are given advance knowledge of the size of the lineup, whether the procedure continues once an identification is made, and whether witnesses are allowed to see the lineup more than once. In their meta-analysis comparing simultaneous and sequential presentation, Steblay et al. (2001) found that participants were more likely to correctly identify the perpetrator in a simultaneous lineup than in a sequential lineup (50% versus 35%); they were also less likely to falsely reject the lineup and indicate that the perpetrator was not there (26% simultaneous versus 46% sequential). There were no significant differences between the two lineups in terms of filler choices. Although the simultaneous presentation provided a slight advantage in the perpetrator-present lineups, the perpetrator-absent lineups told a very different story.

Participants were far more likely to choose someone from a simultaneous lineup (51%) than a sequential lineup (28%) when the perpetrator was not present (Steblay et al. 2001). Overall, sequential lineups produced more correct decisions than simultaneous lineups (56% versus 48%). This phenomenon has been referred to as the sequential-superiority effect. These findings have been controversial in at least two respects. First, there have been various attempts to explain the sequential-superiority effect, and these explanations have received mixed empirical support. Second, some researchers have questioned whether the sequential-superiority effect is valid. We summarize the writings about both issues next.

Initially, Wells (1984) posited that the simultaneous lineup may encourage witnesses to make relative judgments because all lineup members are shown at the same time. The witness can compare the members to each other to determine, by process of elimination, which one most resembles his or her memory of the perpetrator. The problem is that, even if the lineup is unbiased, one of the lineup members will look most like the perpetrator. In a target-present lineup, it is expected that the perpetrator will be chosen because he or she is the member who most resembles the witness's memory; this would account for the higher correct identification rate that is associated with the simultaneous lineup. In contrast, if the perpetrator is not in the lineup, the witness may still be inclined to choose the individual who most resembles his or her memory of the perpetrator, resulting in a false identification. In support of the existence of a relative-judgment strategy, one study showed that when the perpetrator was removed from the simultaneous lineup without replacement, witnesses were more likely to choose another filler—the next best match (Wells 1993).

The sequential lineup was designed to reduce witnesses' ability to rely upon a relative-judgment strategy (Lindsay & Wells 1985). The ability to compare lineup members is significantly reduced, if not eliminated, because members are presented one at a time and the witness must provide a decision about each member

before moving to the next. Rather than comparing lineup members to each other, the witness is forced to match each lineup member—in isolation—to his or her memory of the perpetrator. Witnesses who are shown sequential lineups are more likely to report using this absolute-judgment strategy (Lindsay et al. 1991). This approach may account for the lower false identification rates that are associated with the sequential lineup. Presumably, when none of the members matches a witness's memory for the perpetrator, the lineup will be rejected.

More recently, researchers have used a signal detection approach to argue that the lower identification rates associated with the sequential lineup are due to a criterion shift (e.g., Ebbesen & Flowe n.d.). Components of the sequential lineup (e.g., committing to a decision before seeing the next lineup member) may force the witness to become more conservative when attempting an identification. That is, the witness may require a higher threshold—or better match to memory of the perpetrator—before making an identification. There are several pieces of evidence that suggest that the sequential lineup leads to a criterion shift rather than simply to an absolute-judgment strategy. First, the finding that correct identifications are lower with sequential lineups than simultaneous lineups (Steblay et al. 2001) can be explained by a criterion shift. If witnesses are less likely to choose someone from the lineup, they should be more likely to reject a lineup even if the perpetrator were actually there. In fact, witnesses viewing a sequential lineup are less likely to choose anyone (Steblay et al. 2001). Second, Clark & Davey (2005) have suggested that if the perpetrator is removed from the lineup without being replaced by another member, relative- and absolute-judgment strategies should be differentially affected. If a relative-judgment strategy is being used, then the witness should be more likely to choose the next lineup member who looks most like the perpetrator. If an absolute-judgment strategy is being used, the witness should be more likely to reject the lineup when the perpetrator is removed. Thus, removal without replacement should result

in more filler choices in simultaneous lineups than in sequential lineups. However, that does not occur: Filler choices are affected equally across both lineup types by removal without replacement (Clark & Davey 2005). Third, witnesses actually show a higher response criterion when viewing a sequential lineup (Meissner et al. 2005), although the criterion shift is moderated by the order and similarity of the fillers to the suspect (Clark & Davey 2005). Last, the criterion-shift and relative-judgment explanations are not mutually exclusive. It is possible that both have roles in explaining the sequential-superiority effect. Further research is needed to determine whether changing strategies, criteria, or a combination of the two can account for differences between the sequential and simultaneous lineups.

The empirical foundation for the sequential-superiority effect has been challenged, however. Some researchers have raised the possibility that differences in correct identification rates across the two lineups may be due to the laboratories in which the studies were conducted (McQuiston-Surrett et al. 2006). They noted that there were smaller differences between simultaneous and sequential correct identification rates when studies were associated with a particular researcher—a finding they referred to as the Lindsay effect. When studies in which R.C.L. Lindsay was identified as an author were removed from the analysis, there was no longer an overall difference between sequential and simultaneous lineups (overall accuracy = 0.48). Researchers have posited that the issue arose because of a counterbalancing problem: Presentation order of the targets was less likely to be counterbalanced in Lindsay's studies (Malpass et al. 2009, McQuiston-Surrett et al. 2006). Although Lindsay acknowledges that this might have been an oversight (Lindsay et al. 2009), it is unlikely that counterbalancing alone accounts for the effect. First, studies in which counterbalancing occurred still showed smaller differences in correct identification rates between the two lineups (e.g., Steblay et al. 2001). Second, counterbalancing is an issue only if participants

share information about the position of the perpetrator in the lineup or if there is a particular order effect in terms of choosing preferences (see Lindsay et al. 2009). It is unlikely that either of these possibilities would affect only correct identifications in sequential lineups. Given that Lindsay's studies usually feature comparisons of sequential and simultaneous lineups as well as examinations of correct and false identification rates (e.g., McQuiston-Surrett et al. 2006), all conditions should be affected equally. This would mean that both correct identification rates (when the target is present) and correct rejection rates (when the target is absent) should be elevated and equal across both types of lineups. However, this does not occur.

Instead, other factors may be responsible for the Lindsay effect. The laboratory in which studies were conducted is likely confounded with other variables. It is not unusual for researchers within a given laboratory to consistently use a preferred criminal event. Within the Lindsay lab, researchers often used live, staged events or a recorded crime that afforded a clear, extended view of the perpetrator (Beaudry et al. 2006). However, in other studies, researchers have presented participants with obscured and/or brief glimpses of the perpetrator (e.g., Parker & Ryan 1993). Thus, one possibility is that the Lindsay effect can be attributed to the quality of exposure to targets: the better the exposure, the smaller the difference between correct identifications across the two lineups. If it is true that differences in the lineups are, in fact, due to a criterion shift, the sequential lineup would be most affected by changes in the quality of exposure to targets. Specifically, poorer views of the perpetrator would result in fewer choices in the sequential lineup (and, accordingly, correct identifications would be suppressed). Thus, it is more likely that the quality of exposure and/or the type of event account for differences between lineups than do counterbalancing or experimenter effects.

Regardless, researchers have questioned the validity of an overall sequential-superiority effect (McQuiston-Surrett et al. 2006). These

authors have noted that the original Steblay et al. (2001) meta-analysis incorporated unpublished manuscripts and conference presentations. Although they agree that the approach does conform to current scientific practice, they argue that it might present problems for policymaking. Researchers have indicated that, because of the *Daubert* standard, the legal system might have a preference for published articles (e.g., Deffenbacher et al. 2004). Given that there is a relatively small published literature on the topic, a few researchers have suggested that there is insufficient evidence to make any policy recommendations (e.g., McQuiston-Surrett et al. 2006). However, if that is the case, then a strong argument could be made in favor of the sequential lineup. Steblay et al.'s (2001) analysis revealed that publication status moderated the sequential-superiority effect: Published articles reported larger differences in correct identifications and smaller differences in false identifications between the two lineup types. Perhaps these findings add weight to claims that studies that find that simultaneous lineups are superior are more difficult to publish (Steblay et al. 2001). However, the most important point is that, regardless of the publication status, the pattern of results remained the same. Thus, if the courts were to examine either published or unpublished studies, they would still find that the simultaneous lineup is superior in terms of the number of correct identifications and the sequential lineup is superior in terms of reducing false identifications. Generally, it is important not to confuse policymaking with scientific rigor. Researchers should not constrain their conclusions—or scientific approaches—because the legal system may not be as receptive to them.

The empirical foundation underlying the sequential-superiority effect was also challenged based on the results of a year-long, multi-site field study in Northern Illinois (Mecklenburg 2006). The known error rate for simultaneous lineups (2.7%) was lower than for sequential lineups (9.2%) (Mecklenburg et al. 2008); however, it is difficult to conclude that simultaneous lineups were superior.

Although the effect of blind administration was not a central issue in the field study, it has been identified as a significant confound (e.g., Schacter et al. 2008): All simultaneous lineups were single-blind and all sequential lineups were double-blind. Thus, it is unclear whether simultaneous lineups led to fewer filler identifications because the procedure was more effective, knowledgeable administrators influenced witnesses, or a combination of the two. If knowledgeable administrators of the simultaneous lineup cued witnesses to avoid choosing fillers, that would account for the lower filler selection rate (Wells 2008). Some officials (e.g., Mecklenburg et al. 2008) have argued that police influence was not evident, but it is difficult to prove this conclusively. Intuitively, administrator expectancy effects should be greater in field studies. The majority of research on double-blind administration has been conducted using student administrators. Not only is the investigative process difficult to simulate in the laboratory, but also it is unlikely that participants are as motivated for the witness to select the suspect as are police officers trying to solve real cases (e.g., Russano et al. 2006). Thus, the Illinois field study does not offer a sense of which approach is better: simultaneous versus sequential presentation or single- versus double-blind administration.

In sum, although the sequential-superiority effect is well accepted among eyewitness researchers (Kassin et al. 2001), there is a vociferous minority of researchers who dispute the effect and raise arguments that can be challenged but not easily refuted. One such argument that we find compelling is that more research is needed on the conditions that qualify the sequential-superiority effect, such as other features of the lineup (e.g., instructions, similarity of the fillers to the suspect or perpetrator, order of fillers).

Showups versus Traditional Lineups

Another debate centers on whether showups are comparable to traditional lineups. A showup occurs when only one suspect is shown to the

witness; in essence, it is a one-person lineup. Police officers may conduct showups at the crime scene to determine whether they should arrest a suspect. Under these circumstances, showups are advantageous because they minimize the time delay between the crime and the witness's identification and reduce the risk that changes in the perpetrator's appearance will jeopardize a future eyewitness identification—factors that, as discussed above, decrease identification accuracy. Showups are efficient in that they do not require the selection of fillers and they can enhance public safety by allowing for the swift apprehension of dangerous criminals. In the case of nonidentifications, showups can quickly eliminate citizens from suspicion, thus minimizing inconvenience to innocent suspects (compared with detainment), enhancing public safety (by redirecting investigators to finding the guilty suspect), and enhancing the efficiency of criminal investigations (by reducing time spent on false leads). Perhaps for these reasons, showup procedures are used frequently. In a study of 689 identification attempts from 271 cases in Northern California, 258 (37%) of the identification attempts were from showups (Behrman & Davey 2001).

Showups, however, may have significant limitations. Researchers typically identify at least two potential problems. First, showups are believed to be inherently suggestive. Candidates for showups are not selected randomly, and witnesses may believe that a suspect that is apprehended near the crime scene is probably guilty and that police officers would not have presented an innocent individual. Other factors surrounding the showup may enhance suggestiveness. Regardless of guilt or innocence, the suspect may be highly anxious or agitated. Moreover, the suspect may show signs of being apprehended after a chase and may even be brought before the witness in handcuffs. All of these factors may increase the perception of guilt and the likelihood that a witness will make a positive identification.

Do the suggestive elements of showups lead to more suspect identifications than do lineups? In a meta-analysis directly comparing the effectiveness of showups and lineups (Steblay et al. 2003), showups resulted in more accurate decisions overall (correct reports that the perpetrator was or was not presented) than did lineups (69% versus 51%, respectively). There were no differences between participants' correct identifications of the perpetrators in target-present showups (47%) or lineups (45%); yet, participants who saw showups made more false rejections and were more likely to say that the perpetrator was not there (58% versus 34% for lineups). In target-absent presentations, participants were more likely to correctly reject showups (85%) than lineups (57%). Thus, the overall false identification rate was lower for showups (15%) than lineups (43%).

There are several ways to interpret these results. First, showups resulted in lower choosing rates (54% versus 27%). Witnesses may have adopted an absolute-judgment strategy, increased their decision criterion, or both. Regardless, their reluctance to make a choice—combined with their overall greater accuracy—could suggest that showups are a superior presentation method. Another way to interpret these results is to focus more closely on false identifications. Although more false identifications were made in lineups, these might serve as protective factors for the innocent (i.e., if a witness chooses a filler—who is known to be innocent—his or her memory is suspect and the innocent suspect is less at risk). In addition, when researchers included a designated suspect (i.e., an individual who closely resembled the perpetrator), witnesses were more likely to identify the innocent suspect from showups than from lineups (23% versus 17%). Thus, showups may be more problematic when the suspect and perpetrator are highly similar. However, based on these data, the concern that showups lead to more false identification than lineups appears to be misplaced.

Showups have another significant limitation, however. It is difficult—if not impossible—to ascertain whether a showup identification is the product of the witness's memory for the perpetrator. In a well-constructed lineup, a witness who attempts to

identify the suspect by guessing or deduction has a better chance of mistakenly identifying a filler than correctly identifying the suspect. In a showup, guessing, deduction, and identification from memory all lead to the same single option: the suspect. Thus, regardless of their impact on positive identifications, showups cannot rule out guessing or deduction and are less diagnostic than lineups.

In sum, the extant research suggests that showups do not lead to a greater likelihood of mistaken identification. However, the results of an individual showup identification are more difficult to interpret because the test itself is more open to alternative explanations compared with a well-constructed lineup. Generally, showup identifications have been examined in only a few studies and are seriously underresearched relative to lineup identifications. Given the frequent use of showups and their potential advantages in criminal investigations, the topic is ripe for future research.

FUTURE GENERATIONS OF EYEWITNESS RESEARCH

As the field of eyewitness science matures, we can expect research to flow from several streams. First, the controversial topics discussed above—blind administration, the sequential-superiority effect, and showups—continue to be the subject of ongoing research and may remain under the microscope for some time. Second, the field of eyewitness science would benefit from both inward- and outward-looking approaches. By inward we mean the mining of psychological research and theory for ideas to guide eyewitness research. By outward we mean drawing attention to what is happening in actual investigations and identifying phenomena and problems that could be informed by psychological research.

Looking Inward

Just as within the field of social psychology (Kunda 1999), a cognitive shift in eyewitness identification research seems to have occurred.

Over time, researchers have become more focused on underlying cognitive processes (i.e., memory). Using this approach, witnesses are regarded as information processors. However, witnesses must be highly motivated. Yet researchers have placed significantly less emphasis on hot cognition, or how decisions are affected by witnesses' or investigators' emotions, goals, and desires (although cf. Ask & Granhag 2007). Thus, there are several relevant hot cognition estimator and system variables that have not been explored. We highlight a few such topics below.

Deception. One might assume that witnesses will tell the truth and will cooperate with law enforcement officials to make correct identifications. Although an innocent bystander may have no reason to lie, not all witnesses are innocent or bystanders. There are several scenarios under which an eyewitness may choose to lie. First, a witness could feel, or actually be, threatened by the perpetrator. Therefore, a witness may not want to make an identification in order to ensure the safety and welfare of himself/herself or others. Second, a witness may be tempted to lie because of the perceived benefits involved. A perpetrator (or other parties) could bribe a witness not to testify, for example. A less nefarious scenario involves promises from within the justice system. For example, if the witness is currently serving a sentence for a crime or will be prosecuted in the near future, a prosecutor or police officer could promise leniency in exchange for cooperation with the identification. Indeed, testimony from unreliable accomplices and informants is often blamed for conviction of the innocent (Innocence Project 2009). Other individuals could lie—when making the identification or even about witnessing the event in the first place—because they wish to qualify for a monetary reward or gain notoriety by making an identification and "catching the bad guy." Third, a witness might lie to aid the perpetrator. Within small communities or groups (e.g., gangs), it is a reasonable expectation that there would be a prior relationship between the

witness and the perpetrator. Thus, a witness may knowingly lie to help the perpetrator avoid legal trouble. Finally, a witness could lie because he or she has some involvement in the crime or other criminal activity that could come to light. Susan Smith's false description of an African American man who kidnapped her two children—when she, in fact, had killed them—illustrates this scenario (Terry 1994). Despite there being many circumstances under which a witness may lie, there has been very little research to address this issue.

Research has focused on people's ability to detect deception in witnesses' accounts (e.g., Köhnken 1987). In general, individuals cannot detect lies (Bond & DePaulo 2006). The veracity of accounts is even more difficult to detect in confident witnesses (Tetterton & Warren 2005). However, few researchers have examined the effects of deception on eyewitness identifications. Parliament & Yarmey (2002) found that witnesses who lied in response to a perpetrator's threat were the quickest to make an identification decision: Generally, they opted to reject the lineup rather than choose a filler. Moreover, witnesses who were instructed to lie to convict the perpetrator were virtually indistinguishable from the control group in terms of correct and false identifications. These findings suggest that it is very difficult to tell whether witnesses are lying from their identification decisions alone. However, these conclusions are based on one study—more research is urgently needed to determine whether identifications are influenced by the different types of motives for deception. For example, it is known that highly motivated lie-tellers are easier to detect (e.g., DePaulo & Kirkendol 1989); the same may be true for deceptive eyewitnesses.

Motivation impairment effects. When a witness is brought in to view a lineup, an identification is highly anticipated. Police officers may have spent months investigating a crime before uncovering a suspect. Lawyers from the defense and prosecution may be on hand to ensure that proper procedures are followed. In the case of a live lineup, all those people may be in the same room as the witness. Moreover, even if the witness was not the victim of the crime, he or she may feel responsible for ensuring that the perpetrator is caught. Thus, a witness should be highly motivated to make an identification. Little research has been done on whether the motivation of the witness affects accuracy. Indeed, crime simulation research has been strongly criticized by practicing attorneys because it does not simulate the motivations and emotions that often characterize situations involving eyewitness identification (e.g., Mecklenburg et al. 2008).

Evidence from the field of deception detection suggests that motivation impairs decision making. People who are highly motivated to identify deception are more confident but display less discrimination accuracy than do individuals who experience low levels of motivation (Porter et al. 2007). There are several possible implications for eyewitness identification research. First, current laboratory findings might overestimate witnesses' accuracy. In general, witnesses in eyewitness research experiments likely experience little motivation. Participants are university students who are asked to view a video and make an identification in exchange for course credit. Although participants may find the study interesting and challenging, it is unlikely that they are as motivated as real witnesses. If motivation impairs witnesses' accuracy, then real-life identification rates should be poorer than those observed in the laboratory. Second, this line of research offers a new way to conduct identification procedures. In Porter et al.'s (2007) study, motivation was reduced by telling participants that lie detection accuracy is generally poor. When compared with the motivated group, people who received these instructions were more accurate. Researchers could explore the effects of similar instructions on eyewitness identification accuracy. Finally, increasing motivation is thought to induce tunnel-vision in decision making (Porter et al. 2007). Thus, future research could also examine how motivation affects the judgment strategies of witnesses and law enforcement officials.

Mood and emotional state. Although the relationship between stress and memory has been studied, little is known about the effects of other emotional states. Witnesses may feel more than arousal when they witness a crime or make an identification. For example, a witness may experience anger, sadness, or disgust when viewing a person robbing a store. Mood and emotional state could influence identification performance in several ways. First, emotions may determine people's cognitive strategies and may interfere with their processing of events. Rainis (2001) found that face recognition decreased when negative emotions were induced. However, it is unclear what emotions were induced because the contexts (e.g., concentration camps, surgeries) could have prompted any combination of feelings (e.g., anger, disgust) or arousal. In addition, the task involved face recognition rather than eyewitness identifications. Second, individuals are more likely to recall events that are congruent with their current moods (Blaney 1986). Witnesses who are brought in to make an identification while in a happy mood may have more difficulty recalling sad events (i.e., details related to the crime); this could adversely affect their identification of the perpetrator. Third, eyewitnesses' identifications could involve mood-dependent memory. Events that are encoded in a particular mood may be best retrieved when the individual is in that same mood (see Eich 1995 for a full review). On the one hand, a witness may not be in the same emotional state when asked to make an identification as when he or she witnessed the crime. Perhaps if a similar mood were induced, the witness's memory of the perpetrator would be primed. On the other hand, according to Eich (1995), mood-dependent memory is most likely to occur when the target event is internal or involves recall, when mood is intense, and when the person is not explicitly reminded of the event. Given that eyewitness identifications involve the explicit recognition of individuals after external events, it remains unknown whether eyewitness memory is mood dependent. Fourth, mood can affect witnesses' processing of information. Specifically,

individuals who are in sad moods are more likely to engage in elaborative, systematic processing, whereas individuals in good moods rely more heavily upon heuristics (see Schwarz & Clore 2003 for a review). In a recent study by Ask & Granhag (2007), sad investigators were more likely to engage in substantive processing of a witness's statements (e.g., examining the consistency of statements), whereas angry investigators tended to rely upon more simplified strategies (e.g., the trustworthiness of the witness). The same might be true for the witnesses themselves. For example, an angry witness may be more swayed by superficial cues (e.g., likeability of the lineup administrator) than would a sad witness. In sum, the extent to which mood affects identifications and decision making has received little research and is ripe for investigation.

Looking Outward

Actual cases involving eyewitness identification are a rich source of ideas for future research. Exposure to actual cases from field and archival research, consultation with investigators and members of the legal profession, and service as an expert witness reveals real-world phenomena and problems that are not obvious from psychological theories and laboratory research literatures. In this section, we draw upon our own experience with cases, as well as the experience of colleagues whom we have consulted about this issue, to assist with generating directions for future research.

In-court identifications. At trial, a witness may be asked to indicate whether the perpetrator of the crime is seated in the courtroom. The witness is encouraged to testify that the in-court and lineup identifications of the suspect are independent. That is, the prosecutor may explicitly ask the witness to confirm that the in-court identification arises from his or her actual memory of the perpetrator rather than any interim exposure (e.g., to a lineup). Although the in-court identification may appear to be merely a formality, its impact on the witness and the

jury is unknown. Research has shown that individuals can have difficulty recalling the source of information (e.g., Johnson et al. 1993). Thus, it is unclear whether witnesses would be able to accurately specify the origins of their memory of the defendant. An in-court identification procedure shares features of a showup, but as noted earlier little research has been devoted to showup identifications. In addition, the cognitive and motivational processes underlying in-court identifications are unknown. Perhaps witnesses do not really expend much effort in making their identifications; they may rely on the heuristic, "If the person is in the courtroom, it must be the man that I identified." It would be interesting to know what would happen if the defendant were replaced with a filler during the in-court identification. If the witness had a strong memory for the perpetrator, the filler should be easily rejected. Although this scenario may be plausible only in dramatic and fictional accounts of court cases, it would serve as evidence of the credibility of the witness (i.e., if the witness makes an incorrect in-court identification, then the original lineup identification would be called into question). Another possibility is that the in-court identification activates an availability heuristic. Ease of retrieval serves as a source of information: When events are easy to recall, people tend to think that their memories of those events are better (see Schwarz 1998 for a review). A witness may infer that, because the person was easily identified in the courtroom, he or she has a good memory of the perpetrator. Thus, the in-court identification could bolster the witness's confidence in the lineup identification and, subsequently, affect his or her testimony that the defendant is the perpetrator. In-court identifications seem to be more than a formality. Their presence may subtly affect the witness and, subsequently, jurors; however, little research has been done on the topic.

Familiarity. Although the vast majority of eyewitness research focuses on the identification of strangers, familiarity can play a role in actual criminal cases. Consider the following hypothetical scenario: Julia, a witness to a robbery, spontaneously identifies the perpetrator as someone she knows. In her statement, she says, "He had a disguise, but I could tell that it was a regular customer known as Spike. Spike is a member of the street gang the Crisps. He worked here for about a month last year." Police officers know the members of the Crisps, and they think that they know who Spike is, so they show Julia a lineup containing Spike's photo. Julia points to Spike's photo and says, "That's Spike. He robbed the store." Now, let's carefully review this scenario. Julia's accurate identification of Spike strongly suggests that she and the police have the same suspect in mind. But does the lineup identification prove that Spike is the perpetrator? We assert that it does not. The evidence that Spike is the perpetrator comes from Julia's spontaneous identification of him and not from the lineup identification. The distinction becomes more obvious when we consider an analogous situation. Suppose that, as you are walking in the mall, you look ahead and you think that you see your sister. You jog to catch up to her, but the person that you saw has slipped into a store, and she is now out of sight. Your spontaneous identification of your sister may or may not have been correct. Now suppose that we showed you a lineup and asked you to identify your sister. Clearly, you can identify your sister from the lineup. But does this prove that she was the person whom you spotted in the mall? Of course not! The lineup in this situation is not diagnostic of the spontaneous identification's accuracy; it merely shows that you know the person whom you spontaneously identified. When the analogy reverts to the criminal case involving Julia and Spike, however, interesting research questions become evident. What factors affect the accuracy of spontaneous identifications? Familiarity is, of course, a matter of degree. Some judgments of familiarity are not strong (e.g., "I think I went to school with him"). How accurate are these familiarity judgments and what factors influence their accuracy? How do estimator and

system factors interact with levels of familiarity? In some cases, in which the witness claims to know the perpetrator, prosecutors could argue that all of the eyewitness research is irrelevant because it pertains to identifications of strangers. Is this point valid? Could short exposure time, high stress, disguise, and other such conditions cause a witness to mistakenly identify a stranger as someone she knows? In the Julia and Spike case, police officers showed Julia a lineup in order to ensure that they had the right Spike. Even if they recognize that the lineup identification does not prove the accuracy of Julia's spontaneous identification of Spike, could the identification procedure nevertheless inflate Julia's confidence in her memory? Could the identification outcome influence the investigators' confidence in the evidence? Future research should address these questions by examining the role of familiarity and its interactions with other estimator and system variables.

Suggestive procedures. Considerable emphasis has been placed on eliminating biased instructions. Many established guidelines for identification procedures, such as those produced by the U.S. Department of Justice's Technical Working Group (1999), require that witnesses be warned that the perpetrator may not be present in the lineup. Some have stronger language, suggesting that witnesses should take care not to implicate innocent people. Little attention, however, has been paid to the context in which those instructions are delivered. For example, an investigator may contact the witness and say, "We got the guy. Can you come down and ID him for us?" Once the witness arrives to make the identification, the lineup administrator may provide the standard instructions. Given the expectation already created by the investigator, do the unbiased instructions still reduce the risk of false identification? There has been no research addressing this question. In addition, no research has been conducted on other ways in which the lineup administrator can trivialize the standard instructions. For example, if an administrator indicates that the instructions are "merely a formality," this might suggest to the witness that they are not to be taken seriously because, in fact, the perpetrator is actually in the lineup. Further research is needed on how interactions between the witness and investigator prior to the delivery of the instructions can affect the impact of unbiased instructions, identifications, and witness confidence.

Investigator and legal reasoning. One of the main reasons for which mistaken identifications occur and become influential is that, historically, law enforcement and the judicial system have not thought scientifically about eyewitness evidence. In his American Psychology–Law Society Presidential Address, Gary Wells (2006) noted that eyewitness memory should—but has not been—treated as trace evidence that needs to be carefully analyzed and preserved and not tainted or compromised. Establishing new guidelines and procedures based on scientific research is a step in the right direction, but it is not sufficient in the absence of enforcement. In fact, guidelines can be rigid and counterproductive. For example, in 2007 North Carolina approved legislation dictating specific methods of identification procedures. What happens when research reveals alternative procedures that are more effective at improving identification accuracy and further reducing the risk of false identification? The answer is that the new, effective procedures will be illegal until the law changes. Thus, it is essential that law enforcement officials and members of the legal profession recognize the importance of memory as trace evidence. Such practitioners would benefit from a solid understanding of the social, cognitive, affective, and motivational factors that can influence trace evidence and from knowledge of how to safeguard against spoilage of eyewitness evidence. Eyewitness scientists are well positioned to provide guidance in this change. Research on how to create this change is sorely needed.

DISCLOSURE STATEMENT

ACKNOWLEDGMENTS

LITERATURE CITED

Ask K, Granhag PA. 2007. Hot cognition in investigative judgments: the differential influence of anger and sadness. *Law Hum. Behav.* 31:537–51

Beaudry JL. 2004. *Evaluating a radical alternative lineup procedure: the multiple-choice sequential, large lineup*. Master's thesis, Queen's Univ., Kingston, Ontario, Canada

Beaudry JL, Leach A-M, Mansour J, Bertrand MI, Lindsay RCL. 2006. *The element of surprise: the impact of participants' knowledge of a subsequent lineup task*. Presented Am. Psychol.-Law Soc. Annu. Conf., St. Petersburg, FL, March 1–5

Behrman BW, Davey SL. 2001. Eyewitness identification in actual criminal cases: an archival analysis. *Law Hum. Behav.* 25:475–91

Behrman BW, Richards RE. 2005. Suspect/foil identification in actual crimes and in the laboratory: a reality monitoring analysis. *Law Hum. Behav.* 29:279–301

Blaney PH. 1986. Affect and memory: a review. *Psychol. Bull.* 99:229–46

Bond CF Jr, DePaulo BM. 2006. Accuracy of deception judgments. *Personal. Soc. Psychol. Rev.* 10:214–34

Borchard E-M. 1932. *Convicting the Innocent*. Garden City, NY: Garden City Publishing

Bradfield AL, Wells GL, Olson EA. 2002. The damaging effect of confirming feedback on the relation between eyewitness certainty and identification accuracy. *J. Appl. Psychol.* 87:112–20

Brewer N, Weber N. 2008. Eyewitness confidence and latency: indices of memory processes not just markers of accuracy. *Appl. Cogn. Psychol.* 22:827–40

Brewer N, Wells GL. 2006. The confidence-accuracy relationship in eyewitness identification: effects of lineup instructions, foil similarity, and target-absent base rates. *J. Exp. Psychol. Appl.* 1:11–30

Charman SD, Wells GL. 2007. Eyewitness lineups: Is the appearance-change instruction a good idea? *Law Hum. Behav.* 31:3–22

Clark SE. 2005. A re-examination of the effects of biased lineup instructions in eyewitness identification. *Law Hum. Behav.* 29:395–42

Clark SE, Davey SL. 2005. The target-to-foils shift in simultaneous and sequential lineups. *Law Hum. Behav.* 29:151–72

Clark S, Tunnicliff JL. 2001. Selecting lineup foils in eyewitness identification experiments: experimental control and real-world simulation. *Law Hum. Behav.* 25:199–216

Cutler BL. 2006. A sample of witness, crime, and perpetrator characteristics affecting eyewitness identification accuracy. *Cardozo Public Law Policy Ethics J.* 4:327–40

Cutler BL, ed. 2008. *Encyclopedia of Psychology & Law*, Vols. 1–2. Thousand Oaks, CA: Sage

Cutler BL, ed. 2009. *Expert Testimony on the Psychology of Eyewitness Identification*. Oxford: Oxford Univ. Press

Deffenbacher KA. 1980. Eyewitnesses accuracy and confidence: Can we infer anything about their relationship? *Law Hum. Behav.* 4:243–60

Deffenbacher KA, Bornstein BH, McGorty K, Penrod SD. 2008. Forgetting the once-seen face: estimating the strength of an eyewitness's memory representation. *J. Exp. Psychol. Appl.* 14:139–50

Deffenbacher KA, Bornstein BH, Penrod SD, McGorty EK. 2004. A meta-analytic review of the effects of high stress on eyewitness memory. *Law Hum. Behav.* 28:687–706

DePaulo BM, Kirkendol SE. 1989. The motivational impairment effects in the communication of deception. In *Credibility Assessment*, ed. J Yuille, pp. 51–70. Belgium: Kluwer Acad.

Douglass AB, Steblay NM. 2006. Memory distortion in eyewitnesses: a meta-analysis of the postidentification feedback effect. *Appl. Cogn. Psychol.* 20:859–69

Dunning D, Perretta S. 2002. Automaticity and eyewitness accuracy: a 10 to 12 second rule for distinguishing accurate from inaccurate positive identifications. *J. Appl. Psychol.* 87:951–62

Eich E. 1995. Searching for mood dependent memory. *Psychol. Sci.* 6:67–75

Ebbesen EB, Flowe HD. n.d. *Simultaneous v. sequential lineups: What do we really know?* **http://psy.ucsd.edu/~eebbesen/SimSeq.htm**

Garrioch L, Brimacombe CAE. 2001. Lineup administrators' expectations: their impact on eyewitness confidence. *Law Hum. Behav.* 25:299–315

Greathouse SM, Kovera MB. 2009. Instruction bias and lineup presentation moderate the effects of administrator knowledge on eyewitness identification. *Law Hum. Behav.* 33:70–82

Haw RM, Fisher RP. 2004. Effects of administrator-witness contact on eyewitness identification accuracy. *J. Appl. Psychol.* 89:1106–12

Innocence Project. 2009. *Understand the causes: the causes of wrongful conviction*. New York: Innocence Project. **http://www.innocenceproject.com/understand**. Accessed June 12, 2009

Jacoby LL, Woloshyn V, Kelley CM. 1989. Becoming famous without being recognized: unconscious influences of memory produced by dividing attention. *J. Exp. Psychol. Gen.* 118:115–25

Johnson MK, Hashtroudi S, Lindsay DS. 1993. Source monitoring. *Psychol. Bull.* 114:3–28

Kassin SM, Tubb VA, Hosch HM, Memon A. 2001. On the "general acceptance" of eyewitness testimony research. *Am. Psychol.* 56:405–16

Köhnken G. 1987. Training police officers to detect deceptive eyewitness statements: Does it work? *Soc. Behav.* 2:1–17

Kunda Z. 1999. *Social Cognition: Making Sense of People*. Cambridge, MA: MIT Press

Levi AM. 1998. Protecting innocent defendants, nailing the guilty: a modified sequential lineup. *Appl. Cogn. Psychol.* 12:265–75

Levi AM. 2006. An analysis of multiple choices in MSL lineups, and a comparison with simultaneous and sequential ones. *Psychol. Crime Law* 12:273–85

Levi AM. 2007. Research note: evidence for moving to an 84-person photo lineup. *J. Exp. Criminol.* 3:377–91

Lindsay RCL, Lea JA, Nosworthy GJ, Fulford JA, Hector J, et al. 1991. Biased lineups: sequential presentation reduces the problem. *J. Appl. Psychol.* 76:796–802

Lindsay RCL, Mansour JK, Beaudry JL, Leach A-M, Bertrand MI. 2009. Sequential lineup presentation: patterns and policy. *Legal Criminol. Psychol.* 14:13–24

Lindsay RCL, Martin R, Webber L. 1994. Default values in eyewitness descriptions: a problem for the match-to-description lineup foil selection strategy. *Law Hum. Behav.* 18(5):527–41

Lindsay RCL, Ross DF, Read JD, Toglia MP, eds. 2007. *The Handbook of Eyewitness Psychology, Vol. II: Memory for People*. Mahwah, NJ: Lawrence Erlbaum

Lindsay RCL, Wells GL. 1985. Improving eyewitness identification from lineups: simultaneous versus sequential lineup presentations. *J. Appl. Psychol.* 70:556–64

Loftus EF, Loftus GR, Messo J. 1987. Some facts about "weapon focus." *Law Hum. Behav.* 11(1):55–62

Luus CAE, Wells GL. 1991. Eyewitness identification and the selection of distractors for lineups. *Law Hum. Behav.* 15:43–57

Luus CAE, Wells GL. 1994. The malleability of eyewitness confidence: co-witness and perseverance effects. *J. Appl. Psychol.* 79:714–23

Maass A, Brigham JC. 1982. Eyewitness identifications: the role of attention and encoding specificity. *Personal. Soc. Psychol. Bull.* 8:54–59

Malpass RS, Devine PG. 1981. Eyewitness identification: lineup instructions and the absence of the offender. *J. Appl. Psychol.* 66:482–89

Malpass RS, Tredoux CG, McQuiston-Surrett DE. 2009. Public policy and sequential lineups. *Legal Criminol. Psychol.* 14:1–12

McQuiston-Surrett DE, Malpass RS, Tredoux CG. 2006. Sequential vs simultaneous lineups: a review of methods, data, and theory. *Psychol. Public Policy Law* 12:137–69

Mecklenburg SH. 2006. *Report to the Legislature of the State of Illinois: The Illinois Pilot Program on Double-Blind, Sequential Lineup Procedures*. Springfield: Ill. State Police

Mecklenburg SH, Bailey P, Larson M. 2008. The Illinois Field Study: a significant contribution to understanding real world eyewitness identification issues. *Law Hum. Behav.* 32:22–27

Meissner CA, Brigham JC. 2001. Thirty years of investigating the own race bias in memory for faces: a meta-analytic review. *Psychol. Public Policy Law* 7:3–35

Meissner CA, Tredoux CG, Parker JF, MacLin OH. 2005. Eyewitness decisions in simultaneous and sequential lineups: a dual-process signal detection theory analysis. *Mem. Cogn.* 33:783–92

Mitchell KJ, Livosky M, Mather M. 1998. The weapon focus effect revisited: the role of novelty. *Legal Criminol. Psychol.* 3:287–303

Morgan CA III, Hazlett G, Doran A, Garrett S, Hoyt G, et al. 2004. Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress. *Int. J. Law Psychiatry* 27(3):265–79

Neuschatz JS, Lawson DS, Powers RA, Fairless AH, Goodsell CA, Toglia MP. 2007. The mitigating effects of suspicion on postidentification feedback and on retrospective eyewitness memory. *Law Hum. Behav.* 31:231–47

Odinot G, Wolters G, Van Koppen PJ. 2008. Eyewitness memory of a supermarket robbery: a case study of accuracy and confidence after 3 months. *Law Hum. Behav.* doi 10.1007/s10979-008-9152-x

Parker JF, Ryan V. 1993. An attempt to reduce guessing behavior in children's and adults' eyewitness identifications. *Law Hum. Behav.* 17:11–26

Parliament L, Yarmey AD. 2002. Deception in eyewitness identification. *Crim. Justice Behav.* 29:734–46

Penrod S, Cutler B. 1995. Witness confidence and witness accuracy: assessing their forensic relation. *Psychol. Public Policy Law* 1:817–45

Phillips MR, McAuliff BD, Kovera MB, Cutler BL. 1999. Double-blind photo array administration as a safeguard against investigator bias. *J. Appl. Psychol.* 84(6):940–51

Pickel KL. 1998. Unusualness and threat as possible causes of "weapon focus." *Memory* 6(3):277–95

Pickel KL. 1999. The influence of context on the "weapon focus" effect. *Law Hum. Behav.* 23(3):299–311

Porter S, McCabe S, Woodworth M, Peace KA. 2007. Genius is 1% inspiration and 99% perspiration?...or is it? An investigation of the effects of motivation and feedback on deception detection. *Legal Criminol. Psychol.* 12:297–309

Pozzulo JD, Balfour J. 2006. The impact of change in appearance on children's eyewitness identification accuracy: comparing simultaneous and elimination lineup procedures. *Legal Criminol. Psychol.* 11:25–34

Rainis N. 2001. Semantic contexts and face recognition. *Appl. Cogn. Psychol.* 15:173–86

Read JD. 1995. The availability heuristic in person identification: the sometimes misleading consequences of enhanced contextual information. *Appl. Cogn. Psychol.* 9:91–122

Read JD, Vokey JR, Hammersley R. 1990. Changing photos of faces: effects of exposure duration and photo similarity on recognition and the accuracy-confidence relationship. *J. Exp. Psychol. Learn. Mem. Cognit.* 16:870–82

Rosenthal R. 2002. Covert communication in classrooms, clinics, courtrooms, and cubicles. *Am. Psychol.* 57:839–49

Russano MB, Dickinson JJ, Greathouse SM, Kovera MB. 2006. "Why don't you take another look at number three?" Investigator knowledge and its effects on eyewitness confidence and identification decisions. *Cardozo Public Law Policy Ethics J.* 4:355–79

Schacter D, Dawes R, Jacoby LL, Kahneman D, Lempert R, et al. 2008. Studying eyewitness investigations in the field. *Law Hum. Behav.* 32:3–5

Schwarz N. 1998. Accessible content and accessibility experiences: the interplay of declarative and experiential information in judgment. *Personal. Soc. Psychol. Rev.* 2:87–99

Schwarz N, Clore GL. 2003. Mood as information: 20 years later. *Psychol. Inq.* 14:296–303

Shapiro P, Penrod SD. 1986. A meta-analysis of the facial identification literature. *Psychol. Bull.* 100:139–56

Smith SM, Lindsay RCL, Pryke S. 2000. Postdictors of eyewitness errors: Can false identifications be diagnosed? *J. Appl. Psychol.* 85(4):542–50

Smith SM, Lindsay RCL, Pryke S, Dysart JE. 2001. Postdictors of eyewitness errors: Can false identifications be diagnosed in the cross-race situation? *Psychol. Public Policy Law* 7:153–69

Sporer SL. 1992. Post-dicting eyewitness accuracy: confidence, decision-times and person descriptions of choosers and non-choosers. *Eur. J. Soc. Psychol.* 22:157–180

Sporer SL. 1993. Eyewitness identification accuracy, confidence, and decision times in simultaneous and sequential lineups. *J. Appl. Psychol.* 78:22–33

Sporer SL, Penrod S, Read D, Cutler B. 1995. Choosing, confidence, and accuracy: a meta-analysis of the confidence-accuracy relation in eyewitness identification studies. *Psychol. Bull.* 118(3):315–27

Steblay NM. 1992. A meta-analytic review of the weapon focus effect. *Law Hum. Behav.* 16:413–24

Steblay NM. 1997. Social influences in eyewitness recall: a meta-analytic review of lineup instruction effects. *Law Hum. Behav.* 21(3):283–97

Steblay NM, Dysart J, Fulero S, Lindsay RCL. 2001. Eyewitness accuracy rates in sequential and simultaneous line-up presentations: a meta-analytic comparison. *Law Hum. Behav.* 25:459–74

Steblay NM, Dysart J, Fulero S, Lindsay RCL. 2003. Eyewitness accuracy rates in police showup and lineup presentations: a meta-analytic comparison. *Law Hum. Behav.* 27:523–40

Technical Working Group for Eyewitness Evidence. 1999. *Eyewitness Evidence: A Guide for Law Enforcement.* Washington, DC: U.S. Dep. Justice, Off. Justice Programs

Terry D. 1994. A woman's false accusation pains many blacks. *New York Times*, Nov. 6. **http://www.nytimes.com/1994/11/06/us/a-woman-s-false-accusation-pains-many-blacks.html**

Tetterton VS, Warren AR. 2005. Using witness confidence can impair the ability to detect deception. *Crim. Justice Behav.* 32:433–51

Toglia MP, Read JD, Ross DF, Lindsay RCL, eds. 2007. *The Handbook of Eyewitness Psychology*, *Vol. I: Memory for Events.* Mahwah, NJ: Lawrence Erlbaum

Tulving E, Thomson DM. 1973. Encoding specificity and retrieval processes in episodic memory. *Psychol. Rev.* 80:352–73

Weber N, Brewer N, Wells GL, Semmler C, Keast A. 2004. Eyewitness identification accuracy and response latency: the unruly 10–12 second rule. *J. Exp. Psychol. Appl.* 10:139–47

Wells GL. 1978. Applied eyewitness-testimony research: system variables and estimator variables. *J. Personal. Soc. Psychol.* 36:1546–57

Wells GL. 1984. The psychology of lineup identifications. *J. Appl. Soc. Psychol.* 14:89–103

Wells GL. 1993. What do we know about eyewitness identification? *Am. Psychol.* 48(5):553–71

Wells GL. 2006. *American Psychology–Law Society division presidential address.* Presented at Am. Psychol. Assoc. Conv., New Orleans, LA, Aug. 10

Wells GL. 2008. Field experiments on eyewitness identification: towards a better understanding of pitfalls and prospects. *Law Hum. Behav.* 32:6–10

Wells GL, Bradfield AL. 1998. "Good, you identified the suspect": feedback to eyewitnesses distorts their reports of the witnessing experience. *J. Appl. Psychol.* 83(3):360–76

Wells GL, Luus CAE. 1990. The diagnosticity of a lineup should not be confused with the diagnostic value of nonlineup evidence. *J. Appl. Psychol.* 75(5):511–16

Wells GL, Malpass RS, Lindsay RCL, Fisher RP, Turtle JW, Fulero S. 2000. From the lab to the police station: a successful application of eyewitness research. *Am. Psychol.* 55:581–98

Wells GL, Memon A, Penrod SD. 2006. Eyewitness evidence: improving its probative value. *Psychol. Sci. Public Interest* 7:45–75

Wells GL, Rydell SM, Seelau EP. 1993. On the selection of distracters for eyewitness lineups. *J. Appl. Psychol.* 78:835–44

Wells GL, Seelau EP. 1995. Eyewitness identification: psychological research and legal policy on lineups. *Psychol. Public Policy Law* 1:765–91

Wells GL, Small M, Penrod SJ, Malpass RS, Fulero SM, Brimacombe CAE. 1998. Eyewitness identification procedures: recommendations for lineups and photospreads. *Law Hum. Behav.* 22:603–647

Wixted JT, Ebbesen E. 1991. On the form of forgetting. *Psychol. Sci.* 2:409–415

Wogalter MS, Malpass RM, McQuiston DE. 2004. A national survey of US police on preparation and conduct of identification lineups. *Psychol. Crime Law* 10:69–82

Ⓐ Ⓡ

Contents

Indexes

Errata

An online log of corrections to *Annual Review of Law and Social Science* articles may be
found at http://lawsocsci.annualreviews.org