The Behavioral Foundations of Public Policy

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CHAPTER 8

Eyewitness Identification and the Legal System

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Anthony Capozzi was completely exonerated in 2007 from his earlier rape convictions, just one of nineteen wrongfully convicted persons exonerated of their crimes in that year alone through work of the Innocence Project. At the trial in 1987, the victims positively identified the Buffalo New York man as their attacker, and Capozzi, convicted of two rapes, spent the next twenty years in prison. Postconviction DNA testing of evidence that had been collected from the victims back in 1985 and saved in a hospital drawer proved that the real rapist, a man currently awaiting trial for murder, had committed the crimes for which Capozzi served time. On its website, the Innocence Project reports Capozzi's case and over 200 other wrongful convictions overturned by DNA evidence (http://www.innocenceproject.org/Content/488.php).

How were two-hundred-plus innocent persons like Capozzi erroneously convicted? False arrest and wrongful conviction can result from many types of errors. If there were no discernable patterns of risk factors for error, the justice system would probably be at a loss to offer solutions, perhaps judging these events as the unavoidable fallout of an imperfect justice system. However, this group of exonerations does present a clear pattern. Estimates place faulty eyewitness memory as having been involved in at least 75% of DNA exoneration cases, far more than faulty forensic evidence, bad informant testimony, false confessions, or any other cause (Garrett, 2008; Wells, Memon, and Penrod, 2006). Thus it behooves us to learn as much as we can about the science of eyewitness memory and to draw lessons for improving the justice system whenever eyewitnesses are playing a crucial role.

Research on eyewitness memory has been cited as having produced one of the most successful collaborations between psychological science and the legal system (Doyle, 2005), and a long-term contributor to the scientific literature recently proclaimed that "the science of eyewitness testimony has come of age" (Sporer, 2006, p. i). In this chapter, we will describe the nature and content of the massive research effort, the changes in legal policy spurred by the collaboration between those in science and those in the legal field, and the challenges ahead as memory research continues to be applied to public policy.

Eyewitness Memory Principles

Human memory, more generally, has been studied by psychologists for more than one hundred years, who have created a broad theoretical and empirical foundation for understanding the memory processes of interest to the legal system—in particular, eyewitness experience. Psychology's specific interest in the topic of eyewitness memory spans a hundred years as well. The writings of Hugo Munsterberg (1908) brought early attention to intriguing intersections between the young science of psychology and the established discipline of law (Doyle, 2005). The most recent thirty-five years have seen intense experimental examination of eyewitness issues and productive application of memory science to legal cases and policy. This activity has illuminated the task of psychological science to be one not only of establishing and disseminating new knowledge about memory function, but also one of correcting many memory myths held by both professionals and laypersons and articulating the role of psychological science in policy considerations. The audience for eyewitness research now includes lawyers, judges and juries, legislators, law enforcement, the media, and policy makers.

Five essential memory principles can provide a brief primer of eyewitness performance: *memory loss, memory construction, the misinformation effect, social*

influence, and *confidence inflation*. *Memory loss*, especially the process of forgetting, is perhaps the easiest concept to grasp, because we all recognize that the clarity of past life events fades with time. Instead, it is the complex process through which we attempt to *remember* persons and events that is often less understood by laypersons, a gap in knowledge that has presented challenges for memory scientists as they bring forward laboratory results to sometimes-resistant audiences. Scientists now recognize that memories do not lie hidden in pristine and easily recoverable form; rather, memory research has provided a much more sophisticated and nuanced understanding—that an experienced event is initially encoded incompletely into memory and later recalled through a *constructive memory process* that blends true recollection with intruding nonmemory features. An individual's beliefs, desires, and imagination can fuel misremembering, and information from external sources will exacerbate false recollection.

Research from the last three decades has established beyond question that information from outside of memory can be incorporated into a convincing "memory experience" (dubbed the *misinformation effect*) as memory gaps are unknowingly and effortlessly filled (Loftus, 2005). More dramatically, whole episodic memories can be constructed from imagination in the absence of true experience. Indeed, people have been led to believe that in childhood they were lost in a shopping mall for an extended time, broke a window and cut themselves, were attacked by an animal, or endured other experiences that would have been upsetting had they actually occurred (see, for example, Mazzoni, 2007). Thousands of experiments involving tens of thousands of participants provide documentation of the breadth and regularity of such disruptive memory effects. A leading memory researcher, Daniel Schacter, has fittingly referred to memory's "fragile power" (1996, 2001): the same remarkable brain capacity that allows for elaborate learning and effective social interaction and that holds each person's unique personal history—the essence of human identity—is also extremely vulnerable to misremembering and error.

Scientists recognize that eyewitness experience is not just a memory phenomenon, it also reflects social forces. Social and cognitive psychologists have established that memories can be enormously affected by even very subtle and unintentional verbal and nonverbal communications from other people. The process of *normative social influence* conveys expectations from one person to another about proper or modal behavior in a given situation (examples from a legal context include the eyewitness who feels pressure to make a choice from a police lineup or the patient who acquiesces to employ imagination during therapy). In addition, *informational social influence* provides seemingly useful knowledge to the recipient (e.g., that the suspect is in this lineup; that hypnosis will help recall) that subsequently affects perceptions, actions, and beliefs (Deutsch and Gerard, 1955). Appreciation of social influence principles is apparent in revised techniques for effective forensic interviews (e.g., Geiselman et al., 1985, 1986). More specific to eyewitness identification itself, current recommendations include an explicit "I don't know" response option for the eyewitness and a cautionary instruction that reminds the witness that the "offender you saw *may or may not* be in this lineup" (Steblay, 1997). This instruction has been shown to significantly reduce misidentifications, presumably by altering normative and social influences on the witness.

Interpersonal expectancy effects, the unintentional transfer of beliefs through social influence, occur across a broad set of human interactions (Harris and Rosenthal, 1985; Rosenthal, 2002; Rosenthal and Rubin, 1978). For example, within the science community, the expectations held by a researcher are recognized as threats to the integrity of research results. The well-known remedy is a double-blind method in which neither experimenter nor subject knows the subject's treatment condition. Double-blind studies are required in drug testing because we recognize that physician-researchers might inadvertently behave differently if they know a particular subject has been given the real drug rather than the placebo. Memory scientists similarly recommend appropriate methods for conducting forensic interviews such that interviewer knowledge is less likely to taint the direction and content of the questions pursued (e.g., Bruck and Ceci, 1997; Geiselman et al., 1985). The administration of double-blind lineups has also received substantial attention and is discussed below.

The powerful combination of postevent information delivered by a trustworthy nonblind authority can be observed in its remarkable impact on eyewitness *confidence*. An eyewitness who has received confirmatory feedback after her police lineup decision ("Good, you identified the suspect"), even if her choice was wrong, will show significantly more certainty about the identification and will report greater ease in making the identification than will a witness who did not receive feedback. In other words, confidence itself is highly malleable. Even more unsettling, the witness whose identification choice is "confirmed" will report distorted retrospective memory for subjective components of the crime event itself, claiming a better view and greater attention paid to the perpetrator (Douglass and Steblay, 2006; Wells and Bradfield, 1998; Wright and Skagerberg, 2007). The testimony of this eyewitness is likely to be quite believable at trial because she truly accepts this version of reality. Investigators and jurors have been found to be strongly affected by confident, but sometimes inaccurate, witnesses (Bradfield and Wells, 2000; Brewer and Burke, 2002; Wells, Lindsay, and Ferguson, 1979). Confidence and accuracy are correlated; however, the relationship is easily corrupted.

In summary, five essentials of eyewitness memory—memory loss, memory construction, the misinformation effect, social influence, and confidence inflation—reveal the potential for memory to be contaminated and distorted and yet reported with great confidence. These lessons are immensely relevant to a legal system that depends on and believes in eyewitness veracity, and in which over 75,000 people become criminal defendants each year on the basis of eyewitness identifications (National Science Foundation, 1997). Although many applications of eyewitness memory for events are relevant to legal policy, we will focus on the illustrative example of eyewitness memory for faces and police lineup reform.

Key Events in the Growth of Lineup Reform

The Legal Environment

Eyewitness identification is persuasive evidence of criminal wrongdoing. Yet the courts recognize that an eyewitness may bring flawed recall to a police lineup and falsely incriminating evidence to court. In the 1960s, the United States Supreme Court began to institute safeguards to protect criminal defendants from misidentification and wrongful conviction. For example, in *United States v. Wade* (1967) the court held that the Sixth Amendment right to counsel applies to critical stages of pretrial proceedings, including the physical lineup procedure. The court recognized the "vagaries of eyewitness identification" and the "innumerable dangers and variable factors which might seriously, even crucially, derogate from a fair trial." The United States Supreme Court ruled in *Stovall v. Denno* (1967) that an unduly suggestive lineup constitutes a due process violation if it could lead to an irreparably mistaken identification. Therefore, a defendant could move to suppress identification testimony depending on the "totality of the circumstances" surrounding the testimony (p. 302). In *Simmons v. United States* (1968), the Court ruled that each potential due process violation during a lineup must be examined on the facts of the individual case. Lineups would be excluded from trial if the "procedure was so impermissibly suggestive as to give rise to a very substantial likelihood of irreparable misidentification" (p. 384).

Courtroom Testimony

For many years, psychological scientists have offered expert information to assist jurors and judges in assessing eyewitness accounts of criminal and civil events. A thorough explanation of the many factors that affect the accuracy of a witness's account of events or identification of a suspect can presumably be helpful to the triers of fact. Attorneys who have attempted to bring psychological testimony to trial have met with varying degrees of success, depending on the judge's determination as to the strength of the science underlying the proffered testimony, its perceived match to evidentiary standards, and particularly the need for the jury to hear the information. Wells et al. (2006) reported that prosecutors commonly use four core arguments against admission of expert testimony on eyewitness topics. The first, that the eyewitness literature is insufficient, today rarely prevails as a basis for excluding expert testimony. The three additional arguments are that such testimony invades the province of the jury to decipher the reliability of an eyewitness; that the research findings are simply a matter of common sense; and that the expert testimony is more prejudicial than probative, producing overly cautious jurors. Trial judges in most jurisdictions continue to use their discretionary powers to exclude expert testimony regarding the reliability of eyewitness identifications, often maintaining that scientific findings are not "beyond the ken" of the average juror (see Schmechel et al., 2006 for a summary of current case law on eyewitness research). In any individual case it may be difficult to calibrate the need for juror education on eyewitness topics and the extent to which expert testimony will appropriately remedy juror misconceptions. However, both laboratory research and surveys of eyewitness experts, judges, and prospective jurors suggest that, in general, jurors and judges relying on common-sense intuition often do not understand eyewitness memory processes and are likely to rely too heavily on eyewitnesses. Otherwise stated, eyewitness evidence without expert testimony is likely to exceed its probative value (Kassin et al., 2001; Schmechel et al., 2006; Wise and Safer, 2003). Wells and Hasel (2008) also make a persuasive argument that current police and court practice in itself is evidence that the justice system does not possess common knowledge of the psychological processes that affect the accuracy of eyewitness identification. For example, the legal system's continued trust in nonblind lineup administrators and in the ability of eyewitnesses to retrospectively assess how tainting variables (such as seeing the suspect on a news broadcast) affected their lineup decision illustrates that problems of eyewitness memory are not at all obvious to police and the court.

System and Estimator Variables

Expert trial testimony and the science that underlies it impart insight into the memory dynamics of eyewitnesses and provide probabilistic rules of likely outcomes for the typical witness in a given situation. However, after-the-fact determination of whether a particular eyewitness's experience is the rule or the exception is difficult, a problem inherent to the courtroom use of the eyewitness literature (Doyle, 2005). Responding at least in part to this circumstance, Wells (1978) outlined a framework for the consideration of eyewitness memory that became useful as both a theoretical and practical tool. Wells's insightful model of system and estimator variables helped to direct research attention to the possibilities for systemic change, highlighting the fact that the principles of human perception, memory, and social influence can illuminate not only the causes of faulty memory but also suggest preventive measures to preclude eyewitness failure.

DNA Exonerations

As noted earlier, new techniques of forensic DNA testing introduced in the 1990s and the formation of the Innocence Project in 1992 have helped to exonerate many wrongfully convicted individuals, to date more than two hundred (Innocence Project, 2006, 2007, 2008). Investigators, attorneys, and testifying witnesses who have helped to prosecute a later-exonerated individual realize with extreme regret that even well-intentioned by-the-book procedures can end very badly. Along with the horrific effects on the lives of violated innocent people and their loved ones, wrongful conviction leaves the true perpetrators on the streets to commit additional offenses. The reality of wrongful conviction also has the potential to erode public confidence in the justice system and citizens' sense of security. By the mid-1990s, law enforcement and the legal community could not help but look uneasily over their shoulders for past wrongful convictions.

The National Institute of Justice Guide

A decade ago, this confluence of events—eyewitness science, DNA exonerations, legal cases, and media coverage—propelled joint action among law enforcement, legal professionals, and eyewitness scientists. A group convened by Attorney General Janet Reno produced *Eyewitness Evidence: A Guide for Law Enforcement* (hereafter, "the guide"), which was published by the National Institute of Justice in 1999 (Technical Working Group for Eyewitness Accuracy, 1999; a training manual, *Eyewitness Evidence: A Trainer's Manual for Law Enforcement*, was published by the National Institute for Justice in 2003). Psychological science had shown that eyewitness reports are often unreliable and that unintentional police influence can affect witness lineup selections. The guide was a productive step toward remediation of this problem, providing science-based recommendations for effective collection of eyewitness evidence. Specific to police lineups, the guide offers clear advice: the eyewitness should be given unbiased lineup instruction ("The perpetrator may or may not be in this lineup"), lineups should be constructed fairly (e.g., foils matched to perpetrator description and the suspect not standing out in the lineup), and officers should record results in a prescribed manner. The guide did not endorse, but rather alerted law enforcement to, three developing refinements: sequential-lineup presentation format, double-blind lineup administration, and the use of computers for lineup delivery. In the years since, researchers have produced a solid body of laboratory evidence that supports the use of double-blind sequential lineups as a means to secure better-quality eyewitness evidence (Steblay and Dysart, 2008; Steblay et al., 2001), and most recently, computer delivery of photo lineups has been implemented by a small number of police departments.

The Reformed Lineup Protocol

Relative and Absolute Judgment

Standard police lineups present the eyewitness with all lineup members (e.g., six persons) at one time. Under this simultaneous format, eyewitnesses tend to compare lineup members to each other to determine which most closely resembles the offender in memory, a process of *relative judgment* (Wells, 1984). If the witness was able to encode a vivid memory of the perpetrator and this person is in the lineup (a *culprit-present* array), the likelihood of a positive and correct identification is increased. The concern, however, is whether the witness will recognize the absence of the offender when, in fact, the suspect is not the perpetrator. The DNA-exoneration cases—the majority of which were instances in which the actual offender was not in the lineup—illustrate exactly this problem: witness inability to correctly reject a *culprit-absent* lineup (Innocence Project, 2006). The results of controlled experiments predict a negative outcome when police unknowingly place an innocent suspect in a lineup. The witness may slip into the pursuit of which photo to choose, rather than a careful evaluation of whether the previously seen offender is one of the photos. Put another way, the witness makes a relative judgment: "Number 5 is the closest compared to the others."

The impact of relative judgment when the offender is absent from the lineup was demonstrated convincingly by Wells (1993). Participant-witnesses to a staged crime were shown one of two versions of a lineup. When the perpetrator was present in a six-person lineup, 54% of the witnesses selected him. All witnesses had been given an unbiased cautionary instruction ("the perpetrator may or may not be in the lineup"), and 21% opted not to choose from the lineup. Now, the key question: What would happen when a second group of witnesses viewed the same lineup minus the perpetrator? If 54% of witnesses truly recognize the offender when he is present, this 54%—who would have identified the offender had he been in the lineup—should join the 21% who reject the lineup, producing a 75% "no-choice" response. What happened was quite different: only 32% of the witness responses landed in the "no-choice" category, these witnesses correctly rejecting the culprit-absent lineup. Sixty-eight percent of the witnesses chose from the lineup, most of the filler identifications falling on the photo that was the next-best match to the offender, placing this innocent suspect in jeopardy. Even in a culprit-absent lineup, it is likely that one lineup member will provide a better relative match to memory than the others, thereby drawing the attention of the eyewitness and increasing the risk of false identification.

Double-Blind Sequential Lineups

Most recently, scientists have advised police to use double-blind administration and a sequential photo presentation format for their lineup procedures (Wells et al., 2000). A meta-analytic review has demonstrated reliable laboratory outcomes with the use of a sequential procedure (Steblay and Dysart, 2008; Steblay et al., 2001). Witnesses who view a simultaneous lineup array are more likely to choose a photo from the lineup. When the perpetrator is present, this higher choosing rate may boost correct identifications, possibly aided by relative judgment. However, when the culprit is not in the lineup, an increased tendency to choose translates into greater risk of false identification. Recent cumulative data (Steblay and Dysart, 2008) show an average 8% fewer correct identifications of the culprit when the sequential is compared with the simultaneous format, but also an average 22% fewer identification errors. Thus, strategic use of a sequential versus simultaneous lineup format can be construed as a cost-benefit analysis. More precisely, the Bayesian likelihood ratio of a lineup procedure can be computed as the ratio of correct to mistaken identifications (Wells and Lindsay, 1980; Wells and Turtle, 1986). Wells (2006c) explains that the correct identification rate for a culprit-present condition can be divided by the average identification rate of any given person in the culprit-absent condition to produce a diagnosticity ratio; simply put, a ratio of hits to false alarms. The sequential lineup is more diagnostic of guilt (a ratio of 7.76) when the witness does make a choice than is the simultaneous lineup (ratio of 5.58). For police, the critical question is, Is the identification a good predictor of guilt? The blind-sequential-lineup procedure improves the odds that a suspect, if identified, is the actual culprit (Wells, 2006c) and thereby increases the probative value of the identification evidence (Lindsay et al., 2009).

Support for use of the double-blind component of the procedure is rooted in the broader psychological research about experimenter expectancy, which was discussed earlier. The exchange between the investigator and the eyewitness is ripe for potentially dangerous interpersonal influence. To help manage the risk for bias in identification procedures, eyewitness scientists recommend that lineup administrators be unaware—blind—to the identity of the suspect in the array. First noted as a lineup essential by Wells in 1988 and later reinforced by a broader group of scientists in lineup recommendations (Wells et al, 1998), there is wide agreement among eyewitness scientists that the administration of the double-blind lineup is crucial in eyewitness procedures (Douglass, Smith, and Fraser-Thill, 2005; Garrioch and Brimacombe, 2001; Haw and Fisher, 2004; McQuiston-Surrett, Malpass, and Tredoux, 2006; Phillips et al., 1999; Wells, 2006a; Wright and Skagerberg, 2007). A very recent experiment by Greathouse and Kovera (2009) explored the effect of the lineup administrator's knowledge of the suspect on the eyewitness's identification decisions, specifically with attention to the conditions under which administrator bias is likely to occur. In an eyewitness-identification paradigm in which the administrator's knowledge, lineup presentation format, and instruction bias were experimentally manipulated, the researchers found that administrator influence was significant under conditions that otherwise promote witness guessing. That is, witnesses were more likely to choose the suspect (apparently adopting a lower response criterion) when the lineup administrator knew the suspect, provided biased lineup instructions ("We have the suspect in custody, and would like to show you a photo lineup to see if you are able to identify him."), and presented photos simultaneously. When biasing factors were present to increase the likelihood of witness guessing, nonblind administrator behavior influenced the witness to choose the suspect.

Researchers use the phrase *double-blind sequential lineup* as shorthand for what is actually a collection of

rules that represent best practice for conducting eyewitness identifications. For example, the sequential procedure assumes a single-suspect model (only one suspect in the array) and that the lineup task is the first identification attempt by the witness. Furthermore, an effective sequential procedure includes the following features (see, e.g., Cutler and Penrod, 1988; Lindsay and Wells, 1985; Wells et al., 1998; Wells and Turtle, 1986):

> A lineup consists of at least six members, five of whom are fillers unknown to the eyewitness, and all are chosen to match the witness's description of the perpetrator.
>
> The suspect's position in the lineup is determined in a random manner.
>
> An instruction to the witness advises that the perpetrator may or may not be in the collection of photos to be displayed (an "unbiased," or "cautionary," instruction).
>
> The complete sequence of lineups is shown to the witness, and the witness is instructed that the complete series will be shown. Witness decision changes are recorded.
>
> The witness is unaware of how many photos are in the sequence.
>
> Photos are presented one at a time, with a decision made before examining the next.
>
> The witness is not allowed to "go back" over the sequence or to place photos next to one another.
>
> The officer displaying the photos does not know which photo depicts the suspect.
>
> The witness is informed that the lineup administrator does not know which photo, if any, is the suspect.
>
> An assessment of witness confidence is taken at the time of the identification and before feedback from police or others.

Lineup Reform

Scientific research has led to a cohesive lineup prototype that promises a significant improvement in eyewitness accuracy (Wells et al., 1998). The next step is to educate and to bring the recommendations into practice. Although courts in almost every jurisdiction have seen expert testimony about eyewitness identification over decades (Wells and Hasel, 2008), organized lineup reforms began to show up nationally just after 2000.

A powerful component of the lineup-reform effort has been the vivid and emotional testimony of the victims of wrongful conviction. Compelling presentations and writings by exonerees and crime victims have drawn national attention. Examples include Kirk Bloodsworth, the first death-row inmate to be exonerated by DNA evidence, who published a book and became a national spokesman for justice initiatives (Junkin, 1998). Similarly, Penny Beerntsen (2006) and Jennifer Thompson Cannino (2006), two victims and witnesses who unknowingly helped to convict the wrong men, are now educating audiences about eyewitness fallibility in the justice system. In addition, law enforcement officers, prosecutors, defense attorneys, and scientists, among many others, have become involved in the dissemination of information about eyewitness fallibility, wrongful conviction, and available remedies. Education underlies the reform effort, and many professionals are willing to provide the information to interested jurisdictions.

Below, we will briefly summarize the myriad ways in which lineup reform has occurred, in the hope that this may be instructive for other legal-reform efforts. Lineup reform has emerged from a number of catalysts and has been achieved through a variety of avenues: executive mandates, legislative actions, case law, and law enforcement initiatives, among them. The reforms to date illustrate a continuum of strategies, from jurisdictions in which detectives or police chiefs have initiated lineup reform ("bottom up") to those that change as a result of a mandate from high levels of government ("top down"). One early example of a grassroots orientation is provided by Lt. Ken Patenaude of the Northampton, Massachusetts Police Department, a long-time investigator and supervisor and a member of the National Institute of Justice Technical Working Group for Eyewitness Evidence. The changeover of Patenaude's own department to double-blind sequential lineups began at the ground level, when he developed and introduced a training program, providing long-needed structure and consistency in written procedures for securing eyewitness evidence (Patenaude, 2006). Police administrators monitored the implementation of the new sequential procedure for a year, at which time a survey of investigators revealed that they favored the new format. The department then changed its policy to mandate the sequential lineup format, at the same time noting a strong preference for double-blind lineup administration (Northampton Police Department, 2000). In 2003, the double-blind administration of photo arrays became mandatory as well, after concerns about

cost and personnel shortages failed to materialize. Patenaude's (2006) description of his department's transition to the new lineup procedures emphasizes the need to begin at the recruit level with proper and consistent training.[1]

Suffolk County (Boston, MA) followed a somewhat different route to lineup reform, spurred by discovery of wrongful convictions. A task force on eyewitness evidence was formed that brought together the perspectives of eyewitness scientists, law enforcement and administration, prosecutors, and defense attorneys. The task force issued its report with twenty-five recommendations to the Suffolk County District Attorney and the Boston Police Commissioner in 2004 (Suffolk County Task Force on Eyewitness Evidence, 2004); it was followed by reforms in lineup practice.

The combination of concerned, change-oriented law enforcement leaders, collaborative efforts, pilot testing, and effective police training has worked in a number of jurisdictions. In Minnesota, two counties independently developed year-long pilot programs. Under the direction of the county attorney, Amy Klobuchar, the Hennepin County Attorney's Office in Minneapolis tested the practicability of double-blind sequential lineups in four volunteer cities and became the first jurisdiction to collect data regarding eyewitness lineup decisions under double-blind sequential conditions and to document implementation issues. After one year, the changes were determined to be successful, and the new lineup protocol, along with a training DVD, was rolled out countywide (Klobuchar, Steblay, and Caligiuri, 2006). Next door, in Ramsey County (MN), County Attorney Susan Gaertner had also carefully examined the lineup literature and found the scientists' recommendations for double-blind sequential lineups sensible and potentially practicable. A pilot project was launched. Modifications were developed through experience, and all investigators found the new lineup procedures workable, as did the prosecutors who presented cases later in court (J. Schleh, personal communication, July 16, 2006). Ramsey County also developed written and DVD training materials as double-blind sequential procedures became the standard countywide. Among the benefits noted by Assistant County Attorney Jeanne Schleh were the increase in confidence in witness identifications, the reduced probability of misidentification, and the ability to insulate the prosecution from defense attack at trial since the new approach is consistent with best practices supported by established science (Schleh, 2006).

Local DNA exonerations can be the spur to action. New Jersey followed a highly prescriptive model in the wake of the *Cromedy* case—an eyewitness-evidence case in which after two trials, two convictions, and awaiting a third trial on appeal, a DNA test of biological evidence collected from the victim exonerated the defendant. Attorney General John Farmer turned to the lineup reforms recommended by researchers and approved new lineup procedures with safeguards exceeding those recommended by the National Institute of Justice (Doyle, 2005). Using the unique authority granted the attorney general in that state, Farmer implemented mandatory statewide guidelines, making New Jersey the first state to uniformly adopt double-blind sequential-lineup procedures (State of New Jersey, 2002).

At the state level, eyewitness-identification reform also has been attempted through a variety of legislative models (Ehlers, 2006). For example, a best-practices approach was used in Wisconsin, where the Training and Standards Bureau of the Wisconsin Department of Justice, working with the University of Wisconsin Law School, wrote model guidelines for law enforcement. Legislation passed in 2005 (State of Wisconsin Office of the Attorney General, 2005) and affirmed in 2006 required that each law enforcement agency adopt policies or guidelines (State of Wisconsin Office of the Attorney General, 2006).[2]

The formation of special state commissions has been used to learn about wrongful convictions and to identify remedies (see http://www.innocenceproject.org/fix/Eyewitness-Identification.php). A multistep process is typical. The first such group, the North Carolina Actual Innocence Commission, was established by the North Carolina Supreme Court in the aftermath of several high-profile DNA exonerations. The court decided that a permanent interdisciplinary study commission was needed, but one that was independent of the judiciary and had interdisciplinary participation of law enforcement, defense attorneys, social scientists, and judges (Garrett, 2006). The thirty-one-member commission created a series of recommendations in 2003 for state law-enforcement officers that left the details of implementation of these practices to the discretion of law enforcement. Later, state legislation mandated double-blind sequential procedures (Eyewitness ID Reform Act, 2007). To guide statewide efforts, model legislation is available through the Innocence Project.[3] The Justice Project (2007) also recently published a policy review and model guidelines.

One difficulty encountered with the legislative route is that precisely mandated reforms may need to be updated later as even better lineup revisions are developed (and this brings up the potentially messy revisitation of legislative actions). The

alternate route—leaving individual jurisdictions to find a solution—offers flexibility and local ownership but may result in protracted delays and less-than-effective outcomes. Even the middle ground—a task force and a pilot study—is not always successful. Wells (2006c) claims, based on his experience, that the actual costs of reform are minimal. However, he notes that the typical communication gap between eyewitness scientists and law enforcement, a tenacious police tradition, a lack of pressure from prosecutors and the court, and the disparate local control of law enforcement make lineup modifications difficult.

Resistance to Lineup Reform

Not all lineup-reform initiatives have gone smoothly. In 2002, Governor George Ryan's (Illinois) Commission on Capital Punishment, charged with ensuring the accuracy and justness of capital punishment, recommended the implementation of eyewitness-identification reforms (Governor's Commission on Capital Punishment, 2002). However, the proposed reforms were not popular with law enforcement (O'Toole, 2006). Resistance from police led to a compromise: a pilot program would be conducted by the Illinois State Police in which the new sequential lineup format would be compared to a simultaneous lineup format using "a protocol for the selection and administration of lineups which is practical, designed to elicit information for comparative evaluation purposes, and is consistent with objective scientific research methodology" (Capitol Punishment Reform Study Committee Act, 2003). The Illinois State Police ceded the pilot test to the Chicago Police Department, a group reportedly hostile to lineup reform (O'Toole, 2006) and to the direction by the general counsel for the Chicago police. Without rigorous scientific input as to the essentials of experimental design, three cities—Chicago, Joliet, and Evanston—collected data comparing a double-blind sequential-lineup protocol to the status quo (a relatively undefined nonblind simultaneous-lineup format). The 2006 report to the Illinois legislature (Mecklenburg, 2006) on the pilot program received substantial media attention, including the front page of the *New York Times* (Zernicke, 2006). Its surprising conclusion: the sequential double-blind lineup led to higher rates of false identification. The astute reader will appropriately note that dangerous false identifications of innocent suspects—the sort revealed by postconviction forensic DNA tests—cannot be ascertained in field lineup studies because the true guilt or innocence of the suspects is unknown. Mecklenburg's forceful use of the phrase "false identifications" (which, in fact, referred to nondangerous filler selections) and her decision to equate all suspect selections with true offender identifications served to inflame and confuse the subsequent discussion.

But the problems ran much deeper than semantics, and the Mecklenburg Report was critiqued and bitterly contested among scientists, lawyers, scholars, and policy makers (see e.g., Diamond, 2007; Doyle et al., 2006; Malpass, 2006; O'Toole, 2006; Sherman, 2006; Steblay, 2006; Sullivan, 2007; Wells, 2006a). Some scientists were quick to point out that the study's design was in numerous ways ineffectual by scientific standards and, above all, that the results were confounded by a fundamental design flaw; thus, the underlying reason for the obtained effects could not be determined (see Doyle et al., 2006; Steblay, 2006). More specifically, in one tested condition, the lineups were double-blind and sequential; in the other condition, the lineups were nonblind and simultaneous. Thus, it is unclear as to whether the outcomes were produced by the lineup format (sequential vs. simultaneous) or by administrator knowledge of the suspect (blind vs. nonblind); the variables were confounded. Furthermore, the specific results—higher suspect-identification rates and lower filler-selection rates in the nonblind simultaneous condition—are suggestive of administrator bias; critics maintain that it is not surprising to see that more witnesses chose suspects in a condition in which the lineup administrator knew who the suspect was. The conundrum is that the outcome data can be seen as evidence either of better lineup performance (and eyewitness accuracy) *or* of administrator influence and dangerous error introduced by the nonblind procedures. As noted earlier, there is no ground truth in the field (we do not know if the suspects are, in fact, perpetrators), thus the ambiguity of the results is increased. Diamond (2007) starkly states that this field test provides a classic example of what the law would deem not relevant; it provides exactly no probative evidence on the question at hand.

A remarkable step to attempt a resolution of the Illinois study controversy, and specifically to address the Mecklenburg Report that described its results, was quickly undertaken in 2006 by the Center for Modern Forensic Practice of John Jay College of Criminal Justice. This unprecedented action was succinctly explained by the center's director, James Doyle: "It's critical that criminal justice policy be based on sound science" (John Jay College of Criminal Justice, 2007). A panel of distinguished social scientists was convened to assess the Illinois field study, and they issued their report in February 2008 (Schacter et al., 2008). The panel of experts brought neutrality and outstanding collective expertise to the contentious issue.

The panel's clear determination was that the Illinois Eyewitness Identification Field Study was crippled by a design flaw that made the study's conclusions a dangerous basis for shaping public policy and the Mecklenburg Report unreliable in determining effective eyewitness-identification procedures. The Illinois study's fundamental design flaw "has devastating consequences for assessing the real-world implications of this particular study. . . . The design guaranteed that most outcomes would be difficult or impossible to interpret. The only way to sort this out is by conducting further studies" (Schacter et al., 2008, p. 4–5). Doyle summarized the panel's decision: "They found, unequivocally, that the Illinois report cannot be relied on to determine whether sequential double-blind procedures are effective. Most importantly, they recommend that future study of these procedures be designed in consultation with qualified scientists from the beginning, so that such studies can produce solid, reliable guidance for practitioners and policy makers" (Innocence Project, 2007; see also a series of 2008 articles by Cutler and Kovera; Mecklenburg, Bailey, and Larson; Ross and Malpass; Steblay; and Wells).

The author of the Mecklenburg Report stood by her initial conclusions (Mecklenburg, Bailey, and Larson, 2008a, 2008b). However, further suspicion of the Illinois data has been fueled by the refusal of the Chicago and Joliet Police Departments to share the underlying data of the report. A FOIA lawsuit was filed by the National Association of Criminal Defense Lawyers in conjunction with the MacArthur Justice Center at Northwestern University School of Law in Chicago (Jaksic, 2007). One objective of the lawsuit was to obtain previously unexamined information regarding the identification history of each witness and suspect, as well as data regarding the relationship between the suspect and witness. One of the three cities (Evanston) cooperated with the lawsuit, providing data from its 100 pilot-study lineups. The Evanston data revealed an additional crucial design flaw in the project (Steblay, 2009)—the failure of effective random assignment of lineups to the two tested conditions—and added to confusion about what exactly was measured in the Illinois pilot program. More precisely, the Evanston nonblind, simultaneous (status quo) condition included significantly more verification and confirmatory lineups. These are lineups in which the eyewitness simply verified the identity of a perpetrator known by the witness prior to the crime (e.g., a boyfriend or neighbor) or confirmed with a second identification a suspect selection that the same witness had already made from an earlier lineup); not surprisingly, these types of lineups produce high suspect-identification rates and very low filler-selection rates. In line with this, the suspect identification rate for nonblind simultaneous lineups was significantly inflated, by 17.7 percentage points, through inclusion of such lineups, compared to the sequential lineup, which was virtually unaffected (1% inflation from verification/confirmatory lineups). The failure to randomly assign the lineups to the two experimental conditions caused the status quo to look better. In the end, the assorted methodological shortcomings of the Illinois pilot program undermined the claims of the Mecklenburg Report.

The courtroom has seen setbacks for eyewitness science resulting at least in part from the Illinois study. Not only has the Mecklenburg Report been used to justify the status quo for lineup procedures, it also has been employed more broadly to challenge expert testimony on eyewitness topics such as cross-race identification and stress effects. The Public Defender's Service for the District of Columbia reports that the Illinois study is cited in nearly every government brief opposing expert testimony on eyewitness-identification issues and is heavily relied upon by prosecutors as "evidence" that status quo procedures are superior and that what has been heavily tested in controlled laboratory settings simply does not hold true in the field (B. Hiltzheimer, personal communication, July 13, 2007).

The results from the Illinois pilot study have proved inconsequential for some jurisdictions as they continue their reforms, but others view the fallout from the study as substantial. In Illinois, there has been no lineup reform to date, although the Capital Punishment Reform Study Committee (2007) reaffirmed its recommendation of blind-lineup administration. (A detailed summary of the Illinois capital punishment reform effort has been recently published by the co-chair of the governor's commission, Thomas Sullivan, 2007). To the dismay of reform advocates, the Illinois field study has been used to defeat legislation in several states that were otherwise moving toward sequential double-blind as a standard practice (B. Hiltzheimer, personal communication, July 13, 2007). In Rhode Island, for example, the Illinois report was used three years in a row to stop identification reform legislation (M. DiLauro, Office of the Rhode Island Public Defender, personal communication, July 18, 2007). The Mecklenburg Report was raised in New Mexico in connection with a successful police and prosecutor effort to squash a reform bill there (Rozas, 2007).

Science in Public Policy

Three decades of careful, peer-reviewed, and published research detail scientific knowledge regarding eyewitness memory. The body of eyewitness research

has matured over this period, precisely in the manner and to the standards of high-quality science: a steadily growing body of rigorous tests from independent labs has revealed reliable principles of eyewitness memory and behavior. This theoretically grounded body of literature is widely accepted in the science community (Kassin et al., 2001). Moreover, eyewitness science has made strong use of the quantitative review method of meta-analysis, a technique of research synthesis that particularly lends itself to the scrutiny and requirements of law. Meta-analysis allows scientists and the law to see beyond individual studies to overall patterns in the data, the "forest rather than the trees," and provides quantitative indices about reliability, effect sizes, and error rates (see Blumenthal, 2007, for a discussion of meta-analysis in legal policy). Peer-reviewed meta-analyses are particularly crucial as a means for employing the valuable self-correcting nature of scientific study. The eyewitness literature on a selection of both estimator and system variables has benefited from meta-analytic reviews.[4]

Given this "good news," the next question is Where does eyewitness science go from here?

Method Matters

The key role of eyewitness scientists is to keep good science front and center—in the laboratory, in the field, and in the public policy arena. As lineup reform moves forward, scientists must lead with their most valuable and productive attribute: adherence to sound scientific method and the logic of effective experimentation.

The future research agenda surely should, and will, involve field experiments, and method matters no less in the field than in the lab. Field studies bring unique strengths to research efforts, capturing eyewitness decisions not only in the most forensically relevant settings but also under circumstances that often lack the control and precision found in the laboratory. A primary and substantial challenge for eyewitness field tests is in the lack of available ground truth—that is, without follow-up tests of additional strong evidence, such as DNA, we cannot be certain that the police suspect is indeed the culprit. In the lab, of course, we have information about this crucial dependent measure. Public-policy makers can benefit when scientists discern the appropriate fit of lab and field results into the growing mosaic of knowledge about eyewitness memory.

Scientific attention to upcoming lineup field research is necessary in at least two specific ways: to define the proper method for lineup field tests and to bring scientific expertise to the interpretation of field results. There are multiple means to gain knowledge from the field. First, archival and descriptive studies offer a picture of how a lineup technique operates within a specific jurisdiction; they provide a starting point for discussion about the practicability and effectiveness for securing eyewitness memory in that locale. Examples are available in the work of Slater (1994), Tollestrup, Turtle, and Yuille (1994), Wright and McDaid (1996), Valentine and Heaton (1999), Behrman and Davey (2001), Valentine, Pickering, and Darling (2003), Behrman and Richards (2005), Klobuchar, Steblay, and Caligiuri (2006), and Wright and Skagerberg (2007). An important discovery from the Behrman studies is that traditional lineups conducted by police reveal that approximately 20% of witnesses pick an innocent foil from the lineup. These are, of course, known mistaken identifications that indicate unreliable witness memory. An important facet of these field investigations has been the opportunity for scientists to uncover variables overlooked in previous laboratory experiments. Of particular interest is any factor that would negate the viability of lab-based lineup recommendations. Thus far, there has been no sign of such a crippling factor.

The persuasive appeal of a good field study—and the potential for destructive misreading of field results from a poor one—can be enormous. Audiences may lock onto the phrase *field study* and quickly surmise that a report about real eyewitnesses to real crimes working with real police officers is a study to trust, not only in its description of *what* the eyewitnesses did but also in its conclusion about *why* these behaviors occurred. In essence, a field study may be used to automatically and uncritically eclipse "not-field" lab data. It is the role of scientists to counter, and in the best of worlds prevent through peer review, unfortunate leaps of logic—particularly when causal inferences in field or lab studies are not well grounded. Prudent evaluation of field research can be found in some descriptive studies that have attempted to examine the impact on eyewitness decisions of crime incident features, such as weapon presence. In these cases, the researchers were careful to point out the dangers of comparing pseudoexperimental conditions. For example, weapon presence or absence may be confounded with the type of crime (fraud vs. robbery) and therefore also with differential witness attention, the quality of the culprit description, and the delay prior to lineup (see, e.g., Steblay, 2007; Tollestrup, Turtle, and Yuille, 1994). The difficulty of interpreting study results following nonrandom assignment is illustrated by a London research team who compared the more controlled environment of a lineup suite (among other aspects, where volunteer foils are readily available for construction of higher-quality live lineups) to a standard police station setting (where the lineup members are "picked off the street" for each single lineup; Wright and McDaid, 1996). The researchers noted that the lineups assigned to the suite differed in important ways from those assigned to ordinary police stations, such as in the time elapsed since the crime event, the race of suspect, and the violence of the crime.

Recently, a good deal of thought has been given to a more complex line of field research: experiments that can directly compare competing lineup strategies. In the fall of 2006, the Center for Modern Forensic Practice and the American Judicature Society brought together top eyewitness scientists and legal experts to map the methodological requirements for conducting future field experiments. The considerations included the means to creatively bring vital components of experimental design to eyewitness research in the field. Such features include double-blind testing, true random assignment to experimental conditions, clear operational protocols for stimulus materials and presentation, standardized instructions to participants (witnesses), and transparent documentation of the eyewitness-identification experience. The rationale for bringing standard experimental design components into field lineup investigations matches that for laboratory research: conclusions can be generated from the study more directly and with greater confidence if the appropriate controls are instituted across comparison groups and if the lineup task has been structured to minimize extraneous influences on the witnesses' decisions. Efforts are now underway to run sound field experiments in a number of cities nationwide.

Even with a properly designed and executed study, however, the interpretation of field reports and field experiments is tricky. There is no parallel in the field to the laboratory's culprit-present and culprit-absent lineups because the true status of the suspect as guilty or innocent is unknown. Field identification of a lineup member may be due to an eyewitness's true recognition of the offender *or* an erroneous choice of an innocent suspect. The worst-case scenario—when a witness's selection is incorrectly judged to be accurate—is illustrated by many DNA-exoneration cases. And, as we know from the laboratory, suspect-identification rates can be pushed up (and filler picks reduced) by undesirable practices that encourage witnesses to guess when their memory is poor or that bias the lineup structure toward the suspect (e.g., poor filler photos, a suspect with incriminating clothing, or a suggestive photo background). Left with measures that offer no absolute standard of goodness, lineup outcomes must be evaluated cautiously, within the context of the study design and the estimated gains or losses in witness-decision accuracy that are likely from the procedures employed. The interpretation of a field test demands a sophisticated understanding of memory principles, clarity about the underlying local street practice, and an appreciation of what field data can and cannot tell us. Law enforcement and researchers must together explore the implications of the data for future practice (see Steblay, 2007 for additional discussion).

The inherent ambiguity of eyewitness decisions in the field severely limits our ability to assess field outcomes with precision, and this impediment is likely to frustrate audiences who look for immediate definitive answers in field reports. Wise policy makers will continue to circle back to the laboratory for clarification of eyewitness phenomena. The primary objective of eyewitness research is better access to witness memory, and the benefit of laboratory lineup research is its methodical identification of factors that reduce or enhance eyewitness accuracy. As noted by Schacter et al. (2008) "no single study can produce a final blueprint for procedural reform." Just as in the lab, confident knowledge about field lineup performance will develop as evidence grows and patterns converge across jurisdictions and between the laboratory and the field.[5] As in all science, cumulative evidence carries more weight than any single study. Scientifically, the long view is much preferred to the short.

The laboratory will continue to feed the theoretical and empirical growth of the principles and applied knowledge of eyewitness memory. To help this process along, law enforcement officials are in a good position to identify gaps in that knowledge. Field studies already have prompted another iteration of lab inquiries in order to fine-tune the current recommended lineup protocol and to ascertain how adjustments in police lineup procedures that meet the convenience or practical needs of a local jurisdiction (including the current initiative to introduce laptop lineup administration) might compromise or enhance witness accuracy. Collaboration between the field and the laboratory has the potential to be very productive. A procedural anomaly or a creative idea brought forward by law enforcement may itself become the subject of experimentation and policy review, and perhaps get expediently built into the research design in both the field and lab to determine its impact on eyewitness decisions. For example, some jurisdictions prefer that eyewitnesses be allowed multiple viewings of the sequential lineup. Hennepin County (MN) permitted multiple "laps" in its pilot study (laps allowed only at witness request). In the lab, witnesses were offered the same option. The findings converged: the field data showed increasing filler selections (known errors) with lineup laps, and lab data echoed this pattern, establishing that misidentifications increased by 26% following repeated viewing of the lineup. (Klobuchar, Steblay, and Caligiuri, 2006; Steblay, 2007). As noted by Diamond (2007), there are significant benefits to learning "when well-documented field investigations are combined with laboratory backup" (p. 13).

Among these benefits is that laboratory researchers can use field research to inform their efforts to achieve desirable levels of authenticity and ecological validity in the laboratory.

Untidiness in Policy Development

The role of science in public policy has its limits. The squad room, the courtroom, and the legislative meeting room each have idiosyncratic perspectives and agendas not always in full synchrony with those of scientists. Consider, for example, some of the primary points of resistance to lineup reform, which are an assortment of political and logistical issues: "It's not broken." "It will cost too much." "It will slow our investigations and weaken our prosecutions." "It's soft on crime." "It favors the defense." "We are professionals and know best." There is also the practical concern that the courts will essentially punish reform efforts by opening the door to appeals of cases based on the traditional lineup if new sequential lineups are mandated (Taslitz, 2006).[6] Scientists can sometimes find creative empirical means to address such concerns, but for the most part, law enforcement, legal professionals, and policy makers must deliberate, test, and resolve these challenges. The justice system will accrue the long-term benefits of eyewitness reform if it can find immediate ways to boost the short-term value and the ease of reform implementation in today's street investigations and crime prosecution. For example, one promising means to satisfy logistical concerns is the use of laptop computers for lineup delivery. With the laptop method, fillers can be selected by a computer program, and the presentation of choices can be easily randomized and presented "blind" to the eyewitness. Helpful, unbiased instructions can be guaranteed. Computer cameras can even record the session.

Scientists and policy makers share a common conundrum: both must make decisions under conditions of uncertainty, and uncertainty spurs disagreement. As with most policy considerations, some discussants will voice apprehension about policy change in the absence of more complete information. This is true of recent debate about lineup reform. In the case of lineup reform, however, it should be pointed out that existing police procedures were not based on scientific memory principles or empirical evidence of effectiveness. The legal system has conducted little if any research on eyewitness memory and has no scientific theory of memory processes (Wells et al., 2006). Psychology's accumulating laboratory and field data evaluate the status quo practices as well as new procedures, and it may not be wise to presume inherent superiority in traditional practice.

Two examples of unknowns that have challenged lineup reform can be cited. First, lab research supports a *sequential superiority effect*—a sequential lineup display produces significant reductions in false identifications—but for undetermined reasons also reveals some loss in correct identifications compared to the simultaneous lineup format. Thus, from a policy perspective, there is not a simple solution, but rather an underlying balance to be achieved between avoiding erroneous identifications and securing accurate identifications of the guilty.

For some law enforcement, the average drop in correct identifications with a sequential format (one estimate is 8%; Steblay and Dysart, 2008) is read as a criterion shift that indiscriminately inhibits choosing in the sequential array and results in unacceptable nonidentifications of the truly guilty. On the other hand, a number of scientists speculate that the average difference in correct identifications between the two formats is at least in part accounted for by lucky guesses of witnesses with weak memories; the relative judgment in simultaneous arrays helps these guesses land on correct identifications when the offender is present (see Lindsay et al., 2009; Penrod, 2003; Steblay and Dysart, 2008; Steblay et al., 2001; Wells 2006b). According to these scientists, sequential presentation better captures true recognition. Sequential format does not make witnesses just hesitant to choose; rather, the witness becomes desirably cautious about choosing *just anyone* (see, e.g., Gronlund, 2004; Lindsay et al., 2009).

No perfect lineup procedure has yet been designed. Yet, the double-blind sequential lineup is viewed by many as promoting a higher quality of eyewitness evidence. If this is so, perhaps it should be the bright-line standard applied for courtroom eyewitness evidence. Is it also well suited for all stages of investigative police work? This is a practical issue for future examination. A policy decision to implement the blind-sequential reform rests on imperfect knowledge, and all said, also on political and philosophical justice issues: What level of risk to innocent suspects is tolerable in order to net more offenders? What is an acceptable basis for eyewitness-identification evidence? On balance, is the status quo—or the advocated reforms—justifiable? Such decisions also must involve a wise and wider view of police investigatory practice. For example, Lindsay et al. (2009) remind us that a failure to obtain a lineup identification does not preclude conviction; a case can be made against a suspect with other evidence.

A second, related, example is the unknown rate of target-absent lineups in the field. New lineup procedures are considered superior because of their demonstrated ability to reduce the risk of false identification when the perpetrator is not in the lineup. Critics have argued that the need for lineup reform is undercut if offender-absent lineups (lineups with innocent suspects) are rare in field practice. However, true rates of target-absent lineups in the field, false identifications, and erroneous convictions are unknown, and perhaps ultimately unknowable. Perhaps more to the point—and strategically useful—is the recognition that there are countless circumstances under which police might unknowingly place an innocent suspect in a lineup and that the rate of target-absent lineups probably varies substantially across different jurisdictional, investigator practices, and stages of crime investigation (see Lindsay et al., 2009, and Wells, 2006c for in-depth discussions of this issue). Scientists can help law enforcement by continuing to determine a multitude of practice refinements to increase the probability that true offenders will be the focus of police investigation—at a lineup and at other points in an investigation. For their part, law enforcement professionals will need to determine whether to adopt reforms even as this knowledge continues to grow and with the awareness that their current investigative net is likely to snare an unknown number of innocent suspects.

Final Remarks

We have focused on the applicability of eyewitness science to reforms regarding lineups and other identification procedures. But the science also has bearing on cases in which eyewitnesses testify about matters beyond those involving the identification of perpetrators. In criminal cases, eyewitnesses testify about myriad matters. What was the color of the getaway car? Who started the fight, and were the defendant's actions a result of self-defense? Moreover, witnesses testify from memory about many matters that arise in civil cases, for example, the details of accidents, recollections of doctor-patient interactions in medical malpractice cases or of conversations in security fraud cases, and instances of claimed recovered memory, to name but a few. Are there reforms awaiting our consideration that would make the memory evidence more reliable and the verdicts in these types of cases more just? With creative scientific research, improved education for triers of fact, and constructive input from legal and policy communities, these are areas for future policy enhancement.

Notes

1. Other individual jurisdictions have also reformed their lineup procedures in the past decade even as their state practices have not changed. Examples include Virginia Beach, VA; Chaska, MN (Klobuchar and Knight, 2005); and Santa Clara County, CA, where Deputy District Attorney David Angel stated: "Some people have said that [these reforms] would reduce valid identifications, or they would be too expensive or too difficult to implement, but these problems have not come forward. . . . There is compliance; the training is not difficult; good IDs are made, and presumably they're more accurate" (Yeung, 2003).

2. Following a somewhat different approach, the Virginia General Assembly in 2004 instructed the Virginia State Crime Commission and Department of Criminal Justice Services to create guidelines for improving lineup procedures in the commonwealth and to develop training requirements for local jurisdictions (Ehlers, 2006). In 2005, the Crime Commission's recommendations were enacted, requiring that police departments have written lineup policies and procedures.

3. The Innocence Project website (http://www.innocenceproject.org/fix/Eyewitness-Identification.php) provides information on exoneration cases, reasons for wrongful convictions, connections to scientific work, model legislation, and a listing of reforms. This site includes materials and descriptions of the Northampton and Boston lineup reforms, among others.

4. Examples of estimator variable meta-analyses include cross-race identification (Meissner and Brigham, 2001b), eyewitness accuracy and confidence (Sporer et al., 1995), eyewitness stress (Deffenbacher et al., 2004), weapon focus (Steblay, 1992), exposure duration, retention interval, and disguises (Shapiro and Penrod, 1986), system-variable reviews on postidentification feedback (Douglass and Steblay, 2006), mugshot-exposure effects (Deffenbacher, Bornstein, and Penrod 2006), lineup instructions (Steblay, 1997), lineup format (Steblay et al., 2001; Steblay and Dysart, 2008), showups (Steblay et al., 2003), forensic hypnosis (Steblay and Bothwell, 1994), the cognitive interview (Kohnken et al., 1999), and verbal overshadowing (Meissner and Brigham, 2001a).

5. An ancillary line of hybrid lab-field research has developed around testing for fairness of real lineups. A *mock witness procedure* requires lab participants, who have not seen the crime and are armed only with the culprit description provided by the real witness, to identify the suspect from the lineup. This procedure is typically used to evaluate individual lineups suspected of biased structure. An emerging use of this method is to analyze a sample of lineups from a jurisdiction of interest. For example, in the Minnesota pilot of double-blind sequential lineups, a mock witness procedure confirmed fair lineup construction through a sample of field lineups (Steblay, 2007).

6. Discord is particularly common on the topic of the administration of double-blind lineups. With rare exception, eyewitness scientists see the double-blind procedure as an absolute necessity to maintain the integrity of the lineup

evidence. The *double-blind* method serves a dual function in lineup-reform research, providing the necessary method for objective comparison of competing lineup strategies (e.g., to test sequential versus simultaneous formats) and also shielding the eyewitness's decision and sense of certainty from the threat or suspicion of unintentional administrator influence. Proponents of this reform recognize that double-blind administration will increase the perceived and real integrity of the eyewitness evidence. While there is no need to assume bad behavior or intentionality on the part of the investigator (this is a protection against the very human phenomenon of unintentional communication), opponents see the drive for double-blind methodology as an insult to the integrity of detectives and their ability to handle witness interviews. Both sides to the argument cite professionalism as a reason for their position.

References

Beerntsen, P. (2006). Transcript of Penny Beerntsen's speech at Reforming Eyewitness Identification Symposium. *Cardozo Public Law, Policy, and Ethics Journal*, *4*(2), 239–249.

Behrman, B. W., and Davey, S. L. (2001). Eyewitness identification in actual criminal cases: An archival analysis. *Law and Human Behavior*, *25*, 475–491.

Behrman, B. W., and Richards, R. E. (2005). Suspect/foil identification in actual crimes and in the laboratory: A reality monitoring analysis. *Law and Human Behavior*, *29*, 279–301.

Blumenthal, J. A. (2007). Meta-analysis: A primer for legal scholars. *Temple Law Review*, *80*(1), 201–244.

Bradfield, A. L., and Wells, G. L. (2000). The perceived validity of eyewitness identification testimony: A test of the five Biggers criteria. *Law and Human Behavior*, *24*, 581–594.

Brewer, N., and Burke, A. (2002). Effects of testimonial inconsistencies and eyewitness confidence on mock juror judgments. *Law and Human Behavior*, *26*, 353–364.

Bruck, M., and Ceci, S. J. (1997). The suggestibility of young children. *Current Directions in Psychological Science*, *6*(3), 75–79.

Cannino, J. T. (2006). Transcript of Jennifer Thompson Cannino's speech at Reforming Eyewitness Identification Symposium. *Cardozo Public Law, Policy, and Ethics Journal*, *4*(2), 251–269.

Capital Punishment Reform Study Committee Act of 2003, Ill. Comp. Stat. Ann. 7255/107A-10 (West 2006).

Capital Punishment Reform Study Committee (2007). *Third annual report.* (Illinois). Retrieved from http://www.icjia.org/public/pdf/dpsrc/CPRSC%20Third%20Annual%20Report.pdf

Cutler, B. L., and Kovera, M. B. (2008). Introduction to commentaries on the Illinois pilot study of lineup reforms, *Law and Human Behavior*, *32*, 1–2.

Cutler, B. L., and Penrod, S. D. (1988). Improving the reliability of eyewitness identification: Lineup construction and presentation. *Journal of Applied Psychology*, *73*, 281–290.

Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993).

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

Deffenbacher, K. A., Bornstein, B. H., Penrod, S. D., and McCorty, E. K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law and Human Behavior*, *28*, 687–706.

Deutsch, M., and Gerard, H. B. (1955). A study of normative and informational influence upon individual judgment. *Journal of Abnormal and Social Psychology*, *51*, 629–636.

Diamond, S. S. (2007). Psychological contributions to evaluating witness testimony. In E. Borgida and S. Fiske (Eds.) *Beyond common sense: Psychological science in the courtroom.* Malden, MA: Blackwell Press.

Douglass, A., Smith, C., and Fraser-Thill, R. (2005). A problem with double-blind photospread procedures: Photospread administrators use one eyewitness's confidence to influence the identification of another eyewitness. *Law and Human Behavior*, *29*, 543–562.

Douglass, A. B., and Steblay, N. M. (2006). Memory distortion and eyewitnesses: A meta-analysis of the post-identification feedback effect. *Applied Cognitive Psychology*, *20*, 859–869.

Doyle, J. (2005). *True witness: Cops, courts, science and the battle against misidentification.* New York: Palgrave Macmillan.

Doyle, J. M., Penrod, S., Kovera, M. B., and Dysart, J. (2006). The street, the lab, the courtroom, the meeting room. *Public Interest Law Reporter*, *11*, 13–46.

Ehlers, S. (2006). Eyewitness ID reform legislation: Past, present, and future. Talk presented at the Litigating Eyewitness Identification Cases Conference, Washington D.C.

Eyewitness ID Reform Act, S. 725, Gen. Assem., Sess. 2007, (N.C.) . Retrieved from http://www.ncleg.net/gascripts/BillLookUp/BillLookUp.pl?Session=2007&BillID=S725

Garrett, B. L. (2006). *Aggregation in criminal law.* Paper 43. University of Virginia Law School: Public Law and Legal Theory Working Paper Series.

———. (2008). Judging innocence. *Columbia Law Review*, *108*(1), 55–142.

Garrioch, L., and Brimacombe, C.A.E. (2001). Lineup administrators' expectations: Their impact on eyewitness confidence. *Law and Human Behavior*, *25*, 299–314.

Geiselman, R. E., Fisher, R. P., MacKinnon, D., and Holland, H. (1985). Eyewitness memory enhancement in the police interview: Cognitive retrieval mnemonics versus hypnosis. *Journal of Applied Psychology*, *70*, 401–412.

———. (1986). Enhancement of eyewitness memory with the cognitive interview. *American Journal of Psychology*, *99*, 385–401.

Governor's Commission on Capitol Punishment. (2002). *Report of the Governor's Commission on Capital Punishment.* Springfield, IL: State of Illinois. Retrieved from http://www.idoc.state.il.us/ccp/ccp/reports/Commission_report/complete_report.pdf

Greathouse, S. M., and Kovera, M. B. (2009). Instruction bias and lineup presentation moderate the effects of administrator knowledge on eyewitness identification. *Law and Human Behavior*, *33*, 70–82.

Gronlund, S. D. (2004). Sequential lineups: Shift in criterion or decision strategy? *Journal of Applied Psychology*, *89*, 362–368.

Harris, M. J., and Rosenthal, R. (1985). Mediation of interpersonal expectancy effects: 31 meta-analyses. *Psychological Bulletin*, *97*, 363–386.

Haw, R. and Fisher, R. P. (2004). Effects of administrator-witness contact on eyewitness identification accuracy. *Journal of Applied Psychology*, *89*, 1106–1112.

Innocence Project. (2006). Mistaken I.D. Retrieved from http://www.innocenceproject.org/docs/Mistaken_ID_FactSheet.pdf

———. (2007, July 12). Social scientists say Illinois identification report is unreliable [Web blog post]. Retrieved from http://www.innocenceproject.org/Content/Social_scientists_say_Illinois_identification_report_is_unreliable.php

———. (2008). Eyewitness identification. Retrieved from http://www.innocenceproject.org/fix/Eyewitness-Identification.php

Jaksic, V. (2007, April 9). States look at reforming lineup methods. *National Law Journal* (online).

John Jay College of Criminal Justice (2007, July 7). "Blue-ribbon" panel of experts calls for more—and better—research of important law enforcement practice. Press release. Retrieved from http://johnjay.jjay.cuny.edu/info/calendar/pressRelease/pressReleaseDetails.asp?ID=93

Junkin, T. (1998). *Bloodsworth: The true story of the first death row inmate exonerated by DNA.* Chapel Hill: Algonquin.

Justice Project. (2007). Eyewitness identification: A policy review. Retrieved from http://www.psychology.iastate.edu/~glwells/The_Justice Project_Eyewitness_Identification_ A_Policy_Review.pdf

Kassin, S. M., Tubb, V. A., Hosch, H. M., and Memon, A. (2001). On the "general acceptance" of eyewitness testimony research: A new survey of the experts. *American Psychologist*, *56*, 405–416.

Klobuchar, A., and Knight, S. (2005, January 12). New lineup procedures can reduce eyewitness mistakes. *Minneapolis Star Tribune*, p. 11A.

Klobuchar, A., Steblay, N., and Caligiuri, H. L. (2006). Improving eyewitness identifications: Hennepin County's blind sequential lineup pilot project. *Cardozo Public Law, Policy, and Ethics Journal*, *4*(2), 381–413.

Kohnken, G., Milne, R., Memon, A., and Bull, R. (1999). A meta-analysis on the effects of the cognitive interview. *Psychology, Crime, and Law*, *5*, 3–27.

Lindsay, R.C.L., Mansour, J. K., Beaudry, J. L., Leach, A. M., and Bertrand, M. I. (2009). Sequential lineup presentation: Patterns and policy. *Legal and Criminological Psychology*, *14*, 13–24.

Lindsay, R.C.L., and Wells, G. L. (1985). Improving eyewitness identifications from lineups: Simultaneous versus sequential presentation. *Journal of Applied Psychology*, *70*, 556–561.

Loftus, E. F. (2005). A 30-year investigation of the malleability of memory. *Learning and Memory*, *12*, 361–366.

Malpass, R. S. (2006). Notes on the Illinois Pilot Program on Sequential Double-Blind Identification Procedures. *Public Interest Law Reporter*, *11*(2), p 5–8, 39–41, 47.

Manson v. Baithwaite, 432 U.S. 98, 114 (1977).

Mazzoni, G. (2007). Did you witness demonic possession? A response time analysis of the relationship between event plausibility and autobiographical beliefs. *Psychonomic Bulletin and Review*, *14*, 277–281.

McQuiston-Surrett, D., Malpass, R. S., and Tredoux, C. G. (2006). Sequential vs. simultaneous lineups: A review of methods, data, and theory. *Psychology, Public Policy, and Law*, *12*(2), 147–169.

Mecklenburg, S. H. (2006). *Report to the legislature of the State of Illinois: The Illinois pilot program on double-blind, sequential lineup procedures.* Retrieved from http://www.chicagopolice.org/IL%20Pilot%20on%20Eyewitness%20ID.pdf

Mecklenburg, S. H., Bailey, P. J., and Larson, M. R. (2008a, October). Eyewitness identification: What chiefs need to know now. *The Police Chief.* Retrieved from http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_id=1636&issue_id=102008

———. (2008b). The Illinois Field Study: A significant contribution to understanding real world eyewitnesses. *Law and Human Behavior*, *32*, 22–27.

Meissner, C. A., and Brigham, J.C. (2001a). A meta-analysis of the verbal overshadowing effect in face identifications. *Applied Cognitive Psychology*, *15*, 603–616.

———. (2001b). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law*, *7*, 3–35.

Morgan, C. A., Hazlett, G., Doran, A., Garrett S., Hoyt, G. Thomas, P., Baronoski, M., and Southwick, S. M. (2004). Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress. *International Journal of Law and Psychiatry*, *27*, 265–279.

Munsterberg, H. (1908). *On the witness stand.* New York: Doubleday.

National Science Foundation (1997, January 3). *False identification: New research seeks to inoculate eyewitnesses against errors.* Press release. Retrieved from http://www.nsf.gov/pubs/stis1997/pr971/pr971.txt

Neil v. Biggers, 409 U.S. 188, 199 (1972).

Northampton Police Department (2000). Eyewitness Identification Procedure. *Administration and Operations Manual* (Chapter 0-408). Northampton, MA. Retrieved from http://www.innocenceproject.org/docs/Northampton_MA_ID_Protocols.pdf

O'Toole, T. P. (2006, August). What's the matter with Illinois? How an opportunity was squandered to conduct an important study on eyewitness identification procedures. *The Champion*, pp. 18–23.

O'Toole, T. P., and Shay, G. (2006). Manson v. Brathwaite revisited: Towards a new rule of decision for due process challenges to eyewitness identification procedures. *Valparaiso University Law Review*, *41*, 109–148.

Patenaude, K. (2006). Police identification procedures: A time for change. *Cardozo Public Law, Policy, and Ethics Journal*, *4*(2), 415–419.

Penrod, S. (2003, Spring). Eyewitness identification evidence: How well are eyewitnesses and police performing? *Criminal Justice Magazine*, pp. 36–47, 54.

Phillips, M., McAuliff, B. D., Kovera, M. B., and Cutler, B. L. (1999). Double-blind lineup administration as a safeguard against investigator bias. *Journal of Applied Psychology*, *84*, 940–951.

Rosenthal, R. (2002). Covert communication in classrooms, clinics, courtrooms, and cubicles. *American Psychologist*, *57*, 834–849.

Rosenthal, R., and Rubin, D. B. (1978). Interpersonal expectancy effects: The first 345 studies. *Behavioral and Brain Sciences*, *3*, 377–386

Ross, S. J., and Malpass, R. S. (2008). Moving forward: Response to "Studying eyewitnesses in the field." *Law and Human Behavior*, *32*, 16–21.

Rozas, A. (2007, July 30). Best police lineup format not yet ID'd. *Chicago Tribune.* Retrieved from http://articles.chicagotribune.com/2007-07-30/news/0707290206_1_illinois-study-lineup-death-penalty-reforms

Schacter, D. L. (1996). *Searching for memory: The brain, the mind, and the past.* New York: Basic Books.

———. (2001). *The seven sins of memory: How the mind forgets and remembers.* Boston: Houghton Mifflin.

Schacter, D. L., Dawes, R., Jacoby, L. L., Kahneman, D., Lempert, R., Roediger, H. L., and Rosenthal, R. (2008). Studying eyewitness investigations in the field. *Law and Human Behavior*, *32*, 3–5.

Schleh, J. (2006, March 9). Sequential photo lineups using an independent administrator in Ramsey County. Memorandum. Ramsey County, MN.

Schmechel, R. S., O'Toole, T. P., Easterly, C. E., and Loftus, E. F. (2006). Beyond the ken? Testing jurors' understanding of eyewitness reliability evidence. *Jurimetrics*, *46*, 177–214.

Shapiro, P., and Penrod, S. (1986). A meta-analysis of facial identification studies. *Psychological Bulletin*, *100*, 139–156.

Sherman, L. W. (2006). To develop and test: The inventive difference between evaluation and experimentation. *Journal of Experimental Criminology*, *2*, 393–406.

Simmons v. United States, 390 U.S. 377, 384 (1968).

Slater, A. (1994). Identification parades: A scientific evaluation. London, UK: Police Research Group, Home Office.

Sporer, S. L. (2006). The science of eyewitness testimony has come of age. *Psychological Science in the Public Interest*, *7*(2), i–ii.

Sporer, S. L., Penrod, S., Read, D., and Cutler, B. L. (1995). Choosing, confidence, and accuracy: A meta-analysis of the confidence-accuracy relation in eyewitness identification. *Psychological Bulletin*, *118*, 315–327.

State of New Jersey, Office of the Attorney General (2002, April 18). Attorney General guidelines for preparing and conducting photo and live lineup identification procedures. Retrieved from http://www.state.nj.us/lps/dcj/agguide/photoid.pdf

State of Wisconsin, Office of the Attorney General. (2006). Response to Chicago report on eyewitness identification procedures. Retrieved from http://www.doj.state.wi.us/dles/tns/ILRptResponse.pdf

———. (2010). Eyewitness identification procedure recommendations. Model Policy and Procedure for Eyewitness Identification. Retrieved from http://www.doj.state.wi.us/dles/tns/eyewitnesspublic.pdf

State v. Ledbetter, S.C. 17307, 275 Conn. 534, 881A.2d 290 (2005). Retrieved from http://www.nlada.org/forensics/for_lib/Documents/1142893341.14/Ledbetter%20SCOTUS%20petition.pdf

Steblay, N. (1992). A meta-analytic review of the weapon-focus effect. *Law and Human Behavior*, *16*, 413–424.

———. (1997). Social influence in eyewitness recall: A meta-analytic review of lineup instruction effects. *Law and Human Behavior*, *21*, 283–297.

———. (2006). Observations on the Illinois data. Retrieved from http://web.augsburg.edu/~steblay/ObservationsOnTheIllinoisData.pdf

———. (2007). *Double-blind sequential police lineup procedures: Toward an integrated laboratory and field practice perspective.* Final report to the National Institute of Justice for grant no. 2004-IJ-CX-0044.

———. (2008). Commentary on "Studying eyewitness investigations in the field": A look forward. *Law and Human Behavior*, *32*, 11–15.

———. (2009). *It's more complicated than that: Lessons from the Evanston, Illinois field data.* Paper presented at the American Psychology-Law Society conference, San Antonio, TX.

Steblay, N., and Bothwell, R. (1994). Evidence for hypnotically refreshed testimony: The view from the laboratory. *Law and Human Behavior*, *18*, 635–652.

Steblay, N., and Dysart, J. (2008). *Seventy tests of the sequential superiority effect: A meta-analysis.* Manuscript submitted for publication.

Steblay, N., Dysart, J., Fulero, S., and Lindsay, R.C.L. (2001). Eyewitness accuracy rates in sequential and simultaneous lineup presentations: A meta-analytic comparison. *Law and Human Behavior*, *25*, 459–473.

———. (2003). Eyewitness accuracy rates in police show-ups and lineup presentations: A meta-analytic comparison. *Law and Human Behavior*, *27*, 523–540.

Stovall v. Denno, 388 U.S. 301–302 (1967).

Suffolk County Task Force on Eyewitness Evidence. (2004). *Report of the task force on eyewitness evidence.* Retrieved from http://www.innocenceproject.org/docs/Suffolk_eyewitness.pdf

Sullivan, T. P. (2007). Efforts to improve the Illinois capital punishment system: Worth the cost? *University of Richmond Law Review*, *41*, 935–969.

Taslitz, A. E. (2006). Eyewitness identification, democratic deliberation, and the politics of science. *Cardozo Public Law, Policy, and Ethics Journal*, *4*(2), 271–325.

Technical Working Group for Eyewitness Accuracy. (1999). *Eyewitness evidence: A guide for law enforcement.* Research Report. Washington, DC: U.S. Department of Justice.

Tollestrup, P. A., Turtle, J. W., and Yuille, J. C. (1994). Actual victims and witnesses to robbery and fraud: an archival analysis. In D. F. Ross, J. D. Read, and M. P. Toglia (Eds.), *Adult eyewitness testimony: Current trends and developments* (pp. 144–160). Cambridge: Cambridge University Press.

United States v. Ash, 413 U.S. 300, 321 (1973).

United States v. Wade, 388 U.S. 218, 228 (1967).

Valentine, T., and Heaton, P. (1999). An evaluation of the fairness of police lineups and video identifications. *Applied Cognitive Psychology*, 13, S59–S72.

Valentine, T., Pickering, A., and Darling, S. (2003). Characteristics of eyewitness identification that predict the outcome of real lineups. *Applied Cognitive Psychology*, *17*, 969–993.

Virginia State Crime Commission. (2005). *Mistaken eyewitness identification.* Report of the Virginia State Crime Commission to the Governor and the General Assembly of Virginia. H.R. Doc. No. 40.

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

———. (1984). The psychology of lineup identifications. *Journal of Applied Social Psychology*, *36*, 1546–1557.

———. (1988). *Eyewitness identification: A system handbook.* Toronto: Carswell Legal Publications.

———. (1993). What do we know about eyewitness identification? *American Psychologist*, *48*, 553–571.

———. (2006a). Comments on the Illinois Report. March 29. Retrieved from http://www.psychology.iastate.edu/faculty/gwells/Illinois_Report.pdf

———. (2006b). Does the sequential lineup reduce accurate identifications in addition to reducing mistaken identifications? Retrieved from www.psychology.iastate.edu/faculty/gwells/SequentialNotesonlossofhits.htm

———. (2006c). Eyewitness identification: Systemic reforms. *Wisconsin Law Review*, *2*, 615–643.

———. (2006d). An important note on field studies of eyewitness identifications from lineups: Filler identifications are "conditional proxy measures." Retrieved from http://www.psychology.iastate.edu/faculty/gwells

———. (2008). Field experiments on eyewitness identification: Towards a better understanding of pitfalls and prospects. *Law and Human Behavior*, *32*, 6–10.

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

Wells, G. L., and Hasel, L. E. (2008). Eyewitness identification: Issues in common knowledge and generalization. In E. Borgida and S. Fiske (Eds.), *Beyond common sense: Psychological science in the court room* (pp. 157–176). Oxford, Blackwell Publishing.

Wells, G. L., and Lindsay, R.C.L. (1980). On estimating the diagnosticity of eyewitness nonidentifications. *Psychological Bulletin*, *88*, 776–784.

Wells, G. L., Lindsay, R.C.L., and Ferguson, T. J. (1979). Accuracy, confidence, and juror perceptions in eyewitness identification. *Journal of Applied Psychology*, *64*, 440–448.

Wells, G. L., Malpass, R. S., Lindsay, R.C.L., Fisher, R. P., Turtle, J. W., and Fulero, S. M. (2000). From the lab to the police station: A successful application of eyewitness research. *American Psychologist*, *55*, 581–598.

Wells, G. L., Memon, A., and Penrod, S. D. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest*, *7*(2), 45–75.

Wells, G. L., and Quinlivan, D. S. (2009). Suggestive eyewitness identification procedures and the Supreme Court's reliability test in light of eyewitness science: 30 years later. *Law and Human Behavior*, *33*. doi: 10.1007/s1097-008-9130-3

Wells, G. L., Small, M., Penrod, S., Malpass, R. S., Fulero, S. M., and Brimacombe, C.A.E. (1998). Eyewitness identification procedures: Recommendations for lineups and photospreads. *Law and Human Behavior*, *22*, 603–647.

Wells, G. L., and Turtle, J. (1986). Eyewitness identification: The importance of lineup models. *Psychological Bulletin*, *99*, 320–329.

Wise, R. A., and Safer, M. A. (2003). A survey of judges' knowledge and beliefs about eyewitness testimony. *Court Review*, *40*(1), 6.

Wright, D. B., and McDaid, A. T. (1996). Comparing system and estimator variables using data from real lineups. *Applied Cognitive Psychology*, *10*, 75–84.

Wright, D. B., and Skagerberg, E. M. (2007) Post-identification feedback affects real witnesses. *Psychological Science*, *18*, 172–178.

Yeung, B. (2003, October 29). Innocence arrested. SFWeekly.com. Retrieved from http://www.sfweekly.com/2003-10-29/news/innocence-arrested/ (Additional information available at http://www.innocenceproject.org/docs/Santa_Clara_eyewitness.pdf)

Zernicke, K. (2006, April 19). Study fuels debate over police lineups. *New York Times*, p. 1.