Chapter 1

The Need for Expert Psychological Testimony on Eyewitness Identification

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The evidence requirements for eyewitness identification were improved in the middle of the 19th century by a Middlesex magistrates' court in the United Kingdom (Malpass, Tredoux, & McQuiston-Surrett, 2007), which established lineups as a means of protecting innocent suspects from false identification. Members of the many groups involved in the criminal justice system have recognized the fragility of eyewitness identification and a troublingly large possibility of error that sends innocent people to jail. Although the problem has appeared to be resistant to reduction, it has not been difficult to document.

Evidence of a need for **development** of diagnostic procedures for obtaining and evaluating eyewitness and other memory-based evidence has been apparent for many decades. Borchard (1932) reviewed 65 criminal cases involving persons known to be completely innocent. He began with this analysis: "Perhaps the major source of these tragic errors is an identification of the accused by the victim of a crime of violence. This mistake was practically alone responsible for twenty-nine of these convictions." He continues "How valueless are these identifications by the victim of a crime is indicated by the fact that in eight of these cases, the wrongfully accused person and the really guilty criminal bore not the slightest resemblance to each other, whereas in twelve other cases, the resemblance, while fair, was still not at all close. In only two cases can the resemblance be called striking" (p. xiii). Borchard

made a series of recommendations, which had little detectable impact on the legal system.

Brandon and Davies (1973) similarly reviewed 70 cases from the United Kingdom. As to causes of wrongful convictions, they write: "Since eyewitness identification is a very common form of evidence in criminal cases, it is perhaps not surprising that a large proportion of the mistakes we have come across occur in this field. Nevertheless, a greater number of mistakes seem to occur in this field even than one would expect. Of the cases we have examined of people who have subsequently been pardoned, or whose convictions have been quashed, or sentences remitted, a remarkably high proportion have involved misidentification" (p. 24).

Almost 45 years after Borchard (1932) and shortly after Brandon and Davies (1973)—and again in the United Kingdom—Devlin (1976) was asked to lead an inquiry into eyewitness identification after two cases of wrongful conviction came to the attention of the public. Devlin made a detailed series of recommendations; however, there was little effect leading to immediate changes in the administration of investigations and the development of eyewitness evidence. Devlin's impact was subtle and took time; some of his impact may be seen in the U.K. National Court of Appeal decision in *R v. Turnbull* (1976), but substantial changes were not visible until the Police and Criminal Evidence (PACE) Act of 1984 and its subsequent updates. The organization of law enforcement and its administration into a highly centralized entity in the United Kingdom likely lends itself to more effective centralized research and development processes, compared with the highly fractionated criminal justice system in the United States.

Radelet, Bedau, and Putnam (1992) reviewed the magnitude of wrongful convictions in 400 capital cases in the United States. They assess the causes as follows: "As for the causes of the errors, our research has shown that the two most frequent are perjury by prosecution witnesses and mistaken eyewitness testimony" (p. 18). Shortly afterward, Huff, Ratner, and Sagarin (1996) reviewed more than 200 cases of wrongful conviction in the United States and articulated the distribution of errors contributing to such instances. Out of 205 cases in their database, the authors cite eyewitness misidentification as a major contributor to 100 of these—just under 50% of the cases. They write: "We believe that the single most important factor leading to wrongful conviction in the United States and England is eyewitness misidentification . . . This is shown not only in our database but in the responses to our questionnaire [sent to attorneys and judges], where nearly 8 out of 10 ranked witness error (primarily witness misidentification, but also including some less frequent types of witness error) as by far the most frequent type of error leading to false convictions."

At about the same time, events began to move forward on two fronts. The need for a focused response was broadly recognized among eyewitness researchers, and a policy paper was composed and published by the American

Psychology-Law Society in the Society's journal *Law and Human Behavior.* This paper (Wells et al., 1998) contained a focused set of recommendations based on a review of findings of well-established lines of scientific investigation. The second front was manifested in a report from a study commissioned by the National Institute of Justice on the exoneration of wrongfully convicted persons via the then-new technology of DNA analysis (Connors, Lundregan, Miller, & McEwen, 1996). The results of the Connors and colleagues' (1996) analysis was examined by Wells and associates (1998) to show that, of the many causes associated with wrongful conviction, faulty eyewitness identification was primary among them. This outcome was recognized by the National Institute of Justice, which subsequently convened the Technical Working Group on Eyewitness Evidence that completed their report in 1999. The Technical Working Group was composed of police investigators, prosecutors, defense attorneys, and scientists, and was tasked to develop a guide for law enforcement representing best practices in the development of eyewitness identification evidence and the administration of eyewitness identification procedures by law enforcement (Technical Working Group on Eyewitness Evidence, 1999).

The most intensive and effective review of wrongful convictions has been carried out by the Innocence Project, created by Barry C. Scheck and Peter J. Neufeld and affiliated with the Benjamin N. Cardozo School of Law at Yeshiva University, New York City. As of this writing, 225 persons have been exonerated through the efforts of the Innocence Project and released from incarceration as innocent persons. Their assessment of the causes of wrongful conviction contains the following statement: "Eyewitness misidentification is the single greatest cause of wrongful convictions nationwide, playing a role in more than 75% of convictions overturned through DNA testing." And "In case after case, DNA has proven what scientists already know—that eyewitness i dentification is frequently inaccurate. In the wrongful convictions caused by eyewitness misidentification, the circumstances varied, but judges and juries all relied on testimony that could have been more accurate if reforms proven by science had been implemented" (Innocence Project, 2008).

The point not to miss is this: Failures in the development of diagnostic procedures for obtaining eyewitness identification evidence, failures in the administration of eyewitness identification procedures, and failures in the evaluation of eyewitness testimony by police, attorneys, jurors, judges, the public, and the American criminal justice system, considered as a fact-finding entity, have been documented repeatedly over at least the last 75 years, with remarkably little effect (in the United States) on the routine operation of these systems of justice. Yet, a scientific approach to understanding the causes of eyewitness misidentification has been undertaken, and a body of knowledge and the means of expanding it to benefit society in general and the criminal justice system in particular is available to law enforcement entities. This chapter explores the

underlying research base on eyewitness identification, including the scientific basis upon which expert testimony relies. We begin by considering conflicting knowledge systems employed in the criminal justice system.

Conflicting Knowledge Systems: Customary Versus Scientific Knowledge

Imagine that two societal institutions are concerned with the same domain of knowledge, but they do not share information about what they know, what they do not know, and how they use the knowledge they have.

Imagine that the first of these institutions makes judgments about whether people will lose their freedom, live, or die based in whole or in part on accusations made by other persons based on their memory, judgment, and response to various events in their cognitive and social environment. Participants in this process make laws governing the process, measure the process against constitutional requirements, administer the process of bringing accused persons into the process, develop evidence for and against their guilt, and judge the validity of the evidence. Imagine further that these participants in the process—through which life or death decisions are made—are informed primarily by customary knowledge and personal experience.

Imagine that the second of these institutions uses scientific techniques of investigation to study the processes through which persons come to have the knowledge—beliefs, perception, memory, etc.—that forms the basis of their accusations that a particular individual acted in a certain way or committed specific acts at a specific time and place. Additionally, this institution studies the ways in which events subsequent to observation of an event may change an individual's memory for events and/or persons. They further study the ways in which errors of memory and reports based on memory contribute to the judgment processes—and errors—of the first institution (including the ways in which memory is contaminated in the process of investigation and prosecution). These matters, known to the second institution through scientific study, are largely unaddressed in the procedural manuals, training, and oversight processes of the first institution.

We know that customary knowledge is commonly used in many areas of our society and in a number of domains of social life. For example, individuals treat themselves (and sometimes others) for various ailments using folk medicines that have never seen scientific evaluation, and modern governments (e.g., Canada and the United States) have made provision for certain indigenous groups to exercise customary legal and governance processes as part of their cultural and tribal autonomy. But we also know that folk medicines and treatment regimes have been supplanted and regulated in the light of science-based medicine and surgical practice, that modern building codes supplant customary principles of construction, and that modern property law has supplanted folk concepts of ownership (Malpass, 1999).

Science is a means of evaluating claims to knowledge based on open, public, explicit procedure. Customary practices are not amenable to such evaluations. Modern knowledge based on scientific analysis has made important contributions to many areas of society, and this process continues in many areas of criminal investigation and legal process—however, the degree of penetration has been quite modest. We will discuss the contrast between customary and scientific knowledge later, but for now it might be surprising that, in a time when scientific contributions to the improvement of life and knowledge have been strong in so many important areas of public and private life, there continues to be vigorous resistance to the contribution of science-based information to criminal justice processes and especially to the deliberations of those every-day people—lay jurors—who make life and death decisions about persons accused of crimes.

To some extent, this should not be surprising, since an adversarial approach is hard-wired into our system of justice, such that both prosecution and defense are devoted to making the best case possible (within certain broad limits) for their "side." It is expensive to replace customary knowledge and traditional approaches with scientifically based information and procedures. And a science-based approach requires knowledge beyond the ken of many practitioners in the legal system, from police and attorneys to judges and legislators. Progress on this front has been slow. It is in the adversarial interest of prosecutors in criminal cases (although not necessarily in the interest of justice) to keep modern scientific analysis—as contrasted with common sense–based "common knowledge"—out of the legal system. Although one can argue for many interpretations of evidence based on customary knowledge, interpretations based on a scientific footing are less easy to mold to the purposes of a particular case.

It is reasonable to inquire into the critical differences between customary knowledge and science. To start with, scientific knowledge is designed from the ground up to be questioned, challenged, evaluated as to its validity and reliability, and ultimately improved. Science provides criteria against which accuracy and adequacy can be evaluated. Apart from what people generally believe, the law has no way of applying validity tests to substantive knowledge other than by asking experts.

Science-based improvements can be monitored according to procedures and evaluative criteria that are open, accessible to anyone with the background to understand them, and which become part of the public domain and discourse. Customary knowledge, on the other hand, has merely the force of common belief and is a standard of society by default—rather than evaluated and improved by rational methods. Evaluation and development of customary knowledge and practice more often occur against criteria of general agreement or political popularity.

Customary knowledge has no explicit origins, it has no records of the conditions on which beliefs are based that might facilitate replication, and it provides no way for interested parties to test the reliability and generalizability

of the resulting conclusions beyond specific forms of personal experience. Rather customary knowledge relies on the perceptions and memories of unknown people under unexamined conditions and in unknowable circumstances; thus it is for these reasons mostly incapable of being evaluated for validity in anything but an impressionistic way.

Science has made great advances specifically because the history of scientific findings is publicly available. The records of this history are explicit, quantitative, and tied to procedures that can be repeated for contemporary evaluation. Reliance on memory is minimized because the publication standards of academic journals and other sources in which scientific studies are published require records that can be produced for inspection. Detailed information is available about the individuals involved, their scientific history and credentials, their institutional location, and the methods and procedures on which observations are based. Records of the original observations frequently are available for scrutiny and reanalysis.

A scientific approach to the collection and evaluation of eyewitness evidence is far more likely to result in improved effectiveness, and it is more likely to benefit from both new science and the continuing experience of the criminal justice system with obtaining and evaluating evidence based on eyewitness testimony. A systematic eye to improving the quality of the information contributed to criminal investigation by eyewitnesses and the way it is used by the criminal justice system can bring important benefits. Application of a scientific approach is likely to provide greater benefits the closer it is to the initial investigation. Placed within the investigation process in law enforcement organizations, science provides a powerful set of tools. Brought in after an investigation has run its course and a prosecution is under way, its power and scope is greatly reduced. In lieu of its presence in the initial investigation and the framing of the prosecutions' case, scientifically based expert testimony is an important way to bring science into the process.

Arguments regarding expert testimony and its legitimacy for the courtroom are endemic to the adversarial system. Many debates have been undertaken over whether eyewitness researchers should testify as experts in criminal trials and the moral and ethical dilemmas that such testimony elicits (i.e., Clifford, 1997; Ebbesen & Konečni, 1996; Elliot, 1993; Loftus, 1983; McCloskey & Egeth, 1983; McCullough, 2002; Wells, 1993; Yarmey, 2001). It is not our goal to rehash these arguments and determine the answer to the question of whether we should be testifying. This issue is a topic for the courts to decide, and we feel that it should remain so. Instead, we focus on the arguments that arise from evaluating the utility of the research on eyewitness identification. Specifically, these arguments are related to whether the testimony is needed and whether the research on which the testimony is based is scientifically valid.

We have already documented that a need exists for understanding the factors that influence eyewitness identification errors, because these errors are a principal cause of wrongful convictions of innocent individuals.

However, even though overwhelming evidence suggests that eyewitness identifications are fallible, arguments have arisen as to whether it is necessary for social scientists to testify about these issues in the courts. A common argument against the admissibility of expert testimony is that jurors already know about the fallibility of eyewitness memory and, therefore, expert testimony on these issues is not needed. We offer the following as a contemporary illustration. From WJBC, AM1230, Radio Bloomington, the Voice of McLean County (Bloomington, Illinois) comes this news report, dated 04/24/2008:

> A McLean County judge will not let an expert about witness identification testify during next month's rape trial for former Bloomington Police Sergeant Jeff Pelo. Pelo is accused of sexually assaulting four women, dating back to 2002. Judge Bob Freitag says there's no compelling reason to allow an Ohio expert to testify about factors, such as memory, that can affect eyewitness identification. Prosecutor Mark Messman had argued putting such an expert on the stand to sort out what are *common sense* issues would only make for a "battle of experts." (WJBC, 2008; italics added)

Read and Desmarais (Chapter 6) dissect this "common sense" argument in detail, and therefore we will not take too much space to discuss their thesis. In short, they present evidence from multiple studies evaluating layperson knowledge of factors affecting eyewitness identifications that have shown that jurors do not understand many of the variables that influence eyewitness identifications. In the few situations in which jurors do understand, they do not know how to apply their understanding to the interpretation of evidence. Laymen may have some forms of knowledge about eyewitness matters (e.g., that certain instructions influence eyewitness identification), but they are much less likely to know what moderates that effect, such as not getting a good opportunity to view the face at the witnessing event, thus making a false identification more likely if an unbiased instruction is not used. In general, laymen (jurors) are unlikely to have discovered for themselves the fruits of the last 50 years of scientific research on eyewitness identification and memory.

In addition to the "common sense" approach, critics of expert testimony on eyewitness issues have argued that the legal system provides effective safeguards against erroneous eyewitness identifications leading to wrongful convictions. Expert testimony is therefore unnecessary. These safeguards include the presence of counsel during identification procedures, the use of voir dire to discover jurors who may be unwilling or unable to carefully evaluate eyewitness evidence, motions to suppress identifications, cross-examination of eyewitnesses and procedure administrators during trial, and judicial instructions. Devenport, Kimbrough and Cutler (Chapter 3) present research that has evaluated the effectiveness of these safeguards and the defense of "common sense" criticism; we direct the reader to their chapter for a detailed evaluation of the validity of this argument. Briefly, their research suggests that these safeguards are relatively ineffective for preventing eyewitness errors

from being presented at trial and influencing juror judgments. A closer examination of their research indicates that judges and attorneys (similar to jurors) are generally insensitive to the factors that influence eyewitness accuracy, thereby limiting the effectiveness of these safeguards. It is evident that layperson, attorney, and judicial insensitivity to the factors that influence eyewitness memory present a need for expert testimony to serve as a knowledge transfer approach.

What can be said, though, regarding the scientific merit of the research upon which expert eyewitness testimony is based? Other authors in this volume discuss the ecological validity and generalizability of eyewitness research in detail (Flowe, Finklea, & Ebbesen, in Chapter 9; Bailey & Mecklenburg, in Chapter 10). We, therefore, focus our efforts on evaluating the methodologies of the eyewitness research.

Is the Study of Eyewitness Memory and Identification a Field of Science?

The study of eyewitness identification emerged from basic research in experimental psychology, particularly with regard to the study of human memory, which was an active field of scientific study in the last half of the 19th century. At the beginning of the 20th century, the first laboratory containing a research program on eyewitness identification was established in the Psychology Department at Harvard University by Prof. Hugo Münsterberg. With the birth of what has become known as "cognitive psychology" in the 1960s, research on perception, memory, and decision-making processes has greatly accelerated. During this period, research specifically on the memory of eyewitnesses was vastly expanded, and it has been the subject of inquiry by psychologists from many diverse areas of psychological science, including cognitive, social, and developmental psychology.

Experimental psychology and the applied field of eyewitness identification and memory are widely recognized as fields of scientific study, embodying the techniques, methodologies, and standards that define science in relation to other forms of knowledge. The field is characterized by the development and evaluation of explicit theory and the use of controlled studies, with experimental methods and research designs capable of producing clearly interpretable results and theoretical advances. Further, researchers seek to generalize their findings to encompass the real-world constraints that witnesses may be exposed to.

In this section, we describe the organizational structure of scientific psychology, placing the study of eyewitness memory within this system. We then briefly describe the methodologies that make the study of eyewitness memory a scientific endeavor, and we discuss the concept of general agreement within the scientific community. Finally, we highlight the reliable phenomena that scientists have discovered with regard to eyewitness memory.

The Organizational Structure of Scientific Psychology

The International Congress of Scientific Unions (ICSU) is the umbrella international organization of all scientific fields in the world. Representing psychology in this world-wide scientific organization is the International Union of Psychological Sciences (IUPsyS). Members of IUPsyS are national psychological associations rather than individual scientists. Both the American Psychological Association (APA) and the Association for Psychological Science (APS) are members of IUPsyS, and many other specialty societies are affiliated. One of the oldest international organizations in which individual psychologists can be members is the International Association for Applied Psychology (IAAP), founded in the 1920s in Europe.

The major umbrella organization for the sciences in the United States is the American Association for the Advancement of Science (AAAS). Serving more than 10 million members, AAAS is the world's largest federation of scientific and engineering societies. The premiere scientific publication in the United States is *Science*, an official publication of the AAAS. Researchers studying both the basic and applied aspects of memory have published their findings in this journal (e.g., Loftus, 1979).

Among the 271 societies and academies of science affiliated with AAAS are the two most prominent associations in the field of scientific psychology, namely the APS and the APA. Researchers who conduct studies on eyewitness memory are members of these organizations, as well as of several specialized divisions or sections of the just-noted societies devoted to psychology and law, including the American Psychology-Law Society (AP-LS, Division 41 of APA) and the Division of Psychology and Law in the IAAP (Division 10). Many scientific specialty organizations in American psychology, including the Psychonomic Society, the Society for Research in Child Development (SRCD), the Society of Personality and Social Psychology (SPSP), and the Society for Applied Research in Memory and Cognition (SARMAC) include eyewitness scientists among their members and publish research on eyewitness identification and memory in their journals.

The Scientific Methodologies of Eyewitness Research

Science is generally characterized by a form of knowledge development based on empirical observation. Theories are tested and modified through observation of events in the environment that are intersubjective in nature—that is, different observers can agree on whether an event occurred and about the attributes of the event. Like all sciences (including the "hard sciences" such as engineering, physics, chemistry, and biology), psychologists rely upon basic principles of scientific inquiry that ensure the reliability and validity of their findings and that alleviate bias or error resulting from the intersubjective characteristics of observation. These methodological principles involve (a) strict adherence to the scientific method, with a focus on the concept of

falsifiability; (b) experimental design that ensures both internal and external validity; (c) reliance upon statistical inference and the provision of error rates associated with each hypothesis test; and (d) a peer review process that provides quality control over studies that are ultimately published. An important publication (Hedges, 1987) favorably compares the reliability and replicability of findings in scientific psychology with the physical sciences. Specifically, Hedges (1987) evaluated the statistical consistency of research in particle physics with that of psychology and found that the results of research in particle physics were no more consistent than the results found in psychological research. In short, the results in psychology were just as reliable and replicable as those in the "hard science" of particle physics.

The Scientific Method

All scientific endeavors, regardless of discipline, must adhere to a common method in which theoretical inquiry allows one to generate specific hypotheses that are objective and clearly testable. Such hypotheses are tested based upon commonly accepted paradigms or measurement standards within a given field, and the results of these tests permit scientists to either support or refute a specific theoretical position. A critical requirement of this method of inquiry is commonly referred to as *falsification*—the notion that it must be possible to disprove any given theoretical proposition through reliable methods of assessment. Thus, the scientific method provides a manner in which scientists may test, or falsify, a given theoretical position.

Experimental Design That Ensures Both Internal and External Validity

Hypotheses may be tested in a number of ways via the scientific method, including direct observation of behavior (*observational designs*), assessing the relative association between two variables of interest (*correlational designs*), identifying groups of individuals that may differ in the hypothesized manner (*quasi-experimental designs*), or experimentally inducing the hypothesized differences in groups of individuals that have been randomly assigned to the relevant conditions (true *experimental designs*). Although each of these approaches is used across the various sub-disciplines of psychological science, it is important to note that these approaches differ in the extent to which causal inferences may be generated and strong internal validity may be established. Specifically, true experimental designs provide the most robust test regarding the direct effect of one variable on another. These designs involve the random assignment of participants to "conditions" (or groups) that systematically vary along a specified dimension relating to the proposed hypothesis. Such an experimental treatment of the hypothesis allows scientists to infer that any differences between conditions are the result of the proposed hypothesis (because other potential factors are controlled through aspects

of the design). Although psychologists studying eyewitness memory have relied upon the variety of designs just described, the most robust findings stem from those studies employing a true experimental design that ensures strong internal validity.

One critique often sounded against the domain of eyewitness psychology is that the experiments conducted fail to simulate the reality of a crime or the "real world." In scientific terms, this critique centers on the degree of ecological validity demonstrated by the science—or the extent to which the findings of a given study can generalize to the population from which the sample was generated or the real-world conditions in which the phenomenon might be observed. For example, one might inquire whether university students who participate in experimental research differ from those individuals who might find themselves witnesses to a real crime, or whether a laboratory demonstration of a given effect might generalize to perception and memory in everyday life. As mentioned previously, other contributors address this ecological validity concern later in this volume (Flowe and colleagues, in Chapter 9; Bailey & Mecklenburg, in Chapter 10), therefore we will not go into great detail in discussing it. However, we are compelled to mention that there appear to be very few, if any, discontinuities in the processes that influence individuals in experimental research and the real world. Perception and memory processes do not work in one way under one circumstance and in quite another way in a different situation. Most events effecting memory and witness testimony are located on an ordered continuum, and the functional relationship is a monotonic function: As the causative factor increases, so does the result. With some well-known exceptions (e.g., stress and arousal, Deffenbacher, Bornstein, & Penrod, 2006), this appears to be true across a wide range of factors, and even what were thought to be exceptions recently have appeared to be less exceptional.

One approach taken by scientists to generalize their results involves systematically examining a phenomenon across a variety of conditions and methodological parameters. Although scientists may begin to explore a phenomenon by employing controlled laboratory experiments, they will often seek to generalize the observed phenomenon by taking their tests of the effect out of the laboratory and into the real world. Eyewitness researchers often utilize experimental paradigms that more appropriately replicate the conditions of a real-world event, such as unintentional encoding conditions and significant delays between the presentation of the event and the administration of a lineup. Researchers may also conduct archival analyses of real-world cases to determine if a given phenomenon has any effect on real witnesses.

One example of this approach can be seen in studies on the cross-race effect in memory for faces (i.e., the finding that memory for faces of one's own race is superior to memory for faces of another, less familiar race). The first studies examining the cross-race effect involved a laboratory experiment in which White and Black university participants viewed a sequence of slides depicting photographs of same- and other-race faces (Malpass & Kravitz, 1969).

Although this phenomenon has been replicated in the laboratory many times over the past 40 years (see Meissner & Brigham, 2001), researchers have also demonstrated that the effect is not unique to individuals of certain racial or ethnic backgrounds (or to university participants), and that the phenomenon is observed both in "eyewitness" paradigms that capture many real-world elements and archival analyses of true witness identifications.

Statistical Inference and Error Rates

As described earlier, the process of scientific inquiry involves the assessment of relationships between variables and the testing of differences between groups of individuals who are randomly assigned to experimentally differentiated conditions. The process of scientific work and the evaluation of theories and hypotheses inherently involve the calculation of error rates associated with the work. In fact, most areas of psychological science use inferential statistical analysis, in which the calculation of error rates is a basic part of the analysis and interpretation of research findings. Generally, to be considered statistically reliable and reported in scientific journals, observed findings must rise above levels of error by specific amounts calculated from data and dictated by quantitative analytic techniques developed and accepted by researchers over a period of more than a century.

The Process of Peer Review

The International Union (IUPsyS), IAAP, APA, APS, and various specialty organizations (such as the Psychonomic Society, SARMAC, and AP-LS) publish scientific journals in psychology, many of which include scientific work on memory and eyewitness identification. All of these journals engage in a process of peer review that is devoted to evaluating the validity of those scientific studies submitted for consideration. The peer review process is a method of quality control that ensures the validity and reliability of experimental research. Papers submitted for publication are reviewed by leading scientists (experts) in the relevant area. These experts provide their critique of the studies in an anonymous fashion, including such aspects as the quality of theoretical contribution, the validity and appropriateness of the scientific methods and procedures employed, and the appropriateness of the data analysis and interpretations. The editor who solicits these reviews is then responsible for permitting revisions to the work by the authors (if such revisions would promote the scientific value of the study) or rejecting the manuscript for publication (if fatal flaws in the study are apparent to the reviewers, such that the study contributes no scientific value to knowledge development). Journals using the peer review system generally accept only a small percentage of the manuscripts that have been submitted for publication—thus, studies published in these outlets have passed a rigorous test and are generally considered worthy of consideration by the greater scientific community.

Determining General Acceptance Within the Scientific Community

As with other scientific communities, there is general agreement about the scientific findings of the eyewitness community (see Hosch, Jolly, Schmersal, & Smith, Chapter 7). General agreement can be evidenced objectively in many ways, including qualitative and quantitative (meta-analytic) reviews of the literature, representation in primary texts representing the science, through documents that chronicle the findings of consensus panels of scientific experts, or more directly through surveys of scientific experts. A review of these areas suggests that it would be very difficult to sustain the position that many of the findings in research on eyewitness memory lack general agreement within the scientific community.

Qualitative and Quantitative (Meta-analytic) Reviews of the Literature

Comprehensive reviews of the nature, content, and contemporary achievements of scientific fields are important indicators of their maturation and standing. Examples are the recent article on eyewitness testimony in the *Annual Review of Psychology*[1] (Wells & Olson, 2003) and the Psychology and Law section in the *Encyclopedia of Applied Psychology*: 13 articles on psychology and law in general and two on eyewitness memory and identification in particular (Spielberg, 2004). More recent publications, the *Encyclopedia of Psychology & Law* (Cutler, 2007) and the two-volume *Handbook of Eyewitness Psychology* (Toglia, Read, Ross, & Lindsay, 2006; Lindsay, Ross, Read, & Toglia, 2007) provide up-to-date treatments of many facets of the field.

In many areas of eyewitness identification, general agreement on a given phenomenon is bolstered via the findings of meta-analytic reviews of the research literature. A meta-analysis is a synthesis of all obtainable data collected in a specified topical area. The benefits of a meta-analysis are that greater statistical power can be obtained by combining data from many studies. Hypotheses not originally specified in the research, such as publication bias or gender effects, can be examined. And finally, directions for future research can be reported when applicable. Like most scientific research, meta-analyses are subject to peer review prior to publication. Important examples of such analyses include topics such as the cross-race effect (Meissner & Brigham, 2001), the confidence–accuracy relationship (Bothwell, Deffenbacher, & Brigham, 1987; Cutler & Penrod, 1989; Sporer, Penrod, Read, & Cutler, 1995), factors influencing face identification (Shapiro & Penrod, 1986), the description–identification relationship (Meissner & Brigham, 2001; Meissner, Sporer, & Susa, 2008), the effects of sequential versus simultaneous lineups and showups (Steblay, Dysart, Fulero, & Lindsay, 2001; McQuiston-Surrett, Malpass, & Tredoux, 2006), the influence of lineup instructions (Steblay, 1997; Clark, 2005), the mug-shot exposure effect

(Deffenbacher, Bornstein, & Penrod, 2006), the weapon-focus effect (Steblay, 1992), the influence of emotion/anxiety (Deffenbacher, Bornstein, Penrod, & McGorty, 2004), the effects of hypnosis on recall (Steblay & Bothwell, 1994), and post-identification feedback (Douglass & Steblay, 2006).

Representation in Introductory Textbooks

Introductory textbooks are the most concise and authoritative presentations of the core concepts and findings of a field. They are aggressively peer-reviewed and represent a range of professionally acceptable emphases or versions of the nature of the field. Eyewitness research concepts are represented in psychology textbooks at a high rate. Hosch and associates (Chapter 7) provide a thorough evaluation of the extent to which phenomena related to eyewitness processes are presented in commonly adopted textbooks across various areas of psychology. In short, they found that almost every textbook contained a presentation of research related to eyewitness issues, with some devoting entire chapters to the discussion of these issues.

Consensus Panels of Scientific Experts

Groups of experts are frequently brought together to assess the foundations of a given area of scientific inquiry. Such consensus panels have been assembled in the field of eyewitness psychology over the past decade. For example, the AP-LS sponsored a review of the scientific work on eyewitness identification with the purpose of proposing changes in law enforcement policy. This "white paper," entitled *Eyewitness Identification Procedures: Recommendations for Lineups and Photospreads*, was authored by Wells and colleagues (1998). It represented the study of eyewitness identification as a stable body of research as of that date, and was authored by six prominent scientists in the field.

A second consensus panel document on eyewitness identification research involved the publication of *Eyewitness Evidence: A Guide for Law Enforcement* by the Technical Working Group on Eyewitness Evidence, under the direction of the Attorney General of the United States (see Wells et al., 2000). This Technical Working Group consisted of a select group of psychological researchers, attorneys, and representatives of law enforcement, and its findings and recommendations were published in 1999, with a training manual following in 2003. The guide and training manual were disseminated to all law enforcement agencies in the United States.

Surveys of Scientific Experts

Periodically, researchers and experts in the eyewitness field are administered questionnaires to determine their level of agreement on specific eyewitness topics. The results of these questionnaires indicate that a high level of consensus exists regarding those issues relevant to the field (Kassin, Ellsworth, &

Smith, 1989; Kassin, Tubb, Hosch, & Memon, 2001). For example, the most recent survey conducted by Kassin and colleagues indicated significant agreement (over 90% of experts surveyed) on the effects of cross-racial identification, alcohol intoxication, hypnotic suggestibility, attitudes and expectations, child suggestibility, post-event information, mug-shot exposure, confidence malleability, lineup instructions, and leading interview questions. This matter is reviewed at length by Hosch and colleagues later in this volume.

What Can Research Tell Us About the Factors That Influence Eyewitness Identification?

As described earlier, psychologists have developed a scientific understanding of factors that influence human perception, memory, and judgment that are relevant to the evaluation of eyewitness evidence. Numerous reviews are available to the interested reader that document, in detail, the specific findings and scientific studies that serve as the scientific basis of this literature (see Brewer & Williams, 2005; Lindsay et al., 2007; Neuschatz & Cutler, 2008; Toglia et al., 2006). This corpus of research has been published in many of the most highly regarded, peer-reviewed journals in the fields of experimental, cognitive, social, developmental, and applied psychology. Although it is not our charge to systematically review the scientific research on eyewitness identification, we review more generally the basic scientific knowledge evidenced by these studies.

Following a timeline beginning with a criminal event, and leading to the investigation of this crime and, ultimately, to the trial of an accused perpetrator, accurate or inaccurate identifications derive principally from the following:

- *The cognitive structures (encoding capabilities), fears, or values that a witness brings to the witnessing situation.* Witnesses who are cognitively impaired through their affective response to a situation, or those distracted from observing relevant information via a focus on other salient aspects of the event (e.g., the weapon used to threaten them), are less likely to render an accurate identification. Certain individuals who are cognitively impaired or those with limited cognitive capability either through alcohol/drug inducement or more natural developmental processes are similarly less accurate in their identifications.
- *The opportunities and constraints afforded the witness at the witnessing situation.* The greater the opportunity a witness has to observe an event or a perpetrator, and the clearer the resolution and acuity associated with this observation, the more accurate the witness's memory is likely to be. Factors such as distance, lighting, and time to view have all been shown to influence the accuracy of witness identification.

- *The information a witness encodes about the offender from the initial viewing of the event.* As we've noted earlier, the constraints on the information a witness encodes into memory depend upon both attributes of the person and attributes of the environment. But whatever the constraints on encoding, the information obtained at the original event is the base from which all subsequent memory (recall, recognition, identification) processes work. If the initial encoding is weak, then subsequent memory-contaminating events are likely to have greater effects than if the original memory is strong.
- *The history of the encoded information from the initial viewing to the time of the identification request.* Witnesses are susceptible to the influence of both suggestive questioning by investigators, as well as to social information that may be shared by other witnesses. They may be exposed to images of other persons or faces represented as being the offender in the media or as part of the investigation process. In addition, witnesses may forget information as the time between their viewing of the event and their attempt at an identification increases.
- *The circumstances surrounding the identification (including the identification procedures, the quality of the lineup that is presented, the witness's social motives and values, etc.).* Suggestive lineup identification procedures can lead to misidentification, including the exposure of a witness to multiple images of the same target person, poorly constructed lineups in which the target person is perceptually salient to the witness, and lineup instructions that induce choosing on the part of the witness.
- *The witness's expectations about testimony and the task of giving evidence, including information derived from interactions with law enforcement or other witnesses.* Witnesses may become overconfident in their testimony in the courtroom if they are provided positive feedback at the time of their identification or if they subsequently draw conclusions about their likely accuracy based on prosecution of the identified person.

The accuracy of a witness's identification(s) and identification testimony is a function of all these factors. Many of these are attributes of human perception, memory, and judgment processes, and these psychological processes have been subject to both general models of cognition (see Lane & Meissner, 2008; Turtle, Read, Lindsay, & Brimacombe, 2008) and more specific models of eyewitness identification performance (Clark, 2008). Although this corpus of research will continue to mature and expand its knowledge base, it is without controversy that our current scientific understanding of eyewitness memory is beyond the ken of lay and customary knowledge (see Read & Desmarais, Chapter 6). It is critical, then, that we seek to transfer this knowledge to those who rely upon eyewitness evidence and make decisions within our criminal justice system.

Knowledge Transfer

The transfer of scientific knowledge from research laboratories to criminal justice practitioners can be accomplished in many ways. Legislative action, as well as training for law enforcement investigators, attorneys (in law school and beyond), and judges are all mechanisms for changing the criminal justice system. But any training regimen has its problems. For example, for attorneys and judges, the path to the law is not often through the sciences, a fact that creates a training-readiness question. Similarly, for law enforcement investigators, educational standards are uneven, frequently low, and infrequently based in science. Legal reform, in the sense of requiring new standards of evidence and standards of oversight of investigation processes, are cumbersome and have low levels of probable success.

Training for law enforcement personnel has an effect more proximal to the source of errors leading to wrongful conviction, and this seems to be a promising knowledge transfer path. However, law enforcement as a societal institution is severely fractionated in the United States (thousands of individual and overlapping jurisdictions), as are training standards and facilities. Budgets for training are commonly thin, and professionalism and educational standards vary widely across individual law enforcement units. Law enforcement has very limited research and development capabilities, especially in the areas of the social and behavioral sciences that focus on such a large range of issues in investigation, use of witnesses, and other areas of legal decision making (Geller, 1997). The contributions of university-based research and educational programs, therefore, are correspondingly more important, and the few genuinely collaborative research programs between law enforcement and university-based researchers have unique value.

Expert testimony, provided to the finders of fact during trial, is another knowledge transfer point. It is particularistic in the sense that it is applied one case at a time. However, this volume and the cumulative base of scientific study of eyewitness identification exemplify the fact that, as in the laboratory, evidence gathered one instance at a time can be productively examined as a means of understanding a phenomenon. Expert testimony has become a field for scientific scrutiny while at the same time it confronts the problems associated with making a case for scientific knowledge to persons who overwhelmingly bring customary knowledge to the courthouse. The many questions of its importance and effectiveness, as well as the size and location of discrepancies between scientific and customary knowledge, are the subject of detailed treatment in the remaining chapters of this volume.

Conceptualizations of Expert Testimony

Ultimate Opinion Testimony

Offering an opinion about whether a witness is correct or incorrect in his identification of a defendant is a form of *ultimate opinion testimony*.

Ultimate opinion testimony is beyond our reach for a number of reasons, beginning with the fact that no one can retrieve precise information on the witnesses' personal state, attentional deployment, memory capability, and similar factors that were present at the time of the offense. The science, based on controlled studies, tells us that these factors have effects on the encoding of information into memory, but we cannot retrospectively measure the degree to which they were present at any particular time. We can advise the finders of fact about indicators of the strength of these factors, but we ourselves cannot form a science-based opinion of the degree of their presence in a given case. However, we can say that, for example, when a weapon was visible in a crime, controlled studies show that effects occur on person recognition and evidence suggests that these effects result from attention distraction resulting from the presence of the weapon. We cannot quantify the degree of attention distraction; we can, however, inform the finder of fact that the presence of a weapon is known to reduce identification accuracy, through the mechanism of attention deployment. This, of course, is only one of many factors that may potentially interfere with the process of acquiring information about the appearance of the offender at the crime scene, and this imposes a limit on the quality of the subsequent memory of the offender's image for use in other processes (e.g., judgment of whether a photograph is or is not the same person who is in their memory). Obviously, if his image is not well established in the witness' memory, the later identification task will be more difficult for the witness and the result will be less reliable as evidence. These are things we can share with the finders of fact.

Likewise, we may know what memory-contaminating events may have occurred in the witness' experience, such as making and subsequently studying a composite image intended to represent the offender. But we cannot quantify exactly the magnitude of the effect that this would have on the witness. We can come very close to specifying the average of a group of people exposed to a similar condition, but it is a characteristic of any science based in statistical analysis and statements of group averages that individual observations (in this case, responses of individual research participants) vary from the group average in a direction and to a degree that cannot be specified for an individual, whether they are in the laboratory or in the witness box. We know the average effect, and we can share that information with the finders of fact. But we stop short of ultimate opinion testimony because the specific quantity of events that we and the finders of fact are certain to have occurred cannot be quantitatively specified on an individual basis with great precision beyond that of the group average.

Similarly, we cannot know exactly what the witness brings to the identification task: what self instructions were present, how the witness values accurate identification of offenders in relation to avoidance of false identification of innocent persons (Malpass, 2006), how instructions were weighed, and with what retrieval and identification decision strategies the witness approached the task. What does the witness believe is her task in the

identification procedure, apart from the instructions given, which may or may not be believed? From early studies (Malpass & Devine, 1981), we know that research participants mis-remember having been given biased lineup instructions more than four times as frequently than mis-remembering having been given unbiased instructions. Does the witness believe that arresting someone who has a reasonably high probability of being the offender is of primary importance? Does the witness consider the importance of not identifying an innocent person and its consequences (that an innocent person may be imprisoned, which results in the guilty person going unpunished and free to commit more crimes)? Does the witness believe it is almost certain that the police have caught the right person, and that the identification is confirmatory rather than independent information? We can determine, in many cases, for example, what instructions were given by law enforcement, and we have a very good idea of their effects (Clark, 2005; Steblay, 1997). We can often determine how the identification procedure was administered and whether the lineup, for example, was fair (Malpass et al., 2007; Eyewitness Identification Research Laboratory, 2008), and we can inform the finders of fact about what we know of the effects on identification of what was, in fact, done. But again, we can speak of the effects on research participants generally but not claim to know exactly (quantitatively) how these factors affected the accuracy of a specific witness' identification.

Expert As Educator

The evaluation of witness accuracy and the weight that eyewitness evidence is to be given in arriving at a verdict are within the task of the finder(s) of fact, and the responsibility of experts does not extend to offering conclusions. Doing so is widely thought of as invading the province of the jury. However, on the experts' side of that line is plenty of room for other functions. Although it is within the task of the finder of fact to make judgments on these matters, the contribution our science can make is to alert them to the existence of factors known to have effects on identification, and to indicate how strong those effects have been shown to be. In many cases, this will bring factors known to be important to the attention of the finders of fact. They may not have thought of these if not reminded of them, or they may not know of them at all. The extent to which the finders of fact know what scientists know about eyewitness identification is discussed by Read and Desmarais later in this volume (Chapter 6).

"Educator" is an obvious way to think about the role of an expert witness. This role can be expressed in a range of knowledge-transfer contexts, as discussed earlier. In the context of the ultimate opinion testimony discussion, the expert's role as educator is explicit. Clearly, there are bits of factual knowledge that it would be appropriate for the finders of fact to learn. These range from the very concrete (e.g., how long a look at a face is sufficient for a good memory image under good viewing conditions) to very abstract (e.g., that memory

involves integrative processes that take place outside of awareness). These are part of an effort to educate the finders of fact and the court more generally about what psychological science knows, and how it might be applied to their evaluation of the eyewitness evidence in the case at hand. However, there are integrative functions that the expert witness can perform that are not simple transfers of knowledge about the effects of a list of factors.

Wagenaar (1988) suggests (p. 149) a Bayesian approach to the expert's role, and uncovers two quite different orientations to the expert's testimony. The first is the estimation of *the probability of guilt given the evidence.* This framing of expert testimony is perilously close to giving an ultimate opinion about guilt or innocence, given the evidence in the case. The second approach reveals a very different and interesting use of an eyewitness scientist's expertise: to provide an estimate of *the probability of the evidence given innocence.* This is based on the principle of *diagnosticity:* if the probability of the evidence given innocence is as high as the probability of the evidence given guilt then the evidence is not diagnostic either of guilt or of innocence, and guilt and innocence cannot be distinguished based on the evidence. The evidence is diagnostic of guilt only when its probability given innocence is substantially lower than its probability given guilt. For example, if, prior to making an identification, the witness who saw the offender briefly under poor conditions viewed the defendant on television as someone being sought in the case, saw the defendant in the police station prior to the identification procedure, saw the defendant's photo in a mug book, saw a lineup in which no other photos resembled either the description given of the offender or the defendant and, without further admonitions or instructions, was told that the police have caught the offender and need the witness to pick him out of a lineup, then one can argue that the witness would not need to have seen the defendant commit the crime in order to "remember" his face and choose to select him from a lineup. The probability of the lineup choice is as likely to result from the events prior to the identification procedure as it is from having seen the defendant commit the crime—perhaps even more likely because, as a result of those events, the witness is likely to have developed a strong memory image of the defendant. Thus, the suggestions in the administration of the identification process come perilously close to forcing an identification of *someone* from the lineup: the most familiar and distinctive person. This use of a scientist's expertise goes beyond a recitation of factors affecting identification, and allows for an integrative approach to informing the finders of fact about the scientific evaluation of the evidence without offering an ultimate opinion about the accuracy of the witness.

Conclusion

It is an extremely unusual law enforcement organization that has research |and evaluation components that work on improving the process of evidence

collection and preservation. The techniques used are to a large extent "customary" in that they have been developed over a period of time by law enforcement officers, without benefit of scientific consultation. This is less true of scientific procedures that are, without question, inaccessible to persons without specific training.

DNA is a good example. Biological materials are harvested by trained technicians and brought to other, more specifically trained and certified technicians who analyze the materials by procedures developed by scientists and approved by the courts. Eyewitness evidence, on the other hand, is collected by people who are not trained as technicians, and the material harvested is not delivered for evaluation to certified technicians who use techniques that have been developed by scientists and approved by the courts. In contrast, reports based on eyewitness evidence are not constructed by specialists qualified to evaluate the significance of the findings of the identification procedure, and they are not contributed to the evidence file, as they are for even the most troublesome areas of forensic evidence, such as bite marks or hair samples.

Procedures that are customary, and that have been developed by non-technicians, non-scientists, without a research base, and not calibrated to continuing scientific findings have not met the burden of showing that the procedures used to develop the evidence being offered to the court are valid. When a scientific field of study 100 years old develops theories and findings that have only rarely been used to inform evidence gathering, preservation, and interpretation processes in law enforcement, it is improper to grant implicit validity to customary procedures without consideration of the corpus of scientific work, or its absence.

Because of the great power of systematic study that it would bring, there is almost no rational way to argue that scientific approaches to the evaluation of eyewitness identification procedures used in investigations would not be helpful. And, in the face of decades of documentation of wrongful conviction based on erroneous eyewitness testimony, it is scandalous that law enforcement has not taken on this problem itself. Although some U.S. jurisdictions have attempted to implement modifications in identification procedures based on scientific evidence, the evidence on which such change was based was developed in academic research laboratories, not as the product of law enforcement agency studies of the effectiveness of their own procedures. We grant that the severe fractionation of law enforcement and legal jurisdictions in the United States works against the development of an effective research and development arm of law enforcement. When we look to nations where law enforcement is far more integrated and centralized, as in the United Kingdom, we find that law enforcement does in fact undertake research and development activities with regard to eyewitness identification (and many other topics), and they work closely with members of the academic community and with members of law enforcement who have scientific training. With fractionation in the United States, much of the research and development activity has fallen to academic researchers who attempt to fill the void.

It is unfortunate that so few collaborative projects exist. We acknowledge that since the advent of DNA exonerations more collaborative projects have sprung up, but these too are fractionated, and the projects are not integrated into the everyday practice of evidence collection on eyewitness identification and systematic evaluation as an ongoing activity. It would be beneficial if the task of doing the research could be placed inside the police station.

From our position outside of the customs and traditions of law enforcement and the courts, we are not bound to accept precedent as important. Our premise is that the legal system is wrong and wrong-headed about the role of scientific study of eyewitness identification in the criminal justice system. If eyewitness research is rightfully criticized for taking place outside of it, that is because law enforcement agencies and the courts have not done the work themselves. No effective research and development organization embedded within the fractionated criminal justice system in the United States has evaluated the questions addressed by academic research. The way in which law enforcement holds onto customary methods and procedures (i.e., eyewitness identification, interviewing and interrogation, detection of deception) is based on a commitment to customary knowledge and a rejection of scientific knowledge. Rather than bring scientific knowledge into the house and work with it to evaluate and improve techniques that are demonstrably flawed, the U.S. criminal justice system has abrogated this work to academic researchers instead.

Without these activities becoming a routine part of law enforcement, there remain other mechanisms for making the knowledge gained through psychological science, and administered from outside the criminal justice system, available to law enforcement and the courts. Expert testimony is but one of these, and it is the mechanism examined in this book.

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