

Toward a More Informative Psychological Science of Eyewitness Evidence

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SUMMARY

Like Hugo Münsterberg, we believe that psychological science can inform the courts and police regarding eyewitness evidence. But 100 years into the enterprise, the body of knowledge acquired to date demands considerable circumspection, both in the claims expert psychological witnesses make in court and in the recommendations psychologists tender to investigating officers. There are a number of points regarding eyewitness evidence that psychologists can offer with considerable confidence, but many matters are as yet open to debate (and some issues are likely to remain unsettled for a long time). We encourage researchers, law enforcement and the legal community to (a) identify and prioritize the problems to be solved, (b) focus on a more integrative empirical approach, including more of the field experiments currently in use, as well as new descriptive research, especially on base rates and (c) use basic psychological theory and principles to consolidate the wide range of phenomena present in individual cases. Copyright © 2008 John Wiley & Sons, Ltd.

Eyewitness evidence is an ideal arena of inquiry for psychology to tackle. It involves elements from every chapter in an introductory psychology textbook, including obvious ones like research methods, perception, memory and cognition, as well as biological processes (e.g. the effects of drugs and alcohol), consciousness (e.g. attention, hypnosis), social psychology (e.g. interpersonal processes in investigative interviews) and developmental psychology (e.g. children as witnesses). In addition to these home-grown psychology interests, researchers are attracted to other aspects of eyewitness evidence, including ‘micro’ issues such as the fate of a particular individual mistakenly identified by a well-intentioned witness (e.g. Doyle, 2005) and ‘macro’ issues such as using science to make progress toward social justice (e.g. Lieberman & Sales, 2007). Münsterberg (e.g. 1908) was among the first psychologists in North America to recognize this apparently natural fit of psychology to eyewitness issues, and now 100 years later we are in a position to look back and see how much has been accomplished. In a word, it is ‘lots’, but this centennial is a good opportunity to consider directions for future research, to add further information to those introductory psychology text chapters discussed earlier, and to address important ‘real world’ issues of interest to many people outside the discipline of psychology.

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A PROBLEM SOLVING APPROACH: CONVERGENCE OVER DIVERGENCE

As a sort of parallel to the 100 years since Münsterberg's (1908) *On the Witness Stand*, the current authors have a combined experience of about 100 years working on, writing about and talking about eyewitness evidence issues, and we are privileged to know many other researchers with similar backgrounds. Drawing on this pooled experience, we think it is safe to say that there is often a gap between psychology's science-oriented approach to eyewitness issues and the way law enforcement, the legal system, and lay persons often view them. The latter groups often assume that the goal of eyewitness research is to answer one or both of what they see as two straightforward questions: 'How good is eyewitness memory in general'? and 'How reliable is this *particular* witness'? Researchers, in contrast, have largely left the first question behind as too broad to answer (beyond something equally simplistic such as 'often not very good') and often obliquely address the second question with research designed to answer a third question: 'What factors affect eyewitness evidence'?

In problem-solving parlance, the first two questions above assume a relatively well-defined problem, for which some set of convergent thought processes and solution strategies are typically most appropriate. The last question appears to assume an ill-defined problem, for which more divergent, 'creative' approaches are suited and therein, we argue, lies the proverbial rub about eyewitness issues—a conflict between seeking *the* answers (e.g. 'eyewitnesses are correct 57% of the time', 'this particular witness has a 92% probability of being correct') *versus* an academic research orientation that focusses on identifying new questions to explore in the context of a thesis topic, grant application, faculty position, etc., with the long-term aim of advancing our general knowledge. This conflict is literally a textbook example of what Greene, Heilbrun, Fortune, and Nietzel (2007, p. 1) call 'impossible choices' in the psychology–law area, based on inherent differences between science and the law (e.g. that law is doctrinal, psychology is empirical; law functions by the case method, psychology [largely] by the experimental method; law deals with absolutes, psychology with probabilities).

Is it inevitable that the scientific goals and procedures (and possibly a relatively liberal attitude) in psychology should be at odds with the doctrinal, absolutist perspectives (and possibly a relatively conservative attitude) in law when it comes to eyewitness evidence? A reasonable balance between the two extremes seems the best route to choose. On the one hand, law enforcement and the legal system should be informed of the value of a scientific approach to eyewitness evidence issues. Psychological scientists specializing in eyewitness evidence have a lot to offer the legal system, and that entails an ethical obligation to do our best to make productive contributions to it. On the other hand, psychologists need to be careful not to exaggerate their knowledge about eyewitness issues, which has been a concern for many over the years (e.g. McCloskey, Egeth, & McKenna, 1986; Wigmore, 1909). This 'value with limitations' approach can be applied in two distinct areas of overlap between psychology and the legal system: (a) expert testimony pertaining to eyewitness evidence and (b) recommendations for training legal professionals and for public policy relevant to eyewitness issues.

The potential value of expert testimony on eyewitness issues suffers from at least two severe limitations. First, its only venue is within the legal system's arena, where the doctrinal, absolutist goals dominate. A trial is not a scholarly conference, where rationale, methods and a discussion of pros and cons complement the presentation of research results.

Lawyers, judges, rules of evidence, the spectre of an appeal and other factors drive the questions that are asked and can narrow the range of acceptable answers. Brodsky's (1999) practical advice to potential expert witnesses highlights how a typical academic needs to prepare for a court setting that is so different from the kind of scholarly debate he or she is likely used to.

A second limitation of expert testimony is the absence of a repository of expert opinions given in courtrooms around the world. Surveys of eyewitness experts, such as that conducted by Kassin, Tubb, Hosch, and Memon (2001), give us some insight into the opinions held by experts in the area, and some trial information is available in greater or less detail by searching databases such as Westlaw[©] and QuickLaw[©], but expert testimony is not archived the way research findings are. Despite these limitations, the expert testimony issue often dominates discussions of eyewitness issues with people in law enforcement and the legal community.¹

A few years ago, one of the authors saw an expert psychologist testify in a delayed sexual abuse trial that there was a 75–90% chance that the complainant's allegations arose from false memories. We speculate that it is not unusual for expert psychologists to tender such estimates (certainly we have often enough been asked to do the same). It would be impressive if expert psychological witnesses could justifiably provide judges and jurors with such estimates, but we believe that in most cases there is insufficient basis for them.² Only rarely do the specifics of a particular case so closely match those of authoritative scientific studies to permit direct quantitative generalization of the empirically documented probabilities to the case in hand. If psychologists had a fully specified and solidly validated theoretical model of a particular phenomenon, it could be used to make principled extrapolations from the extant empirical literature to a particular case, but there are few if any forensic domains in which we can claim to have such a theory.

What psychologist expert witnesses can do, in our opinion, is inform judges and jurors of the variables that have been reliably shown to modulate witnesses' accuracy, and give them a balanced sense of the levels of accuracy observed under various constellations of conditions. Laypersons' ability to infer the implications of the numerous interacting variables differentiating a given case from the research literature—and thereby extrapolate from the extant data to that case—may be no worse than experts'. This may sound contradictory: We believe that triers of fact can usefully be informed by data about known accuracy rates under various conditions, and about theoretical principles known to modulate accuracy. Furthermore, we believe that having this information they are better off than they would be without it, even though we do not believe that experts can use the established data to make probabilistic estimates of accuracy in real-world cases. But there is no contradiction: Qualified experts know the reliable data and effect sizes under various conditions, and in at least some cases these empirical facts and theoretical factors likely differ from laypersons' intuitions; however, experts have little better than common sense with which to extrapolate that knowledge to a particular novel situation.

In contrast to the domain of expert testimony, we argue that the potential value of psychological science for training/policy recommendations, such as those offered by the U.S. National Institute of Justice (1999) concerning pretrial identification procedures, is less limited by differences between psychology's approach and the legal system's

¹As four Canadian authors, we should point out that expert testimony on eyewitness issues in Canadian cases is extremely rare compared to the U.S.; indeed, expert testimony on such issues is virtually never heard in any member country of the British Commonwealth.

²We put aside here the legal issue of whether such estimates would usurp the role of the trier of fact.

perspective. Yet here too psychological science is far from an easy sell. Police, for example, might see such recommendations as restricting their discretionary decision making, or as biased toward missing the identification of a guilty suspect. And they may be wary of psychological experts partly because their only previous contact with them has been in the context of an expert witness testifying for the defense. They may also simply be reluctant to change procedures that seem to work fairly well. But with sufficient explanation, police officers can come to recognize the potential value of these recommendations as a way to improve their long-run accuracy, or at least as a way to minimize criticism from the defense and experts, as opposed to a negative evaluation of their past practice.

We discuss in the next section that there is much recent controversy regarding how to proceed in this current phase of the eyewitness research enterprise, in which the application of decades of empirical findings and theory to police procedures is becoming a new focus of research and debate. Our point here, however, is that this phase would benefit from a more convergent problem-solving approach than researchers have taken in the past. In fact, researchers and 'practitioners' (law enforcement and prosecutors) need to agree that there is even a problem to be solved. The Innocence Project's DNA exoneration cases are typically offered as proof of a problem, but the fact that most exoneration cases involved mistaken eyewitness identifications does not translate easily into an estimate of how many eyewitness cases involve mistaken identifications. And practitioners are often quick to think of situations (actual or hypothetical) in which an exonerated person is not necessarily innocent of the crime, but just not involved in the way the prosecution initially claimed (e.g. the 'unindicted co-ejaculator' situation in which the person's DNA does not match that found at the crime scene even though he assisted the DNA contributor in the commission of the crime). Therefore, reminding practitioners that a real criminal, either in addition to the one they suspect is the offender or instead of him, is still out there, can be an effective way to encourage the use of optimal eyewitness procedures. In fact, any recommendation that focusses on improving the chances of accurately identifying a guilty suspect, such as the match-to-description strategy that can avoid a 'clone lineup', goes a long way toward getting practitioners to buy into the package of recommendations. If all parties agree that a problem has been 'identified', then it is a matter of converging on a solution. We argue in the next section that a template for conducting field studies/experiments is the key to this convergence, as opposed to the divergence of research questions and methods that has characterized much eyewitness research to date.

AN INTEGRATED EMPIRICAL APPROACH

As a complement to our recommendation for a convergent problem solving approach on *what* to study, we also advocate an integrated empirical approach on *how* to do the research. Most of the research in the eyewitness area is experimental, lab based, and with students as participants. But data from other sources, using other paradigms, are essential for a fuller understanding of the area, and to convince practitioners who collect and evaluate eyewitness evidence of the value of our science. Descriptive/survey research could provide a more complete picture of the context in which eyewitness evidence is collected and evaluated. There are a handful of studies addressing what police, prosecutors, defense attorneys and judges believe and do (or at least say they do) (e.g. Wise, Meyer, Pawlenko, & Safer, 2007; Wise & Safer, 2004), but we could use more studies along these lines, especially regarding base rates.

It is crucial that we learn more about the base rates of various forensic events, because they have dramatic implications for the application of psychological principles to specific cases (e.g. Wells & Olson, 2002; Wells & Turtle, 1986). Imagine, for example, that there was a wealth of data showing that under a particular constellation of conditions 40% of people (+/- some confidence interval) will falsely identify an innocent suspect in a target absent (TA) lineup, and that 70% of people (+/- some confidence interval) will correctly identify the culprit in a target present (TP) lineup. Suppose further that a particular real-world case perfectly mapped on to those conditions. Even so, an expert witness could not testify as to the probability that the identification in question was a false alarm on these bases alone, because that probability is hugely influenced by the probability of TA *versus* TP lineups. To illustrate, given these false alarm and hit rates, the probability that a particular ID is a false alarm is approximately .03 if 5% of lineups are TA, and about .40 if 50% of lines are TA. Although we have used eyewitness suspect identification in this example, the same point holds for a wide range of psycho-legal domains (e.g. the likelihood that a child's reports are products of suggestion, that a confession is false, etc.).³

Finally, field studies are a crucial component for implementing the kind of training/policy recommendations we have advocated. We have not done a systematic analysis, but we think it is safe to say that many published papers on eyewitness issues end with a recommendation to follow up on a lab-based finding or a logic/statistics-based point with some complementary field research. Unfortunately, as an area we have not delivered as much here as we could.

Field studies appear to be a no-brainer recommendation, but how to go about conducting them is more debatable than many researchers (at least some of the current authors) would have thought. In fact, a series of commentaries has just been published that address this very issue (see *Law and Human Behavior*, 32(1)), stimulated by the controversial 'Illinois pilot study of lineup reforms' (Illinois Pilot Report, 2006), which looked at witnesses in real cases. The study compared witness responses to traditional simultaneous lineups administered by a person who knew which lineup member was the suspect against responses to sequential lineups administered by a person who was 'blind' to the identity of the suspect. The results showed that witnesses exposed to the traditional lineup made fewer foil identifications (i.e. a lineup member other than the suspect) compared to witnesses who experienced the blind sequential lineup procedure. This difference in known error rates (2.7% with the non-blind, simultaneous lineups vs. 9.2% with the blind, sequential lineups) has been used to discredit the recommendation for blind sequential lineups, or at least to defer the recommendation until more data are in (e.g. Mecklenburg, Bailey, & Larson, 2008; Ross & Malpass, 2008).

The controversy surrounding the Illinois study centres on an acknowledged confound in the study's design, which some have argued 'has severe consequences for assessing [its] real-world implications' (Schacter et al., 2008, p. 3) and on the appropriate outcome measure by which to compare procedures (e.g. Steblay, 2008; Wells, 2008). We concur with Wells's recommendation that field studies employ fully crossed experimental designs, including random assignment to condition, to avoid confounds and tease apart any effects. In addition, we concur with Steblay's (2008) point that the outcome measure(s) from field experiments 'must be evaluated cautiously, within the context of study design and the estimated gains or losses in witness decision accuracy that are likely from the procedures

³This is an application of a basic Bayesian principle that has long been known, but Steve Lindsay acknowledges Bruce Whittlesea for pointing out its implications in this context during a conversation in May of 2002.

employed' (p. 12). This is the type of integrated approach, combining traditional research logic and methods with practical, real-world considerations, that is necessary to advance our general knowledge of eyewitness issues and potentially apply decades of research to an important problem.

PROCESSES OVER PHENOMENA

We believe that eyewitness research suffers from a lack of basic psychological theory that could serve to consolidate the wide range of phenomena present in individual cases. Much attention has been given to the 'eyewitness factors' that have been shown to modulate eyewitness performance in the laboratory and real-world settings. Several schemes or taxonomies have been offered for their organization (e.g. see Wells & Loftus, 2003), such as the dichotomy between estimator and system variables (Wells, 1978). This distinction has been influential perhaps because, more than anything else, it has pointed to methods for improving eyewitness reliability by identifying relevant system variables. When research on both estimator and system variables is applied to real-world forensic contexts, however, the eyewitness 'factors' are often described as phenomena with specific effects rather than as true variables with a range of effects.

As an example, experts refer regularly to the 'weapon focus effect' as though it were a specific effect of a particular size. Such an implication may be seen in the expert survey of Kassin et al. (2001), represented by the empirical proposition: *The presence of a weapon impairs an eyewitness's ability to accurately identify the perpetrator's face*. Similarly, cross-race bias is described by Kassin et al. as a phenomenon and summarized by the statement: *Eyewitnesses are more accurate when identifying members of their own race than members of other races*. More generally, in papers, presentations, and courtroom opinions by researchers, and in surveys of fact-finders, lawyers, and experts, the conceptual foundation for the application of eyewitness research has frequently been represented by lists of 'phenomena' or statements of specific empirical effects (Benton, Ross, Bradshaw, Thomas, & Bradshaw, 2006; Kassin & Barndollar, 1992; Wise et al., 2007; Wise & Safer, 2004). Not infrequently, in our experience, attorneys examine their cases for the presence or absence of these phenomena.

There are at least two obvious difficulties with this approach. First, an emphasis on a list of phenomena suggests that the number of relevant phenomena is finite. However, we would be seriously remiss if we suggested that only the 30 eyewitness 'phenomena' in the Kassin et al. survey exist. Yet writing in the field sometimes suggests this to be the case. For example, whereas Kassin et al. determined that expert consensus concerning the reliability of 16 statements or propositions has been achieved, the implication is that that more research is needed to achieve consensus on the remaining 14, after which we could all rest on our laurels.

A second difficulty is that an emphasis on phenomena may mislead others as to the nature and causes of the empirical effects in question. Researchers recognize that these phenomena or outcomes are highly unlikely to represent the expression of simple and independent processes and that their generality is limited by a variety of individual, event, and contextual variables. However, in a courtroom, the triers of fact may not perceive them this way. Instead, an emphasis on their status as discrete phenomena may focus the court's attention on the effect sizes or magnitudes of impairment suggested by each proposition. This is problematic because (as noted above) absolute magnitudes of any generality are

simply unavailable to us except in very specific settings and with very specific stimuli. We are aware of court cases in which several of these eyewitness phenomena had first been identified as potentially relevant and the expert was then asked to sum the effects of these separate phenomena to yield a combined magnitude of impairment. Doyle (2007) similarly expressed concern about offering a list of factors to a court in a manner that emphasizes their separation over their connectedness.

If we continue to follow this kind of emphasis on specific empirical effects, it is reasonable to ask how many more phenomena will require research and elicit expert opinion. That the listing is not finite is suggested by the increase from 17 to 30 phenomena in 2001 from the Kassin, Ellsworth, and Smith (1989) survey. As we complete more research over the next 100 years, any list of phenomena will necessarily grow in length, an expectation also clearly enunciated by Kassin et al. (2001). Even today, one could easily add to the 30 Kassin et al. (2001) factors with empirical propositions about, for example, post-identification feedback, novelty focus, pop-out facial recognition, testimonial repetition, collaborative recall, gist-verbatim recall, verbal overshadowing, inattention/change blindness, the suggestibility of the elderly (and myriad other groups), tunnel vision, central-peripheral recall asymmetry, clothing bias, own-age (and myriad other demographic) biases, illusory causation and investigator bias, to name a few. Their inclusion only awaits more research investigating them.

The problem, of course, is that all of these phenomena speak only to empirical outcomes rather than to their causes. Their underlying causes are the varied cognitive, memorial, decision and social processes that are well known within the fields of cognitive and social psychology. We would anticipate, of course, that these processes would be discussed by experts when asked to account for a specific phenomenon at court. But doing so on a one-by-one basis would likely reinforce the perception that each phenomenon derives from a unique process. The reality is that each process plays a role or contributes to several, if not many, of the phenomena listed, a point also made recently by Doyle (2007). Although not yet determined, we suspect the underlying processes are substantially fewer in number than the phenomena in any current or updated list of phenomena. Our wish here is to encourage the characterization of eyewitness factors not as an interesting list of empirical effects but rather as manifestations of a range of cognitive and social processes that underlie those outcomes. In other words, we argue here for a future focus on processes rather than phenomena.

From a 'processes' perspective it makes sense to categorize eyewitness variables in terms of their roles at encoding, retention, retrieval and evaluation because perceptual, memorial, decision and social processes are engaged to some degree and in varying proportions at each. The end result of this approach might be illustrated by the wording of items on a new expert survey in the future. For example, because source monitoring difficulties appear to play a role in several eyewitness phenomena (e.g. Lindsay, 2008), experts might evaluate the reliability of a variety of statements about source monitoring processes, as in: *All else being equal, the likelihood that individuals will mistake memories from one source as being from another increases with the perceptual and semantic similarity of those sources*. Thus, instead of a court hearing that 'there is a phenomenon called unconscious transference by which bystander misidentifications are made', it may make more sense to indicate that 'when people fail to monitor the sources of their knowledge, they may misattribute familiarity based on one source to another and therefore identify the wrong individual as the culprit'. Particular real-world cases could then be considered in the context of theories of the variables that modulate the likelihood of such

source-monitoring errors. Or, from a perspective of individual differences, an item such as *The elderly are more likely than younger witnesses to experience source monitoring difficulty* might be evaluated by experts for reliability.

The advantage of emphasizing psychological processes rather than effects is that a memorial capability such as source monitoring is and can be seen to be relevant to many current phenomena; for example, to child and elderly suggestibility, to postevent information, unconscious transference, mugshot bias and false childhood memories. Similarly, a number of established eyewitness phenomena appear to have their bases in reduced encoding opportunities and an item such as *The greater the extent that attention is directed away from a perpetrator, the lower the likelihood of subsequent identification* could be presented to experts for their assessment. The empirical findings for weapon focus and cross-race bias, for example, may follow in large part from this principle (e.g. Loftus, Loftus, & Messo, 1987). Similarly, 'categorical perception' or rapid automatic decisions based on previous experience are most likely with reduced exposure time (MacLin & Malpass, 2003), and, as a result, may also contribute to the phenomena of weapon focus and cross-race bias.

In short, we believe it would be worthwhile to examine current phenomena in terms of their underlying causes or processes that are primarily relevant at each stage of an eyewitness event's processing, retention, retrieval and evaluation. Several processes may contribute to each of the current list of eyewitness phenomena. The definitions and most useful boundaries of these stages, of course, are up for discussion and research. For example, whereas others may not do so, we would make a distinction within the 'retrieval' of information (recognition and recollection experiences) and the evaluative and metamemorial judgments that may flow from the 'retrieval' itself. Doing so with the current Kassin et al. (2001) list of eyewitness phenomena (and the abbreviations of each provided by Kassin et al.) would assign them primarily to either the first component (e.g. description-matched foils, forgetting curve, identification speed, lineup instructions and lineup fairness) or to the second component of retrieval (e.g. confidence malleability, accuracy-confidence correlation, question wording, unconscious transference, showups, presentation format). A tentative assignment of underlying processes and eyewitness phenomena may look something like the following.

Perception and encoding

Processes of categorical perception, influence of schemata and scripts on perception, automatic priming of social stereotypes and semantic information and attentional capacity limitations that alone or in combination may contribute to cross-race bias, alcoholic intoxication, attitudes and expectations, weapon focus, exposure time and event violence.

Retention

Cognitive processes of decay and distortion over time through inhibitory processes, directed forgetting and the receipt of new information that may underlie the phenomena of forgetting curve, mugshot-induced bias, postevent information, description-matched foils, identification speed and long-term repression.

Retrieval processes

There is, of course, overlap in the effects of some processes upon both retention and retrieval because the alterations in memory trace over the retention interval will also be

evidenced in the ease, speed and experience of retrieval. Hence the processes of decay and distortion affect the retrieval experiences associated with postevent information, forgetting curve and identification speed. Moreover, the availability of contextual information at test will influence fluency and ease of retrieval, and will contribute to long-term repression, false childhood memories, mugshot-induced bias, lineup instructions and lineup fairness.

Evaluation and metamemory

Processes involved in the evaluation of recollective experiences involve heuristics such as fluency, availability, decision-making and the establishment of judgment criteria, and are often moderated by a range of social processes such as collaborative recall and public commitment. Relevant eyewitness phenomena include confidence malleability, verbal overshadowing, question wording, unconscious transference, show-ups, presentation format and lineup fairness.

In addition, modulation of the suggested processes above may very well occur as a result of individual differences related to lifespan development (child suggestibility, elderly witnesses) and to training (discriminability and trained observers). Although we do not commit ourselves here to the assignments above without much further consideration, we offer them simply as a potential model for the kind of direction we believe will be useful. And, of course, we do not suggest that we are alone in seeking stronger roles for psychological theory in the behaviour of eyewitnesses (e.g. making identification decisions—see Brewer, Weber, & Semmler, 2007) and the ways in which the complexity of the underlying causes of eyewitness behaviours may be characterized (e.g. see Doyle, 2007). The implications and challenges of this approach for expert witnesses is their description of these processes in such a way that jurors can recognize and evaluate the differential weights of specific processes that contribute to an eyewitness's testimony. Doing so necessitates an even stronger role for experts as educators about expert testimony, a role that may indeed better provide jurors with the tools needed to apply the expert opinion to the case rather than simply increasing juror skepticism (e.g. see Devenport, Penrod, & Cutler, 1997).

One hundred years after Münsterberg (1908) first described the potential contributions that psychological research could make to the field of eyewitness evidence, we are now facing issues that Münsterberg could not have anticipated. Münsterberg's reflection that 'experimental psychology has not only in general experienced a wonderful progress during the last decades, but has also given in recent years an unusual amount of attention to just those problems which are involved on the witness stand' (p. 19) remains apt today. We need to continue our efforts if psychology is to realize the promise of Münsterberg's vision. We hope that the suggestions in this paper go some way toward meeting this goal, and offer some useful directions the field can take in the future.

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