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LOGIC AND RESEARCH VERSUS INTUITION AND PAST PRACTICE AS GUIDES TO GATHERING AND EVALUATING EYEWITNESS EVIDENCE

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Psychologists have conducted extensive research and devoted substantial thought to the memory, cognition, decision-making, logic, and human interaction components of eyewitness evidence. It is fortunate that much of that work has been formally recognized by law enforcement and the legal community and used as the basis for procedure and policy changes with regard to how eyewitness evidence is collected and evaluated. The authors discuss reasons that some segments of law enforcement, the legal community, and the public resist these research findings (e.g., by seeing psychology's role as a way to discredit eyewitness evidence or being committed to established procedures that have no empirical support). The authors also address gaps between these common misconceptions and what the psychology research perspective has to offer, in an effort to gain even more support for research- and logic-based recommendations concerning eyewitness evidence.

Keywords: eyewitness evidence; intuitive beliefs about memory; police investigation procedures

Like many issues in the psychology-law area, when it comes to eyewitness evidence, researchers see an obvious opportunity to help solve a problem—in this case, to maximize the rate of accurate information and identification decisions while at the same time minimizing the rate of mistakes. Psychology is especially well suited to this task, given its interest in the psychological aspects of eyewitness evidence, such as attention (e.g., studying an assailant's face while being assaulted vs. learning only later that a bank customer committed fraud by passing a bad check), perception (e.g., of color, distance, height, speed), memory (e.g., length of retention interval, interference, source monitoring), decision making (e.g., determining the odds of a witness choosing a suspect by chance), interpersonal communication (e.g., witness interviews), and attribution theory (e.g., a witness wonders why she has been asked a particular question or shown a particular lineup).

So, to address the legal system's "problem," the box of tools familiar to psychology researchers—stocked with things such as skepticism, empiricism, experimental design and hypothesis testing, theory building, and practical application—is brought out of the truck and carried to the job site where, combined with our existing knowledge, we expect to make some progress on the homeowner's predicament. In many cases, the tools and assistance are welcomed as helpful procedure and policy changes (e.g., National Institute of Justice, 1999; Wells, 2006; Wells, Malpass, Lindsay, Turtle, & Fulero, 2000), and field experiments are under way to measure the effect of implementing these changes (see Steblay, 2008; Wells, 2008). In

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other cases, however, a homeowner not familiar with the methods and goals of a research perspective meets us on the driveway and tells us that the problem is already under control, was working fine up until today, and that “it ain’t rocket science” to keep it up to their standards in the future. And besides, the homeowner continues, the floor plan in there is pretty complicated, and they have heard that our own house is a bit of a mess, so maybe, they politely suggest, we should go get that in order instead. In this article, we discuss some of the reasons that a science-based approach to eyewitness evidence is sometimes difficult to sell at first (or indeed even give away) to law enforcement and the legal community, with the aim of gaining even more support for what we believe are beneficial strategies that have already been adopted in several jurisdictions.

Lilienfeld and Landfield (2008) discuss much of the rationale for using science as the way to figure out how the world works, but the problem remains that not everyone seems to always agree with that rationale, and this difference of opinion can have serious consequences. Although the scientific/scholarly community might take it for granted that their perspective is best—personally, we feel it is obvious that science, logic, and research have proven themselves as the most productive routes to knowledge—it is literally a daily experience for psychologists working in applied fields to talk with people who view these routes as just possible, tenuous candidates among many alternatives, most of which boil down to some version of interpreting their personal experiences based on their intuitive notions of how things work. The clash between scientific perspectives and intuitive, personal notions of the way the world works may indeed be particularly apparent to applied psychologists, as opposed to, say, theoretical physicists. It is obvious to most people that they cannot see atoms, or quasars, or dark matter, so their lack of personal experience with those phenomena does not (usually) interfere with a belief that they exist. But, they can definitely “see” that a psychic is sometimes “correct” or that witnesses are sometimes extremely confident when they report an extraordinary number of details about a particular memory. And, people are much more interested in predicting their own future, and discerning true memories from false ones, than they are in atomic structures, dead stars in remote galaxies, or the basic structure of the universe. So, when it comes to thinking about everyday, human-scale problems, many people feel like they are gathering evidence, testing a hypothesis, and arriving at a logical conclusion, based on an n of 1 (themselves) in many cases.

It is ironic, and therefore often difficult to explain to others, that those with a science orientation are usually more humble about their ability to divine how things work based on personal experience. Our livelihood depends on knowing about confirmation bias, regression to the mean, probabilities of guessing correctly, unintended social influence, the history of claims and refutations in a particular area, the burden of proof, and so on. So, it is hard for us to make much of the fact that five witnesses who encountered an offender in a pitch black room independently picked the guilty suspect from a lineup based on their witnessing experience, except that something very wrong (or at least very unlikely) has occurred. To some people, however, it might suggest that the world sometimes works in mysterious ways—“You just never know, do you?” After all, the bad guy did get picked. Therefore, any procedural recommendation based on the position that it is best to remove human judgment from the equation and relinquish control to a general principle (which in the case of the five witnesses who never saw the offender would likely lead to no identifications of him) is sometimes viewed as the antithesis of the best way to do the job.

This special issue on science versus pseudo-science in psychology and law areas is especially well aimed at topics such as the detection of deception, criminal profiling, interrogation, and others, where there are many explicit pseudo-scientific claims, often promoted by commercial interests, that run counter to the mainstream, academic psychology position. There is much to discuss in the area of eyewitness evidence as well, but, as we have been attempting to outline, the conflict is often more about a clash between a scientific, hypothesis-testing approach to the issues and the kind of commonsense, intuitive notions discussed above. For example, the effect of stress or arousal level on eyewitness memory is a legitimate area of research, with interesting moderating and mediating variables that might drive memory to be better or worse in different situations (e.g., Christianson, 1992). Intuitive notions about this issue show up as pseudo- or quasi-scientific claims in particular legal cases to the extent that an individual police officer, lawyer, or judge assumes something like “There is no way a person could forget (remember) something like that” or “I sure would not be able to forget (remember) something like that.” Part of psychology’s goal is to inform people’s judgments on exactly these issues, but successfully convincing people that (a) they might need help and (b) we have something to offer is not always easy. Our goal, therefore, is to provide readers with a perspective, some details, and some recommendations to increase that success rate. For academics, we offer examples and details that might be relevant for teaching and/or informing others on some eyewitness issues; for law enforcement and the legal community, we hope to address some common misconceptions in a way that might facilitate even more cooperation between academics and those who actually have to put science-based ideas into practice.

ADDRESSING EYEWITNESS ISSUES: PSYCHOLOGY’S TRACK RECORD

No discussion of psychology’s original interest in applying logic and research to eyewitness evidence issues in North America is complete without a mention of the provocative Harvard psychology professor, Hugo Munsterberg. In his 1908 book *On the Witness Stand*, he optimistically claimed that the then-new discipline of psychology was ideally suited to handling the memory-related issues involved in witnessing, remembering, and testifying about a crime. For our purposes of comparing logic and research against intuition and past practice as guides to eyewitness evidence procedures, Munsterberg set the tone by trying to convince the legal community that psychology’s empirical perspective and, in fact, just the empirical *data* available around the turn of the 20th century were superior to the existing strategies in use by law enforcement and the courts. It is traditional at this point to blame Munsterberg for being premature with his claim, and perhaps especially for his adamant style, because the reaction from the legal community was abject dismissal of the idea. Doyle (2005) describes in entertaining detail how Northwestern University’s Dean of Law John Henry Wigmore (1909), actually a supporter of Munsterberg’s main point that eyewitness evidence needs to be viewed with skepticism, gleefully roasted him in virtual effigy as a dumbstruck expert witness on human memory in the mock transcript of a mock trial in the *Illinois Law Review*. So, the story goes, Munsterberg’s significant star power was greatly diminished, and psychology’s attempt to apply its tools of the trade to eyewitness issues suffered a major setback.

The cognitive revolution of the 1960s and 1970s brought a resurgence of scholarly interest in practical memory issues such as eyewitness evidence that has since flourished. Credit is due here to pioneers in the field such as Robert Buckout (e.g., 1974), whose *Scientific American* article brought legitimacy to the issue; Elizabeth Loftus, whose elegant misleading-information experiments (e.g., Loftus & Palmer, 1974) provided a strong empirical and conceptual basis for explaining memory errors (or at least testimony errors); Jack Brigham, who applied traditional social psychology ideas and principles to the issue of cross-race person recognition (e.g., Brigham & Barkowitz, 1978); Dan Yarmey (e.g., 1979), whose book encouraged (you might say, anticipated) much of the research that has followed; and Gary Wells (e.g., 1978), whose distinction between estimator variables and system variables laid the groundwork for an emphasis on the kind of research on which today's recommendations for best practice identification procedures are based (e.g., Turtle, Lindsay, & Wells, 2003; Wells et al., 2000).

Explaining Wells's (1978) estimator versus system variable distinction is one of the best ways to disabuse people of the notion that current eyewitness research is either (a) just a rehashing of the main point that people's memory is often flawed or (b) just the basis for expert testimony concerning witness accuracy in individual cases, usually for the defense to discredit evidence against the defendant. Estimator variables are such things as the age of a witness, the amount of stress he or she experienced at the time of the event, and the viewing conditions, such as exposure duration, lighting, distance, and so forth. Examples of system variables are how questions are asked in a witness interview, the number of photos presented in a lineup, the instructions provided prior to viewing the lineup, who administers the lineup, and so forth. Estimator variables are called that because we can only estimate their potential effect on witness memory and testimony (e.g., sometimes a 5-second exposure might be enough to recognize a person later on, sometimes not), whereas system factors are expected to have a predictable effect (e.g., it is always better to avoid misleading questions in an interview and to tell a witness that the offender may or may not be present in the photos he or she is about to view). In addition, the actual *value*, or level, of many estimator factors can itself only be estimated, because people can be notably inaccurate in reporting, for example, time duration, distances, and speeds. This means that the debated effect of a 5-second exposure duration may be even more debatable, because it might actually have been 15 seconds or 1 second. So, any claim about exposure-time effects might be especially loosely related to actual witness accuracy in a given case, because the effect can depend on many other factors and because the actual length of the exposure might itself be in error.

The two-pronged limitations inherent in estimator factors gain a third prong to the extent that they are much more likely than system factors to be the focus of courtroom debate and expert testimony concerning eyewitness accuracy, at least until recently. Most *Perry Mason*-like or *Law and Order* moments concerning eyewitness evidence hinge on issues such as whether or not a 5-year-old Black girl accurately identified a 30-year-old White man whom she saw for 5 seconds at night in the rain at 100 yards without her glasses on and with a gun to her head, all of which are estimator factors. The dramatic tension for eyewitness evidence is significantly reduced when the issue is whether a lineup had 6 photos or 10, and if they were presented all at once or one at a time. Yet it is on these relatively pale system factors that much recent research is focused, and it is these factors that we think make the bigger contribution to improving the value of eyewitness evidence in the legal

system. Our goal for the rest of this article is to discuss in detail how a few prominent estimator factors are vulnerable to pseudo-scientific, or quasi-scientific, and intuitive confusion and to illustrate, as a counterpoint, that there are relatively stable system-factor recommendations for the best way to handle eyewitness evidence.

MEMORY: THE COGNITIVE PERSPECTIVE VERSUS INTUITIVELY APPEALING CLAIMS

Wagstaff (2008) addresses some basic points about how memory works and the resulting limitations on hypnosis to improve people's ability to remember. For our purposes, it is sufficient to highlight the mantra of the modern, cognitive perspective on memory—that it is a reconstructive process, inherently prone to errors of commission and omission, in contrast to competing perspectives that claim that at least some memories in some people's brains are somehow especially stable and resistant to interference, distortion, forgetting, or whatever you want to call the process that renders a memory flawed. Reconstruction means that a witness's memory is his or her brain's best attempt to recall the past by cobbling together bits of sensory detail from the actual event, along with details from similar experiences before and after the event occurred, as well as information from newspaper accounts, other witnesses, and interviewers' questions, using as binding agents logic, inference, and the demands of the situation, all governed by an unconscious hypothetical construct called a memory *schema* that usually works well enough for our everyday memory needs but that often falls short of the reasonable-doubt standard in a forensic context! All of this is exactly why Munsterberg, Buckout, Loftus, Wells, and others got on the soap box to tell the legal system that memory is a risky route to figuring out the past.

The conflict between the cognitive perspective's preference for a general middle-of-the-road view on memory permanence and more intuitive ideas that commonly arise in people's minds about memory can be illustrated by assessing the scientific status of two commonly held (see Loftus & Loftus, 1980) beliefs about memory:

1. that there are some events (such as witnessing a particularly shocking crime) that, by virtue of their sheer magnitude, leave a memory trace that is immune to the ordinary processes of forgetting, distortion, and reconstruction; and
2. that there are some people who, by virtue of some quirk of biology, are able to faithfully record every detail of everything they encounter.

These intuitive ideas correspond to concepts that have been investigated under the terms *flashbulb* and *photographic* memories, respectively.

FLASHBULB MEMORIES

On the face of it, it does not seem intuitively unreasonable to suppose that certain events may be so dramatic or shocking that they are capable of creating permanent and unchanging memories—put simply, that there are some events that one never forgets. Take, for instance, the assassination of President John F. Kennedy or the events of September 11, 2001. Intuitively, the events seem so momentous that one might suppose that no one could possibly forget where they were when they first heard of them (let alone forget the details of the events themselves). Indeed, this intuition has appealed to some researchers (e.g., Brown

& Kulik, 1977), who have suggested that beyond critical levels of surprise and consequentiality, such dramatic events can trigger the functioning of a special memory mechanism that indiscriminately preserves the details surrounding news of such events, fixing a record of them "for a very long time, and conceivably permanently" (p. 85), like a flashbulb freezing and recording a moment of time in a photograph. Data demonstrating that virtually everyone can very confidently give a great many details about where they were, what they were doing, and who they were with when they heard about such events, as well as the source from which they heard about them, seem to support this idea (e.g., Brown & Kulik, 1977; Talarico & Rubin, 2003). It does not take a great leap of the imagination to see the relevance of these flashbulb memories for the criminal justice system. Crimes, in particular those that are especially dramatic or traumatic, are surely good candidate events for surpassing critical levels of surprise and consequentiality, and so a belief in a special memory mechanism that captures, permanently and accurately, a snapshot of the circumstances surrounding dramatic events might well translate into a belief that an eyewitness could not possibly have forgotten the details of a crime (let alone reconstructed a distorted version of them).

However, there is a hidden assumption at work here and in early studies of supposed flashbulb memories; namely, that the confidently reported details that people give about the circumstances in which they heard about events such as the Kennedy assassination or the events of September 11 are accurate. That is, the original research on flashbulb memories assumed that simply because people offered up such details so confidently, the details they provided were necessarily correct. In fact, subsequent research has demonstrated that so-called flashbulb memories are likely to be subject to the same types of reconstructive processes as other memories. For example, Talarico and Rubin (2003) asked participants on September 12, 2001, to report where, when, and from whom they had learned of the events that took place in New York on the previous day, as well as whom they had been with and what they had been doing at the time. They then asked participants the same questions 1, 6, and 32 weeks later and observed a decrease in consistent details and a corresponding increase in inconsistent details in participants' accounts over time. What is more, those patterns matched the patterns of increasing inconsistencies that accumulated in recollections of "control" memories of everyday autobiographical events reported by their participants (such as parties or sporting events) from around the same time. Talarico and Rubin concluded that "flashbulb memories are not immune to forgetting, nor are they uncommonly consistent over time" (p. 457). In other words, flashbulb memories are subject to the same sorts of reconstructive memory processes as every other memory and, as a result, can accumulate inaccuracies over time, just like other memories. Key differences that Talarico and Rubin did find between flashbulb memories and more everyday memories, however, were that flashbulb memories were reportedly more vivid than everyday memories, and participants were much more confident that the flashbulb events really occurred in the way they remembered them, as compared with the everyday events. In short, this research suggests that in the words of Talarico and Rubin, "Flashbulb memories are not special in their accuracy, as previously claimed, but only in their perceived accuracy"¹ (p. 455) and that the original evidence for flashbulb memories was "an example of the frequent confusion of confidently reported stories that include lots of details with objectively accurate memories" (p. 460).

It is important to point out a potential exception to the research finding that flashbulb memories might be more in our minds than they are in our brains, in terms of actually accessing superior memories for some events over others. Some recent research suggests

that people's memories for violent criminal victimization might be more resistant to forgetting than memory for more mundane events and that there may even be a special memory mechanism responsible for the effect (Alexander et al., 2005; Porter & Peace, 2007).²

Before we leave the topic of flashbulb memories, it is worth exploring one of the consequences of people's high confidence in their own flashbulb memories. Without being aware of the psychological data on this issue, misplaced confidence in one's own memory is highly likely to translate into a high confidence in *other* people's memories of flashbulb events, as in "I [seem to] clearly remember where I was and what I was doing, so how could anybody forget how they heard about the events of September 11?" Correspondingly, any perceived inconsistencies in other people's memories of such events are likely to be interpreted with suspicion. Greenberg (2004) has detailed how just such suspicion was directed at inconsistencies in President George W. Bush's recollections of the circumstances in which he heard about the events of September 11. On two occasions, a few months after September 11, the president claimed that although he did not realize the full extent of what he was seeing at the time, his first knowledge of the attacks on New York came from seeing footage of the first plane hitting the first of the twin towers on television at a school he was visiting at the time. This memory cannot possibly be accurate, because footage of the first plane hitting the towers did not appear on television until September 12. Greenberg goes on to detail how this inconsistency was interpreted by some as evidence of a conspiracy—that the CIA had planned the attack on the towers and secretly filmed it, giving the president his own private screening of the event—and by others as evidence that the president was lying. An understanding of the scientific status of the flashbulb memory concept, however, makes it clear that the president was most likely simply mistaken in his (reconstructed) recollection of the events of that day—that he remembered having watched television at the school on September 11, remembered seeing the footage of the first plane hit the first tower on television when it became available on the next day, and then, when subsequently asked to access his memory of the events, reasoned that he must have seen the first plane hit the first tower on television on September 11.

The point here is that what looks, from a psychological perspective, like a perfectly understandable mistake looks, from the intuitive perspective, like a lie ("He cannot possibly have forgotten, so he must be lying").³ Again, the relevance of this intuitive position to the criminal justice context is worth highlighting. Imagine that an eyewitness (or more seriously still, a suspect) gives inconsistent statements to the police concerning his or her involvement in a serious crime. Believing that one could not possibly forget the details of dramatic events might cause one to believe that an inconsistent witness is lying about having observed a crime or may cast further suspicion on a suspect's alibi regarding his or her whereabouts at the time of the crime. The need to more widely disseminate psychology's findings on the accuracy, or otherwise, of flashbulb memories is therefore of more than academic interest. This is especially true given recent findings that educating people about the true, reconstructive nature of memory serves to both decrease people's (over)confidence in their own memories and make those memories more accurate (Niedźwieńska, 2004).

PHOTOGRAPHIC MEMORIES

A second popular intuitive idea about memory, that also involves a memory-as-photograph metaphor, is that some people are blessed with what is commonly called a "photographic"

memory. That is, some people are capable of faithfully and completely capturing the details of what they see and can then recall those details accurately when asked. Such a person would clearly be invaluable as an eyewitness. Take, for example, the Japanese memorist, Hideaki Tomoyori, who once held a world record for reciting the first 40,000 digits of the mathematical constant Pi from memory! When faced with such an undeniably impressive display, a likely intuitive interpretation is that Hideaki, like other exceptional memorists, is naturally able to memorize all kinds of material effortlessly and accurately—that he has, in essence, a photographic memory. What a boon he would presumably be as an eyewitness in a criminal investigation; surely, with such an extensive memory capacity, he has but only to glance at a crime scene and permanently commit to memory the perpetrator's face, clothes, the license plate of his or her car, and all manner of other helpful and incriminating details!

However, careful psychological study of people such as Hideaki reveals a picture that differs dramatically from this intuitive idea, both in terms of the scope and the source of their mnemonic abilities. Superior memorists such as Hideaki typically demonstrate superior memory for only some types of material, often for somewhat meaningless strings of letters or digits. When tested with other material, such as faces or other visual stimuli, their performance is less impressive, often returning to the level of ordinary (far more fallible) people (Maguire, Valentine, Wilding, & Kapur, 2003). The utility of such mnemonic feats to the eyewitness context is further weakened when it becomes clear just how those feats are achieved. Again, a common intuitive assumption might be that such people are just naturally blessed with superior memory—that given how far beyond a typical person's performance the superior memorist's abilities seem to stretch, their brains are somehow just wired to automatically capture and hold more information than most (even if for only certain types of information). However, psychological investigations of such people paint a far different picture; not only are their feats of memory limited to certain restricted types of material, but they also depend far more on the exceptionally effective use of mundane encoding and retrieval techniques than on some special innate ability (Ericsson, Delaney, Weaver, & Mahadevan, 2004; Maguire et al., 2003; Takahashi, Shimizu, Saito, & Tomoyori, 2006). That is, superior memorists such as Hideaki do not have naturally superior memories that automatically record material that they encounter. Instead, their superior memory performance is based on many thousands of hours of practice with one or more mnemonic techniques that enable them to encode and subsequently retrieve large amounts of information from memory.

EIDETIC IMAGERY

If superior memorists do not possess it, where else might we turn in the search for genuinely photographic memory? Probably more than anything else, it is descriptions of an enigmatic phenomenon called "eidetic imagery" that seem to come closest to intuitive ideas concerning photographic memory. People who experience eidetic imagery (so-called "eidetikers") are reportedly able to continue to "see" images of visual scenes that are no longer present. In a typical test of eidetic imagery, a person is shown a picture on an easel for 30 seconds, after which the picture is removed (Haber & Haber, 1988). Eidetikers claim to still see the pictures projected onto the easel, and they describe them as though they were still perceptually present, confidently and fluently reporting on them for several minutes after they have been removed from view, using the present tense (phrasing their descriptions of

the images as “I see . . .” as opposed to “I saw . . .”) and moving their eyes as though scanning the details.

To be clear, these people are reporting more than just that they can conjure a more-or-less hazy visual memory of the pictures that they previously saw on the easel but that are now out of sight; they claim to actually still see the images projected onto the easel. Again, at first blush, this remarkable ability sounds much like the result of some kind of photographic memory system. Surely, here are individuals who are storing information much like photographs, capturing complete, detailed, and accurate visual images of scenes, and being able to access, examine, and report on them at will?

Not quite. If there is one thing that is clear from research on this remarkable phenomenon, it is that whatever eidetikers are actually seeing, it is not an especially accurate visual image. In fact, even though eidetikers claim to be able to still see vivid images of the pictures after they have been removed from the easel and confidently report the details of those pictures, the details that they report are no more accurate than the details reported from ordinary people’s hazily experienced visual memories (Haber, 1979; Haber & Haber, 1988). In tests, eidetikers’ reports of absent easel pictures have been found to be neither more accurate nor more complete than control non-eidetikers’ recall from memory of the same pictures (Leask, Haber, & Haber, 1969). Eidetic images, even though they seem to be experienced differently from ordinary visual memories, are as much constructions of the visual scene as are ordinary visual memories and are, thus, subject to the same errors. As Haber and Haber (1988) have put it,

Eidetic images are constructed or organized in the same way in which any memorial representation is organized, so that some visual details are omitted, others moved around, and some added. Thus the content of imagery is also organized and not simply an internal template or photograph of the stimulus. (p. 230)

The primary difference between an eidetic image and an ordinary visual memory, therefore, seems to be the perceived location of the image, not its accuracy. That is, eidetic images are experienced as “out there” rather than “in the head.” In addition, the apparent vividness of eidetic images is reportedly relatively short-lived (lasting, at most, several minutes), and most eidetikers report being unable to bring back the images once they have faded.

As with the abilities of superior memorists, once viewed in the light of controlled psychological testing, the utility of eidetic imagery for the eyewitness context is doubtful. The images (if they are anything more than ordinary, misreported, visual memories) are short-lived, cannot be recalled once they have faded, and are no more accurate than other ordinary (and ordinarily fallible) visual memories. Eidetic images are not the lasting, complete, detailed and accurate memories they are often claimed to be.

There are many other factors that might influence eyewitness memory—age, gender, race, emotional stress (and the related idea of weapon focus), alcohol and other drugs, developmental delays, and more—all of which have been cited in actual cases as issues debated on the basis of pseudo-scientific, quasi-scientific, intuitive, or commonsense claims, as well as genuine attempts to bring legitimate science to bear. By examining in detail just the ideas of alleged flashbulb and photographic memories, however, we have tried to show how complex these issues can be, to discourage simple intuitive interpretations and inferences based on personal experience and beliefs and to encourage training, education, and procedures that take this complexity into account.

EYEWITNESS EVIDENCE PROCEDURES

So far, we have discussed some factors that might affect people's memory for a witnessed event, as well as others' beliefs about and expectations for the quality of that memory. Now, we move on to discuss procedures for actually accessing memory as a component of a police investigation or trial. It is important to keep in mind this distinction between eyewitness *memory* and eyewitness *evidence*, to the extent that what a person has in memory might not be retrieved or be useful as evidence. In addition, on the subject of terminology, there is another category called eyewitness *testimony*—a witness's actual words at trial that may or may not correspond to the original event, the person's memory for that event, or the information the witness provided months earlier in a police station, prior to a long delay and the experience of being prepared for trial.

The aspects of eyewitness evidence that have received the most attention from researchers relate to lineup identification procedures. There are many technical, empirical, statistical, and/or logical analyses available with regard to the structure/construction of photo lineups, such as the single-suspect model (Wells & Turtle, 1986), strategies for selecting filler photos around the suspect (e.g., Wells, Rydell, & Seelau, 1993), and the number of photos to include in addition to the suspect (e.g., Wells, Memon, & Penrod, 2006). Consistent recommendations for lineup procedures, as well as other aspects of obtaining and evaluating eyewitness evidence, based on this work are available in several sources (e.g., National Institute of Justice, 1999; Turtle et al., 2003; Wells et al., 1998; Wells et al., 2000) and have been implemented in an ever-increasing number of jurisdictions (Wells, 2006).

It is surprising, though, that an apparently minor aspect of all these analyses and recommendations frequently causes problems when attempting to implement research-based recommendations about lineup structure into law enforcement procedures—the actual meaning of the word *suspect*. There is often a very confusing difference between using *suspect* in reference to a person who is *thought* to have committed a crime and the way the word is often used as an apparently politically correct term in law enforcement and the media for the person everyone agrees is the actual perpetrator. Most people who have never even been in a police station or a courtroom have been exposed to the distinction many times just by watching popular television programs, in which a camera mounted in a police cruiser or helicopter shows a car driven by someone for miles at well over the speed limit, sometimes on the wrong side of a divided highway, crashing into other vehicles, shooting at pursuing police, and throwing stolen property or drugs out the window, while the commentary refers to the driver of the vehicle as “the suspect.” Now, we realize that often the term is used because the driver is thought to have committed a crime that initiated the chase, such as a bank robbery, but even so, this blurs the line between using the word *suspect* the way it is used in eyewitness research versus other contexts. In the case of the police chases, referring to the fleeing person as “the driver” would solve the problem. At the other extreme, how many of us came to learn the opening line from the original *Law and Order* series? “In the criminal justice system, there are two separate but equally important groups: the police who investigate the crimes, and the district attorneys who prosecute the *offenders*.” It is clear that this is where the word should be *suspects* or *defendants*. Call it semantics, but the confusion over the term *suspect* becomes even more problematic when the phrase *innocent suspect* is used in the context of a lineup where the person who the police think committed

the crime is not the actual offender. This concept is, of course, a mainstay of eyewitness research, because the greatest danger of a consequential mistaken identification lurks in that situation, especially if the innocent suspect happens to match more closely the description of the offender as provided by the witness viewing the lineup, and especially if the person conducting the lineup “knows” that Number X is “the shooter.” This brings us to a set of controversies about police lineups that reveal a possible gap between science- and logic-based recommendations versus intuition and logic as guides to eyewitness evidence procedures.

LINEUP CONSTRUCTION

It is common for people to think that a lineup only refers to a live confrontation between a witness and group of despondent people holding up large numerals and trying to look inconspicuous—with height bars, spot lights, and a two-way mirror to protect the identity of the finger pointer. Although still fairly common in the United States, this procedure has been extremely rare for well over 10 years in Canada and is nonexistent or at least very rare in many other countries around the world. Even in the United States, the practice is less common than it was and has been replaced in large part by lineups with photos instead of live people.

Once it is recognized that a “lineup” may include viewing photos rather than actual people, it is extremely common for people—both in and out of law enforcement—to assume that any time a witness looks at one or more pictures of miserable-looking people, caught at one of the worst moments of their life in a police booking room, he or she is viewing a lineup. But, flipping through a “mug book” (hard copies or computer based) of people who match a general description of an offender, or who have been arrested for similar crimes in the past, is not a lineup. It is possible that the offender is in the photos and the witness will recognize him or her, but often, the outcome is just to refine the description of the offender (“He had hair like Photo 83 here, and a mean look like Photo 271”). A photo lineup, per se, is defined as a number of photos, one of which is the suspect—a temptingly simple description of a process that has received decades of attention and hundreds of research studies examining a surprisingly wide range of factors that potentially influence the chances of both a guilty suspect’s being correctly identified or overlooked for a number of reasons and an innocent suspect’s being picked out by mistake.

When it comes to constructing a lineup in the first place, intuition and common sense would appear to suggest that the photos chosen as lineup foils (or distracters, stand-ins, shills, etc.) should look like the suspect, and that view does, in fact, drive the procedure in many, if not most, police services. To some extent, this match-to-appearance strategy is valid, but formal policy on how to do it needs to go further than that extent. The problem is at least twofold: On one hand, as Luus and Wells (1991) first pointed out, the strategy taken to its extreme, with a large supply of photos to choose from and some good judgment of what makes people look alike or different, leads to lineups in which everyone looks so much like one another that even a witness who got a good look at the offender has difficulty picking him or her out. In the long run, this of course results in a reduction in accurate identifications of guilty suspects (offenders). This “clone lineup” problem is reinforced to the extent that lineups are discredited at trial because the suspect-cum-defendant is apparently distinct on some feature compared with the other lineup members, so that law enforcement and prosecutors are often motivated to avoid what can appear to be a flaw in

the procedure. Imagine the doubt that can be generated if it is pointed out that the defendant has bigger/smaller ears/eyes than everyone else in the lineup. But logic dictates, as Luus and Wells point out, that there is no alternative to that argument in a nonclone lineup. If the defendant were not distinct on at least one feature compared with everyone else, then he or she would be indistinguishable and unidentifiable! To demonstrate that a lineup in which the defendant is distinct on some feature compared with the other lineup members is not necessarily invalid, it just needs to be pointed out that one of the distracter faces also has a distinctive feature (perhaps a pointier chin than everyone else) and, yet, that distracter was not chosen by the witness on the basis of that distinctiveness.

Unless, of course, the defendant's distinguishing feature is consistent with the description of the offender. Which brings us to the other hand of the match-to-appearance problem: An innocent suspect can stand out in the mind of a witness who saw the real offender commit the crime, or even for a witness who just knows that the offender was described a particular way (Wells et al., 1993). The point is best made with an example: Suppose that the offender of a particular crime is of a particular ethnic descent, or at least appears to be, and is described as such by a witness to the event. Suppose further that police later arrest a suspect of that ethnic descent, perhaps based on his match to the description, but perhaps for other reasons. Now, suppose that police put together a lineup using a match-to-appearance strategy, carefully choosing people who match the suspect on important physical features: age, hair color and length, eye color, complexion—as many physical features as you care to match and as carefully as you choose to do it. Finally, suppose that the witness who described the offender as being of a particular ethnic descent looks at the very similar faces in the lineup but notices at a glance that only one of them is of the relevant ethnicity, because the foils were chosen just for their match to details of the suspect's actual appearance, which is relatively easy to do without taking into account something “global” about the person, such as his ethnic descent.

This might sound like an obvious example of police misconduct—railroading a minority person by making him stand out as the bad guy in a lineup. That sometimes happens, unfortunately, but it is also common for this kind of a lineup to occur with no malicious intent, the result of an apparently reasonable match-to-appearance strategy consistent with decades of past practice. The alternative match-to-description strategy uses the description of the offender as provided by the witness (or other descriptive information, such as a blurry security-camera videotape or a composite sketch) as the basis for selecting lineup distracters, with the qualifier that the suspect does not stand out in the lineup just because the description was especially vague (e.g., just because the witness failed to mention that the offender was male does not mean that it is acceptable to have a male suspect and female distracters).

In addition to providing reasonable protection against the mistaken identification of an innocent suspect, the match-to-description strategy also helps to avoid the clone-lineup problem. Suppose, for example, that an offender is described as having an insect-like tattoo on his right cheek. Suppose further that the suspect in the case has a scorpion tattoo on his right cheek (technically not an insect, but certainly insect like). It is not uncommon for lineup constructors to assume that everyone in the lineup has to have a scorpion tattoo (in fact, the exact same scorpion tattoo) in order to match the appearance of the suspect, and they will either look through their photos for appropriate matches or copy and paste the suspect's scorpion on to the distracters' faces. But the match-to-description strategy just requires that everyone in the lineup have an insect tattoo on his right cheek, so there can be

spiders (although also technically not insects), hornets, cockroaches, and any other scary examples that people might have on their faces. The point is that everyone in the lineup matches the description of the offender on the most distinguishing feature mentioned, but if the suspect is the offender, then his particular version of the feature might act as a memory cue for the witness, so that he can be recognized. This potential advantage is lost if the distinguishing feature is covered up for the sake of uniformity, in which case the witness is forced to rely on other aspects of the lineup members' appearance or on what should be irrelevant aspects of the lineup (e.g., position of the photo) or perhaps on "help" from the lineup administrator (more on this shortly). If, on the other hand, the suspect is not the offender, then his version of the feature should not make him stand out from all the others who also match the description (i.e., they all have insect-like tattoos on their right cheek).

The take-home message on assessing lineup fairness? It is important to point out that a lineup can look perfectly reasonable to anyone not familiar with the description of the offender, or at least to someone who does not know that the description is an important factor to consider in constructing the lineup. It is not possible to judge the quality of lineup without knowing the description of the offender as provided by the witness who will be viewing the lineup.

LINEUP ADMINISTRATION

Our final point concerns the actual procedures used to administer a (photo) lineup. There are many potential issues to address here, such as instructions to the witness, how the photos are presented (sequentially vs. simultaneously), how the procedure and the outcome are recorded (videotape or a computer-based digital record), and more. We focus on one especially important aspect—the knowledge that the lineup administrator has about the identity of the lineup members. Until recently, common practice has been that the person or police officer conducting the lineup knows who the suspect is. That seems to fit with a general notion that it would help to interpret the witness's behavior, such as if he or she pauses on or says something about a particular photo. Yet standard operating procedure from a research methods/hypothesis-testing perspective is that this is exactly the kind of situation where the person administering the lineup should be blind to the identity of the suspect (Wells & Luus, 1990). The logic is the same as that behind double-blind procedures used in randomized clinical trials of new medications—that both the person taking the medication and the person assessing any effects of the drug should not know if the participant is taking the real drug or a placebo.

The first half of the double-blind equation is typically obvious in the lineup context—the witness is not told which person is the suspect, and nothing about the suspect's photo makes it stand out from the others. We have already discussed the relatively subtle way that a suspect's photo can be distinct from the others because it is the most obvious match to the description of the offender, even though it does not appear radically different from the other photos if one does not know how the offender was described. More blatant examples have occurred, of course, in which a lone black-and-white photo is surrounded by color ones, or one photo is a different pose or has a different background. But, those are relatively easy to distinguish, and law enforcement typically know it is something to avoid.

The second, subtler half of the blind-lineup equation can be a sensitive issue, often because police can perceive it to be an accusation of misconduct. The only accusation here,

however, is that police officers are human beings, and humans can have a tendency to unintentionally influence others' behavior in these and many other situations. In the medical context, a doctor who knows that a particular patient is taking the experimental drug can convey in subtle ways his or her expectations for improvements in the patient's health. Verbal inflection, facial expressions, and body posture are among the unintentional ways that people can elicit particular behaviors from others. Imagine the difference between an up-talking, smiling, head-nodding doctor asking you about your recent, somewhat ambiguous health status ("How well are you sleeping? How well are you eating?") versus a monotone, frowning, head-shaking alternative ("How well are you sleeping? How well are you eating?").

In the lineup context, this subtle form of influence can present itself as follows. Suppose a witness is looking through photos in a lineup, pauses on Number 3, and says, "This one looks a lot like the person I saw." Suppose further that the officer administering the lineup knows that Number 3 was deceased at the time of the crime, knowledge that prompts her to say, "Take your time, ma'am." A few seconds later, the witness stops on Number 6 and says, "This one looks a lot like the person I saw." Because the lineup administrator knows that Number 6 is the suspect (and, perhaps deep down, "knows" it is the offender), she says, "What is it about Number 6 that you recognize, ma'am?" Or perhaps, after looking through all the photos and not choosing anyone, the officer says to the witness, "I noticed you paused a little on Number 6." That subtle tailoring of response based on knowledge of who the suspect is, and knowing which photo a witness is viewing at a particular time, is what the double-blind procedure is designed to avoid.

The most common recommendation to implement the blind lineup is to have someone who does not know the suspect administer the lineup, but there are several potential problems with that. Small police services might not have many officers to choose from, the case might be very high profile so that everyone knows the suspect, it means involving another officer who might have to appear at trial, the witness might feel more comfortable with the officer who has been investigating the case so far, and others. Therefore, more convenient alternatives are available. An officer who knows the identity of the suspect can still conduct the lineup but in a way that he or she does not know which photo the witness is viewing at a particular time. For example, the photos can be presented in an unknown order, with some kind of small barrier (like an opened briefcase) in the way, or in a folder, and/or at an angle such that when the witness says, "This one looks a lot like the person I saw," the officer is only able to respond with an off-the-rack response like "What is it about this one that you recognize, ma'am?"

Perhaps, though, the best way to conduct a blind lineup is with a computer. Almost all moderate- to large-size police services store their photos in some sort of Digital Mugshot System (DMS) and use a computer program to construct their lineups, but they often do not exploit the computer's capability to present the lineup and record the procedure. MacLin, Zimmerman, and Malpass (2005) describe a program that accomplishes these tasks, including randomized presentation of photos, which, if displayed to a witness at the appropriate angle, means that the investigating officer can conduct the lineup blind because he or she does not know which photo the witness is viewing or discussing. The program also keeps a record of the photos shown, how long the witness took to make a decision, the type of decision, confidence in the judgment, and other details. Finally, a computer system can be used to construct the lineup in the first place so that the recommendations for fair lineups are implemented with a minimum of effort, training, cost, and bother to law enforcement.

We endorse this particular strategy as the easiest way to minimize any negative effects of relying on potentially faulty human intuition and apparent common sense, as well as past practice that grew up in an era without computer technology and the benefit of a logical, research-based perspective.

We have discussed two categories of eyewitness issues—memory factors and procedure recommendations—that nicely parallel Wells’s (1978) estimator variable versus system variable distinction. For the memory factors, the main points are that (a) it is difficult to predict the effect of most of them, especially in combinations, (b) people’s own memory experience and/or beliefs are not a sufficient basis on which to make judgments about the accuracy of their own memory or someone else’s, and (c) the best way to reduce any negative effect is to use procedures that take the frailties of memory into account, which is the segue into the procedure recommendations. Best practices for eyewitness evidence procedures should be based on logic and research, not apparent intuition and past practice, and be consistent with the legal, moral, and ethical values we expect to prevail in the legal system. People’s intuition is famously prone to fallacies and bias, and the kind of objective, empirical perspective that has led to advances in so many areas of knowledge should be exploited in the context of identifying guilty suspects and saving innocent suspects from misidentification.

NOTES

1. The term *flashbulb memories* itself may contribute to the perceived accuracy of such memories, in that the name implies the existence of permanent and unchanging memories. Given that the distinctiveness of such memories lies more in their perceived, rather than actual, accuracy, the term *vivid memories* (Rubin & Kozin, 1984) has been proposed as an alternative.

2. We are indebted to an anonymous reviewer for pointing out these research findings.

3. In fact, President Bush is far from alone in believing that he had seen something he could not possibly have seen on September 11. Pezdek (2003) reported that 60% to 80% of American undergraduates, asked a mere 7 weeks after that date, made the same error in claiming to have witnessed television footage of the first attack on the twin towers on September 11. Similarly, Ost, Vrij, Costall, and Bull (2002) report that high numbers of British participants claim to have seen nonexistent footage of the car accident that killed Princess Diana.

REFERENCES

- Alexander, K. W., Quas, J. A., Goodman, G. S., Ghetti, S., Edelstein, R. S., Redlich, A. D., et al. (2005). Traumatic impact predicts long-term memory for documented child sexual abuse. *Psychological Science, 16*, 33-40.
- Brigham, J. C., & Barkowitz, P. (1978). Do “they all look alike”? The effect of race, sex, experience, and attitudes on the ability to recognize faces. *Journal of Applied Psychology, 62*, 311-318.
- Brown, R., & Kulik, J. (1977). Flashbulb memories. *Cognition, 5*, 73-99.
- Buckout, R. (1974). Eyewitness testimony. *Scientific American, 231*, 23-31.
- Christianson, S. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin, 112*, 284-309.
- Doyle, J. (2005). *True witness*. New York: Palgrave Macmillan.
- Ericsson, K. A., Delaney, P. F., Weaver, G., & Mahadevan, R. (2004). Uncovering the structure of a memorist’s superior “basic” memory capacity. *Cognitive Psychology, 49*, 191-237.
- Greenberg, D. L. (2004). President Bush’s false “flashbulb” memory of 9/11/01. *Applied Cognitive Psychology, 18*, 363-370.
- Haber, R. N. (1979). Twenty years of haunting eidetic imagery: Where’s the ghost? *Behavioral and Brain Sciences, 2*, 583-629.
- Haber, R. N., & Haber, L. R. (1988). The characteristics of eidetic memory. In L. K. Obler & D. Fein (Eds.), *The exceptional brain: Neuropsychology of talent and special abilities* (pp. 218-241). New York: Guilford.
- Leask, J., Haber, R. N., & Haber, R. B. (1969). Eidetic imagery in children: II. Longitudinal and experimental results. *Psychonomic Monograph Supplements, 3*, 25-48.
- Lilienfeld, S. O., & Landfield, K. (2008). Science and pseudoscience in law enforcement: A user-friendly primer. *Criminal Justice and Behavior, 35*, 1215-1230.
- Loftus, E. F., & Loftus, G. R. (1980). On the permanence of stored information in the human brain. *American Psychologist, 35*, 409-420.

- Loftus, E. F., & Palmer, J. C. (1974). Reconstruction of an automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior*, *13*, 43-57.
- Luus, C. A. E., & Wells, G. L. (1991). Eyewitness identification and the selection of distracters for lineups. *Law and Human Behavior*, *15*, 43-57.
- MacLin, O. H., Zimmerman, L. A., & Malpass, R. S. (2005). PC_Eyewitness and the sequential superiority effect: Computer-based lineup administration. *Law and Human Behavior*, *29*, 303-321.
- Maguire, E., Valentine, E., Wilding, J., & Kapur, N. (2003). Routes to remembering: The brains behind superior memory. *Nature Neuroscience*, *6*, 90-95.
- Munsterberg, H. (1908). *On the witness stand*. New York: Doubleday.
- National Institute of Justice. (1999). *Eyewitness evidence: A guide for law enforcement* (NCJ 178240). Washington, DC: U.S. Department of Justice.
- Niedźwieńska, A. (2004). Metamemory knowledge and the accuracy of flashbulb memories. *Memory*, *12*, 603-613.
- Ost, J., Vrij, A., Costall, A., & Bull, R. (2002). Crashing memories and reality monitoring: Distinguishing between perceptions, imaginations and "false memories." *Applied Cognitive Psychology*, *16*, 125-134.
- Pezdek, K. (2003). Event memory and autobiographical memory for the events of September 11, 2001. *Applied Cognitive Psychology*, *17*, 1033-1045.
- Porter, S., & Peace, K. A. (2007). The scars of memory: A prospective, longitudinal investigation of the consistency of traumatic memories in adulthood. *Psychological Science*, *18*, 435-441.
- Rubin, D., & Kozin, M. (1984). Vivid memories. *Cognition*, *16*, 81-95.
- Stebly, N. (2008). Commentary on "Studying eyewitness investigations in the field": A look forward. *Law and Human Behavior*, *32*, 11-15.
- Takahashi, M., Shimizu, H., Saito, S., & Tomoyori, H. (2006). One percent ability and ninety-nine percent perspiration: A study of a Japanese memorist. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *32*, 1195-1200.
- Talarico, J. M., & Rubin, D. C. (2003). Confidence, not consistency, characterizes flashbulb memories. *Psychological Science*, *14*, 455-461.
- Turtle, J., Lindsay, R. C. L., & Wells, G. L. (2003). Best practice recommendations for eyewitness evidence procedures: New ideas for the oldest way to solve a case. *Canadian Journal of Police and Security Services*, *1*, 5-18.
- Wagstaff, G. F. (2008). Hypnosis and the law: Examining the stereotypes. *Criminal Justice and Behavior*, *35*, 1277-1294.
- Wells, G. L. (1978). Applied eyewitness testimony research: System variables and estimator variables. *Journal of Personality and Social Psychology*, *36*, 1545-1557.
- Wells, G. L. (2006). Eyewitness identification: Systemic reforms. *Wisconsin Law Review*, pp. 615-643.
- Wells, G. L. (2008). Field experiments on eyewitness identification: Towards a better understanding of pitfalls and prospects. *Law and Human Behavior*, *32*, 6-10.
- Wells, G. L., & Luus, C. A. E. (1990). Police lineups as experiments: Social methodology as a framework for properly conducted lineups. *Personality and Social Psychology Bulletin*, *16*, 106-117.
- Wells, G. L., Malpass, R. S., Lindsay, R. C. L., Turtle, J. W., & Fulero, S. M. (2000). From the lab to the police station: A successful application of eyewitness research. *American Psychologist*, *55*, 581-598.
- Wells, G. L., Memon, A., & Penrod, S. D. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest*, *7*, 45-75.
- Wells, G. L., Rydell, S. M., & Seelau, E. P. (1993). On the selection of distracters for eyewitness lineups. *Journal of Applied Psychology*, *78*, 835-844.
- Wells, G. L., Small, M., Penrod, S., Malpass, R., Fulero, S., & Brimacombe, C. A. E. (1998). Eyewitness identification procedures: Recommendations for lineups and photospreads. *Law and Human Behavior*, *22*, 603-647.
- Wells, G. L., & Turtle, J. W. (1986). Eyewitness identification: The importance of lineup models. *Psychological Bulletin*, *99*, 320-329.
- Wigmore, J. H. (1909). Professor Munsterberg and the psychology of testimony. *Illinois Law Review*, *3*, 399-445.
- Yarmey, A. D. (1979). *The psychology of eyewitness testimony*. New York: Free Press.

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