Eyewitness Identification

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GLOSSARY

blank lineup (target absent lineup) A lineup in which all the members are known to be innocent.

cognitive interview An interview technique designed to enhance memory and communication of events through the use of guided retrieval techniques.

effective size The number of plausible members in a lineup.

encoding specificity principle If cues that were present at encoding are also present at retrieval, recall of stored information is more likely.

estimator variables Factors in eyewitness situations whose influence can only be estimated and are not under the control of the justice system.

eyewitness A person who observes an event and can provide information about that event.

lineup bias A lineup constructed in a manner that leads the suspect to stand out from the other lineup members.

mock witness A person who is not a witness to a crime but is asked to identify a perpetrator from a lineup based on another source of information, such as a verbal description.

postevent (mis)information Events that occur after a crime that influence eyewitness memories of the crime.

sequential lineup A lineup presentation procedure in which one lineup member is presented to the witness at a time.

showup The presentation of a single suspect to a witness in order to determine if that suspect is the perpetrator.

simultaneous lineup A lineup presentation procedure in which all lineup members are presented to the witness at the same time (i.e., in a line).

system variables Factors that may influence eyewitness memory and are under the control of the criminal justice system.

verbal overshadowing effect When the act of verbally describing a perpetrator decreases the witness's ability to accurately identify a perpetrator from a lineup.

An eyewitness's identification of a perpetrator is a prevalent form of incriminating evidence presented in a criminal case. However, eyewitnesses are frequently mistaken, and their errors have led to the conviction of innocent individuals. For more than a century, psychologists have sought to understand the variety of factors that may influence the accuracy of eyewitness identification. This article reviews the current state of

knowledge in the science of eyewitness identification according to the sequence of events that is likely to unfold from the time that an eyewitness makes an observation to the prosecution of the perpetrator of the crime.

1. INTRODUCTION

The testimony of eyewitnesses is an important factor in many criminal cases. Cases that hinge on eyewitness testimony can bring perpetrators of crimes to justice, set innocent people free, and enable the police and courts to carry out their prime societal responsibilities of preserving law and order. However, eyewitnesses are frequently mistaken, leading to the conviction and imprisonment of innocent people for crimes they did not commit. The extent of this problem is becoming clearer with the exoneration of innocent people through DNA evidence. According to The Innocence Project, a New York-based legal team that reviews case records of incarcerated individuals who claim their innocence, there are currently more than 140 documented DNA-exoneration cases in the United States. Mistaken eyewitness identification is generally the most frequent source of evidence used to convict an innocent defendant. Of the current database of DNA exonerations, approximately 85% are estimated to have involved faulty eyewitness identification evidence.

Acknowledgment of the dangers of eyewitness identification is not new. In England, for example, the Criminal Law Revision Committee of 1972 gave explicit recognition to this fact: "We regard mistaken identification as by far the greatest cause of actual or possible wrong convictions." Psychology and law researchers have long recognized the vagaries of eyewitness identification, conducting original empirical research from as far back as the late 19th century. This research has made a significant contribution to police and legal practice, partly because psycholegal researchers bring an empirical and scientific perspective to a legal problem, which is an approach that is quite unnatural for lawyers and jurists to take. In the current discussion of eyewitness identification, we structure our review, as far as possible, according to the sequence of events that is likely to unfold when an eyewitness makes an observation. The processes that eyewitnesses go through at each stage of the process can vary greatly, and the interests of researchers are quite different at each stage, as are the challenges they face.

1.1. Stages in the Eyewitness Process

There are three main stages of the eyewitness process: (i) perception of an event and the persons central to it, (ii) storage and assimilation of the information extracted from that experience, and (iii) remembering aspects of the experience and acting on it. Time delays between the first and third stages can vary greatly. Some information may be requested almost immediately, as when a witness at the crime scene is asked to describe an event or an offender. Other information may be requested much later, such as when a suspect is presented for identification and the witness is asked to make a complex set of judgments and decisions.

1.2. Categorization of Variables

Pertinent psychological variables differ at the various stages of the eyewitness process, and different bodies of theory and research may apply to each variable to understand them. Two important categories of variables are system variables and estimator variables, distinguished by Gary Wells in 1978. Estimator variables arise during the first stage of the eyewitness process and are those factors over which the criminal justice system has no control, whose degree and magnitude can only be estimated after the fact. By definition, these include attributes of the witness, the event, and the perpetrator, and they may involve such things as the opportunity the witness had to view the event and perpetrator, the state of mind of the witness at the time, the attentional constraints that have impinged upon the witness as a result of the demands made on the witness's attention, or any person variables (such as race or gender) that may have influenced memory performance. System variables, on the other hand, are under the control of the criminal justice system. These variables focus on the treatment of the witness, the manner in which law enforcement officers attempt to obtain information from the witness, and the interaction of person attributes with these processes. System variables occur at later stages of the process (e.g., the second and third stages), at the points where information is requested of the witness.

The demands on research vary depending on the stage of the witnessing process and the type of variable under study. For early stage estimator variables (such as the quality of memory encoding), an effective understanding requires one to simulate them in the laboratory or to study them *in situ*, in collaboration with law enforcement. The latter is rarely done. Law

enforcement generally has a very limited interest in and capability for studying these matters, although worldwide there are a few major law enforcement agencies that engage in research in this field. Many other estimator variables cannot feasibly be studied in laboratory simulations for ethical or logistical reasons, such as high levels of stress, fear, and violence. We review, in general terms, what is known about major estimator variables in this article.

System variables are quite different from estimator variables in that they are implemented in similar ways by law enforcement and researchers, and they act upon persons who have already been through the first stages of a criminal event. Thus, witnesses will naturally vary in the amount of information they have encoded about the event and the perpetrator. Witnesses in laboratory studies of system variables will often participate in crimelike events, but these are not intended as precise simulations of criminal events. Rather, they are merely ways of giving witnesses a temporal event, with some degree of complexity, and that includes information about an event and a perpetrator about which they might later be tested. Of most interest is the effect of various system variables (such as the structure of a lineup or the instructions provided to a witness) on the accuracy of information obtained from the witness.

1.3. General Research Assumptions

Generally speaking, the following assumptions underlie research in this area. First, all individuals function according to the same general set of psychological processes. For example, perception and memory do not work differently for different people in any fundamental sense, and the psychological processes that witnesses engage in do not fundamentally change in different contexts or situations. Second, information must be encoded at the time of the witnessed event for it to be reported later. If the witness does not attend to the event or to information within the event, then information about that event will not be available for subsequent recall or recognition. Any distractions of attention away from portions of an event will result in decreased encoding and therefore an absence of subsequent memory for such information. Likewise, attraction of attention to some elements will result in superior encoding of such information. Finally, the willingness of the witnesses to identify someone from a lineup involves a decision process that can be somewhat controlled by those administering the identification procedure. Although the specific factors leading to identification

may differ from person to person, the decision processes utilized are assumed to be highly consistent.

2. THE EVENT

An eyewitness is defined by an event: This is something he or she directly observes and will later be asked to provide information about. In order to study eyewitnesses, then, we need to study the kind of events to which they bear witness. However, witnessed events range from the mundane to the terrifying and are potentially infinite in their diversity. Eyewitness researchers are thus faced with the daunting task of understanding how eyewitness memory and related processes function across a wide range of possibilities. It is important to understand that eyewitness recognition and identification of the criminal offender is based (for the most part) on comparing a face (person or photo) shown to the witness with an image of a face stored in memory. In general, the lower the quality of the image stored in memory, the less likely an eyewitness is to make an accurate recognition decision. Any event or process that degrades perception (i.e., acquisition of the original image) also reduces the likelihood of a correct recognition or identification. The following factors contribute to a witness's opportunity to encode information about an event or an individual.

2.1. Time to View the Event/Perpetrator

The duration of the witness's exposure to the offender is related to later recognition performance, such that limiting exposure time generally reduces eyewitness accuracy. This has been shown in both laboratory and archival studies. Although a range of specific times has been employed across studies, it is difficult to calibrate specific time durations to specific levels of identification accuracy, particularly given the many other factors involved. Furthermore, it is difficult to accurately assess the time a witness had to view the perpetrator *in situ*, as studies have shown that witnesses' post hoc recollection of time estimates can be very inaccurate.

2.2. Distance from the Event/Perpetrator

The physical distance between the witness and the offender is also related to later recognition performance,

with longer distances leading to poorer rates of identification. Again, it is difficult to calibrate specific distances with specific levels of identification accuracy. In addition, witnesses can be very inaccurate at estimating the distance between themselves and the offender, so the information may not be helpful or reliable even if we were able to calibrate accuracy in a laboratory.

2.3. Visibility

Light levels (e.g., time of day) and obscured illumination (e.g., sun shining in the witness's face) have been studied by eyewitness researchers and shown to influence both perceptual and identification processes. Specifically, poor lighting and obscured illumination result in lower rates of accurate identification.

2.4. Stress, Fear, and the Presence of a Weapon

A witness's attention may be impaired or distracted if he or she focuses on the psychological stress or fear accompanying a criminal or otherwise traumatic event. Even if a witness tries to be attentive, high fear or stress may hinder the accuracy of subsequent identifications. Psychologists have often described the effects of stress or fear according to the Yerkes–Dodson law, which posits that very low or very high amounts of arousal are most likely to impede encoding and recognition. The presence of a weapon, which may be accompanied by stress or fear, has also been shown to divert a witness's attention away from the face of the offender. In general, the presence of a weapon reduces both the subsequent quality of the description provided by the witness and his or her attempts at perceptual identification of the perpetrator.

3. THE WITNESS

Individual eyewitnesses may differ along a number of dimensions or attributes, and it is natural to ask whether any of these attributes are relevant to an eyewitness' performance. Research has identified several important characteristics.

3.1. Witness Age

Although eyewitness memory remains relatively stable across a wide age range, it is less reliable for individuals in certain age groups. For example, very early in life, children demonstrate a limited ability to recall information and show lower accuracy in the identification of faces. They also have a proclivity toward choosing (or guessing) during a lineup identification task, leading to an increased likelihood of mistaken identification of an innocent person. By early teen years, their performance is generally indistinguishable, on average, from that of adults. Although children tend to recall less information when compared with adults, the overall proportion of correct information recalled does not typically differ. Older adults also become somewhat variable, but in the absence of a disease process (e.g., dementia), older adults are indistinguishable, on average, from younger adults. Sensory changes, such as cataracts or changes in the contrast or sharpness of vision, may affect an elderly witness's ability to gather and encode information about a situation or offender. Elderly adults also appear to be more susceptible to the effects of suggestive questioning or postevent misinformation than the average adult. Although children may also be susceptible to suggestion, this is presumed to be due to their unwillingness to challenge an adult's authority. The elderly are more likely to forget the sources of their information.

3.2. Alcohol and Other Drugs

There is very little research specifically on the effects of alcohol and other drugs on eyewitness memory for faces. Although research shows that alcohol somewhat impairs memory for verbal materials, its influence on face recognition or person identification tasks has varied across studies. Whereas some studies have shown no effect of alcohol on lineup identification, others have demonstrated impairment in both recall and lineup identification performance, particularly when witnesses consumed alcohol prior to viewing the event and arousal was limited. Of course, drugs that impair or disrupt perception necessarily impair encoding and memory process as well.

3.3. Witness Race, Gender, and Occupation

No reliable evidence demonstrates any general advantage or disadvantage in eyewitness memory or identification associated with the race, gender, or occupation of the eyewitness [although, it will be noted later that the race(s) or gender(s) of the eyewitness and perpetrator may interact]. However, men and women appear to differ in the type of information they recall about an

event. For example, women tend to recall more items such as clothing, whereas men focus on items such as the type of vehicle or weapon.

Law enforcement officers are commonly assumed to be superior at identifying faces and remembering the details of events. Although research has generally found that the level of experience police officers have, either in years on the job or through training, does not significantly enhance their recognition ability, it does have a positive influence on the quality of the descriptions they provide. Officers are generally able to provide more detailed accounts of an event, and they appear to be less susceptible to the effects of postevent (mis)information when compared to laypersons. Officers also provide more correct descriptive information about the perpetrator than do laypeople, without an increase in incorrect information, and tend to elaborate on action details more than laypeople. This elaboration on action details, however, must be weighed against officers' greater tendency to misperceive innocent actions as criminal in nature. Empirical studies attempting to train individuals to remember events and faces have demonstrated a similar pattern; namely, individuals' recall accuracy can be improved for details of an event, but it is difficult to improve recognition accuracy for faces.

3.4. Witness Confidence

Eyewitnesses will often claim to have great confidence in their ability to identify a perpetrator, but for more than 30 years, research examining the utility of confidence as a postdictor of accuracy has generally demonstrated a weak relationship between degree of certainty and identification accuracy. However, there are some conditions in which a stronger relationship may exist. Initial judgments made with very high confidence, for instance, have been shown to be quite diagnostic of witness accuracy.

Even though a witness's confidence may initially be related to the accuracy of the memory, that relationship can be changed dramatically by events that occur after the eyewitness makes a positive identification. If eyewitnesses are told immediately following a positive identification that they have correctly identified a suspect, not only does their degree of confidence increase but also their memory for the crime itself may change. For example, they may become more likely to report that they saw the criminal longer and under better viewing conditions than they had previously reported. In summary, although evidence exists for a relationship between confidence and accuracy under some conditions, confidence has been

shown to be quite malleable. Thus, a witness's statement of confidence, in general, may prove to be a poor indicator of identification accuracy.

4. THE PERPETRATOR

Thus far, we have considered only one of the main actors in the drama that unfolds when an eyewitness observes an event, namely the eyewitness himself or herself. The other actor is, of course, the perpetrator (or perpetrators) of the crime, and several factors have been shown to influence memory for the perpetrator.

4.1. Disguise

Disguises are frequently used during the commission of a crime, and their presence can significantly impair encoding of the perpetrator's face. Disguises may include masks, sunglasses, or anything that obscures significant portions of the face. In general, the upper portions of the face (e.g., eyes and hair) provide the most important information for later identification, and disguises that hinder the encoding of these parts of the face are more likely to prevent identification of the perpetrator.

4.2. Distinctiveness and Typicality of the Perpetrator

In general, typical faces are more difficult to distinguish from other faces in memory, resulting in a higher likelihood of false identification. In contrast, if the offender is distinctive in some way, recognition may be enhanced because the presence of unusual attributes (such as Richard Nixon's chin or Mikhail Gorbachev's forehead birth mark) can make a face easier to remember and help to distinguish it from other faces in memory. However, if the lineup identification procedure is carried out properly (as discussed later) the distinctive suspect will be placed among others who share the same distinctive attribute, requiring the witness to identify him or her without relying solely on the memorable attribute. If the witness's attention was previously drawn to the distinctive attribute, to the neglect of other attributes or away from a holistic perception of the face, then the witness's identification accuracy may be decreased.

Other facial attributes, such as attractiveness or facial "typicality," have been shown to increase the sense that a face has been seen before, resulting in an increase in

the rate of false identifications. There also appear to be a number of widely held stereotypes about general facial appearance, which influence the encoding of information about faces and may therefore influence lineup identifications by eyewitnesses. For example, faces that are stereotyped as "criminal" in appearance are more likely to be identified from a lineup.

4.3. Familiarity Due to Repeated Viewing

Not surprisingly, if the offender was previously unknown to the witness, recognition is less likely than if the offender was known to the witness. However, even when a perpetrator seems familiar, witnesses may not always be correct in their perceptions, especially if a sense of familiarity develops later in the investigative process. If the suspect was viewed committing the crime, the witness may have increased feelings of familiarity at the time of recognition and identification. However, if the suspect did not commit the crime, it is still possible that familiarity can develop after the witness views mug shots and photo spreads containing pictures of the innocent suspect. Following repeated viewings, the appearance of the suspect begins to seem familiar to the witness. Errors caused by repeated viewing have been attributed to errors in source monitoring, or source confusion. According to the source monitoring hypothesis, memory errors occur when a person attempts to identify where the memory (i.e., of the perpetrator) originated following the receipt of postevent information that leads the witness to erroneously attribute the new information (i.e., the innocent suspect) to the original witnessed event. For this reason, in-court identifications of a defendant provide little real evidence that the defendant actually committed the crime. Familiarity at this point has either been artificially strengthened (when the suspect is the offender) or created by previous viewing of the suspect's person or photo (when the suspect is not the offender).

4.4. Perpetrator Race and Gender

Although the race of the perpetrator alone generally has little influence on identification accuracy, when the race of the perpetrator and the witness are different, the interaction can impair identification accuracy. Studies of the cross-race effect or the own-race bias have shown that memory for same-race faces is generally superior to memory for faces of another, less familiar race. The effect has been consistently demonstrated over a 35-year period and has been reliably observed with various ethnic groups (e.g., Europeans, Southern Africans, Americans, Asians, and Hispanics). The cross-race effect is of most significance to the criminal justice system when individuals mistakenly identify a suspect who is not the perpetrator.

Although female faces are generally better recognized than male faces, a similar interaction between the gender of the perpetrator and witness has also been noted. Studies of the own-gender effect have demonstrated that female participants tend to outperform male participants in remembering female faces. Curiously, though, male and female participants do not differ consistently in their ability to remember male faces.

5. OBTAINING INFORMATION FROM THE WITNESS

Eyewitness accounts of criminal events play a vital part in solving crimes and prosecuting criminals, but research has shown that very little of what witnesses actually see ever gets reported to the authorities. One reason for this limited communication has to do with the manner in which information is elicited during police interviews of witnesses. Police interview techniques are often passed on from veteran officers to rookies or learned by trial-and-error on the job. Research has shown that even police officers without formal training tend to share similar interviewing styles, and police interviews of eyewitnesses are often very loosely structured. After requesting open-ended descriptions, officers frequently interrupt witnesses by asking specific, directive questions about the crime, typically pertaining to perpetrator height and weight. These questions usually elicit brief answers from witnesses and disrupt the flow of information. This directive interview style limits the information that witnesses convey and also appears to set up a dynamic between witnesses and officers in which witnesses wait passively for officers to direct the interview. As a result, information not specifically requested by the officer may never get mentioned during the interview, despite its importance to the case.

Interview methods can seriously influence the quality of information given by witnesses in other ways, producing information that is less accurate or even fabricated. A classic example of interviewer influence on witness reports comes from the highly publicized McMartin preschool case in which accusations of ritual child sexual abuse were made against seven preschool teachers.

Videotaped interviews revealed that the children were subjected to highly suggestive and leading questions. When these methods were applied in laboratory studies, children's false allegations greatly increased. Experiences such as the McMartin case and studies of actual police interviews reveal the importance of understanding the effects of interviewer influence on eyewitness reports.

5.1. The Cognitive Interview

One interview technique developed by psychologists explicitly for the purpose of enhancing the retrieval of eyewitness memory (and limiting the detrimental effects of interviewer influence) is the cognitive interview. Developed by Geiselman and Fisher in the early 1980s, the cognitive interview consists of four main components: (i) context reinstatement, which includes mentally reinstating the environmental and personal context of the original event; (ii) instruction to "report all" information including partial information, even if it seems unimportant; (iii) recounting the event in a variety of temporal orders; and (iv) reporting the events from a variety of perspectives. A wealth of research has investigated the potential benefits of this technique, both in laboratory and field settings. A meta-analysis of these studies revealed a large increase in the number of correct details elicited by the cognitive interview and a smaller, yet significant, increase in the number of incorrect details elicited. However, the meta-analysis also indicated that accuracy rates (i.e., the proportion of correct details generated) elicited using the cognitive interview were about the same as accuracy rates using traditional interview methods (84% for the cognitive interview and 82% for standard interviews).

In subsequent research, Fisher, Geiselman, and colleagues devised the enhanced cognitive interview, a modified technique that attempted to incorporate strategies such as rapport building to manage the social dynamics of communicating effectively with a witness. These changes resulted in further increases in the amount of correct information obtained, although some studies also observed significant increases in the amount of incorrect details. Additional research is warranted. Training law enforcement officers and others to consistently employ all the aspects of the cognitive interview has proved difficult.

5.2. Guided Memory

Research shows that when various aspects of the cognitive interview are broken down, context reinstatement instructions appear to play a vital role in the effectiveness of a cognitive interview. Context reinstatement takes place when witnesses are provided with contextual cues about the to-be-remembered event. The basis for the effectiveness of context reinstatement comes from Tulving's encoding specificity principle, which maintains that retrieval cues will enhance memory when the information contained in the retrieval cues matches information contained in the original memory trace. A meta-analysis of facial recognition studies revealed that context reinstatement strategies produce some of the most substantial benefits to identification accuracy.

The guided memory technique was primarily designed to utilize context reinstatement strategies for enhancing memory. This technique involves having witnesses visualize aspects of the event, including physical features and traits of the perpetrator, along with various emotions and reactions elicited by the surrounding event. Although this method has been effective in enhancing correct recognition of perpetrators, little is known about the effects of guided memory on description quality or accuracy. Nevertheless, the guided memory technique, along with other context reinstatement strategies, has been shown to enhance the retrieval of descriptive information from witnesses and offers a promising alternative to current interview techniques.

5.3. Generating Descriptions

Archival research has shown that although descriptions provided by witnesses are frequently vague and lacking in detail, they are generally quite accurate. The descriptors most often reported by witnesses relate to action events. Besides action events, witnesses are called on to provide person descriptions, crime scene descriptions (i.e., objects and environmental details), and accounts of what was said during the crime. With regard to the perpetrator, research indicates that witnesses are much more adept at describing character traits (e.g., he looked like an accountant) and psychological attributes (e.g., he was/looked crazy, kind) than physical aspects of a face, and that such global or holistic judgments improve subsequent attempts at recognition.

5.4. Verbal Overshadowing

Although generating a description of the perpetrator is regarded as a benign activity, studies have indicated that verbally describing a target face may have a detrimental influence on subsequent accuracy at lineup identification. This phenomenon is referred to as verbal overshadowing.

Witnesses who provide a description of a target face perform worse on a subsequent identification task compared to witnesses who did not provide a description. The effect occurs regardless of whether the perpetrator is present or absent from the lineup or whether the lineup is administered sequentially or simultaneously. The negative effect is most pronounced when witnesses are encouraged to adopt a liberal response criterion and to report their memory in great detail.

5.5. Postevent (Mis)Information

Many things can happen to eyewitnesses between the time they give their report to the police and the time they subsequently attempt a lineup or in-court identification. Some intervening events can adversely (or positively) affect their identification accuracy. Eyewitnesses may read newspaper reports about the event they witnessed, they may talk to other eyewitnesses about the same event, or they may be exposed to additional information during the course of the police investigation into the crime. This is known as postevent information. Its (potentially) strongly biasing effects on eyewitness testimony have been extensively investigated and documented by Elizabeth Loftus and colleagues.

5.6. Mug Shot Collections and Composite Reproductions

Following the initial interview with the witness, police may seek to obtain a potential physical likeness of the perpetrator by having the witness attempt to recognize the perpetrator from among a library of criminal mug shots or by having the witness create a composite image based on his or her memory.

5.6.1. Searching Mug Shot Collections

Mug shot collections are maintained by many law enforcement agencies for the simple reason that criminal recidivism rates are high, and many perpetrators have been photographed by the police on a previous occasion. Researchers have investigated the influence of searching mug shot collections on later identification accuracy. This question has very important legal ramifications since eyewitnesses who have been exposed to a mug shot collection prior to making an identification of a suspect from a lineup may be more susceptible to a source monitoring error, mistaking the intervening mug shot for the perpetrator. Some studies demonstrated that mug shot

exposure can "contaminate" an eyewitness's memory, but others did not. Legally, the fact that an eyewitness has been subjected to a potentially biasing and avoidable procedure may be enough to discredit that witness.

A second, often neglected, research question concerns the cumbersome manner in which mug shot searches are conducted. Typically, large collections of photographs are stored in albums (printed or electronic), leaving the eyewitness to page through several thousand photographs in a vain attempt to "spot" the perpetrator. Some researchers have tried to improve mug shot search procedures. For example, English researchers devised a description-driven system in the late 1980s called FRAME, which appeared to work quite well but was later criticized for depending on a limited database. For instance, there were very few mug shots of old men in the database; thus, it was comparatively easy to search the database for old men, inflating the accuracy rate. A similar, description-based system has been developed in Canada, and although it appears promising, there is not enough research to draw a definitive conclusion. Researchers in Hong Kong are exploring ways of structuring mug shot searches according to the physical similarity of faces, but initial results have been disappointing.

5.6.2. Making and Utilizing Composite Portraits

Law enforcement agencies in many parts of the world rely on practical technologies to help crime witnesses reconstruct likenesses of faces. These technologies range from sketch artistry to proprietary computerized composite systems such as Identikit, Photofit, E-Fit, Mac-a-Mug, Faces, and Comp-U-Sketch. Unfortunately, these technologies have not performed well under empirical examination. In most instances, they appear to produce poor-quality composites, which are difficult to match to target faces, even when the target is in full view of the witness. There was some hope that the move to computerized composite software would result in systems containing much larger libraries of features that would be easier to search and graphically "post process" (e.g., allowing the easy addition of specific facial features such as scars or alteration of the aspect ratio of a face). There is no evidence that computerized systems (e.g., Faces and E-Fit) lead to better reconstructions than "manual" systems (e.g., Identikit and Photofit), except when the target is in full view of the witness during the reconstruction, in which case there is a clear advantage for computerized systems.

Recent improvements in computing power have produced more versatile, mathematically sophisticated composite systems. Several groups of researchers are experimenting with "eigenface" systems that potentially allow witnesses to search limitless populations of faces with the assistance of genetic algorithms. Results are promising when witnesses are allowed to reconstruct faces while they are in full view but not from memory. There is evidence that verbal descriptions may be of more assistance to eyewitnesses than visual likenesses or reconstructions.

6. THE WITNESS IDENTIFICATION

6.1. Measuring Lineup Fairness

There are two key events for an eyewitness, as far as the law is concerned. The first is the event they witnessed, and the second is the identification of the person whom they saw commits the crime. When and how the second event unfolds is just as critical as the first because this identification will constitute the evidence against the defendant. Historically, eyewitnesses were primarily asked to identify perpetrators in court, but this practice is frowned upon nowadays since it is very suggestive (indeed, the witness would look foolish if he or she pointed anywhere but at the defendant). An alternative approach is for police to arrange an encounter between the eyewitness and the accused and to hope for a spontaneous identification (i.e., a "show-up" identification). This slightly less suggestible technique still jeopardizes the liberty of innocent people.

The most widely used alternative to in-court identifications in the United States, and in many other countries, is the "lineup," in which the suspect is placed alongside a number of men (or women) of reasonably similar physical appearance and demeanor, and the witness is asked to choose the perpetrator if he or she is present in the array. Police lineups originated in English criminal law and procedure, and it is clear that the notion of "fairness" is their raison d'etre. Lineups are intended to secure an identification that can potentially incriminate the perpetrator, but one that is fair to innocent people who might be suspects. Lineups are not invariably fair in everyday practice since innocent people have been convicted on the basis of eyewitness identification from a lineup. One of the strongest strands of eyewitness research is that investigating all aspects of the fairness of lineups, from their construction to their administration. An array of

methods and measures that can be applied to police lineups has been developed.

In a method known as mock witness evaluation, researchers ask people who did not see the crime event and are "blind" to the identity of the perpetrator (or innocent suspect) to try and identify the suspect in the lineup. This is usually achieved by giving mock witnesses a brief description of the perpetrator (preferably the very description the eyewitness gave to the police) and asking them to indicate the lineup member who best matches this description. If mock witnesses are able to identify the suspect at a rate greater than $1/k$ (where k is the number of lineup members), the lineup is said to be biased. The proportion of mock witnesses choosing the suspect is a measure of "lineup bias."

A second aspect of lineup fairness concerns the number of plausible foils it contains. There are records of police lineups in the United States and other countries where the suspect was the only representative of a particular race or ethnic group in the lineup. In such lineups, the suspect's identity is immediately suggested to the identifying witness. The number of plausible lineup members is referred to as the effective size and is distinguished from the nominal (or actual) size of the lineup. There are currently two measures of effective size in use: (i) a descriptive measure formulated by Malpass in 1981 and (ii) a closely related inferential measure formulated by Tredoux in 1998. For a lineup to be considered fair, it should receive favorable scores on measures of both lineup bias and lineup size.

The validity of lineup fairness measures has been evaluated in a small number of studies, with positive results. Lineup fairness is frequently assessed by researchers examining police lineups in specific legal cases. A small literature exists regarding proactive use of researchers in constructing lineups that meet fairness standards on a priori grounds. A substantial discussion of lineup fairness appeared in a special edition of the journal *Applied Cognitive Psychology* in 1999.

6.2. Lineup Instruction Effects

Some legal and criminal jurisdictions prescribe the instructions, or admonitions, that officers are to provide to eyewitnesses when presenting them with a lineup. The key question is whether these warnings have an effect on the rate of incorrect identification of innocent suspects, which is the main scourge of police lineups. Empirical studies have explored the effect of biased instructions, and several staged-crime experiments have shown that instructions that presuppose the

presence of the criminal in the lineup ("Point out the person who committed the offence") lead to much higher error rates than instructions that do not ("Note that the criminal may not be present. If the criminal is present, point him out"). The implication is that the instructions given to witnesses should be tempered quite carefully with a warning indicating the perpetrator's possible absence. Research comparing a set of clearly biased instructions with instructions usually given by the Los Angeles Police Department and a set of "more balanced" instructions showed an increase in mistaken identifications for the biased instructions but no such increase with either of the other two sets of instructions.

6.3. Alternative Strategies: Blank Lineups, Sequential Lineups, and Relative Judgments

That lineups produce high rates of false identification has been known for a long time, and researchers have puzzled over the causes. The cause was long thought to be that witnesses are led to frame their decision task as choosing the offender from among the people in the lineup, thereby selecting the best choice from among the alternatives presented. The witness enters the identification task presuming that the police would not conduct a lineup if they did not have a suspect firmly in mind and thus interprets the task as requiring him or her to identify the lineup member that the police suspect.

A number of additional strategies to reduce erroneous identifications, apart from the lineup instructions and admonitions discussed previously, have been proposed. One solution, suggested approximately 50 years ago by Glanville Williams, the famous English legal authority, is to present the witness with a blank lineup (a lineup known not to contain the offender/ suspect) to "trap" people who feel they must make an identification into making a harmless one. Witnesses who choose someone from this blank lineup are clearly mistaken and are dismissed as too unreliable to complete the main identification task. Only witnesses who do not pick from the blank lineup are presented with a suspect-present lineup. Studies have employed blank lineups in staged crime experiments and discovered that witnesses who choose a member of the blank lineup are almost twice as likely to make an incorrect identification from a subsequent perpetrator-present lineup and likewise only about half as likely to correctly identify the perpetrator.

There are a number of problems introduced by such an approach. First, blank lineups are not feasible in practice since the public would quickly learn that a lineup consists of two parts, only the second of which involves the real suspect, rendering the blank lineup ineffectual. Second, it burdens law enforcement with constructing twice as many lineups as they currently construct. (The use of modern computing systems and large mug shot databases may solve this problem in the near future.) Third, law enforcement resists "throwing away" a witness who has not yet been given a chance to view the suspect on grounds that a witness may make a choice from the blank lineup and subsequently, when presented with the suspect-present lineup, enthusiastically identify the suspect, claiming that he or she was mistaken before but is now sure this is the offender. Expecting police officers to forego the potential for this "evidence" might be too much to ask.

Another structural manipulation or alteration that has attracted a great deal of attention from psychological researchers is known as the sequential lineup. Instead of presenting multiple lineups in sequence, or members of one lineup simultaneously (exposing the witness to the suspect and a number of foils at the same time), the individual lineup members are presented one at a time and the witness is required to identify the perpetrator from the members of this sequence. Witnesses are led to believe that there are more photos to be seen than they are actually shown and are instructed to decide if each photo is or is not the perpetrator. This procedure is based on an analysis of the lineup task articulated by Glanville Williams in 1963 ("The witness may ... be inclined to pick out someone, and that someone will be the one member of the parade who comes closest to his own recollection of the criminal") and psychologically interpreted by Rod Lindsay and Gary Wells in 1985. They suggested that the structure of the conventional police lineup (all members presented at once) invites witnesses to compare the members of the lineup to one another and identify the person that "best matches" the witness's memory, leading to a decision based not on the virtual correspondence of the witness's memory of the perpetrator to one of the lineup members but on the relative correspondence of the lineup members to the witness's memory, a relative judgment strategy. Presenting lineup photographs sequentially is said to inhibit eyewitnesses from relying on relative judgments and, instead, fosters absolute judgments made by comparing their memory of the perpetrator with each lineup member. Empirical studies have demonstrated that the use of sequential lineups can reduce false identifications and increase correct rejections of lineups that do not

contain the perpetrator, although a significant reduction in the rate of correct identifications in lineups that do contain the perpetrator has also been noted.

The apparent advantages of sequential lineups has made them attractive to law enforcement authorities in some jurisdictions, and they have been promoted very actively to law enforcement by some members of the eyewitness research community. Research on sequential lineups has been very important, but there is also controversy over whether the research has been extensive and careful enough to warrant promotion of sequential lineups as a replacement for traditional police lineups.

6.4. Lineups Involving Other Sensory Modes

The lineup is usually a test of visual memory, but most legal systems also recognize that additional cues to identity may reside in the voice, mannerisms, and gait of the perpetrator.

6.4.1. Earwitness Identification

The case of voice identification has attracted much attention in the research literature. The most pertinent finding has been that familiarity of the voice plays a key role in identification, and that identification of unfamiliar voices is prone to yield alarmingly high false-alarm rates. Unfamiliar voices are very difficult to recognize and especially easy to confuse. Similar to the own-race bias in facial identification, several studies have observed that voices of another, less familiar race are also more difficult to recognize. In addition, a witness's memory for the voice of the perpetrator is equally susceptible to the many estimator variables discussed previously, including opportunity to hear the voice clearly and various factors that may draw the witness's focus of attention away from the auditory stimulus.

6.4.2. Multimode Lineups

Lineups typically used in Western countries restrict the presentation of the lineup to one mode, most frequently involving visual presentation. However, cues from a single (sensory) domain may be degraded with respect to the original context (e.g., physical disguise), and it is easier to identify the perpetrator with the assistance of cues from other domains. Researchers have begun to explore the utility of multimode lineups on witness identification performance. Although there is little

published research, the idea of allowing witnesses access to cues that are not solely visual in nature is already in practice in Sweden. The lineup is formed in a room in which lineup members are allowed to sit down, smoke, communicate, and behave in general as they ordinarily would over an extended period of time. These individuals are then viewed by the witness from behind a one-way mirror, and members of the lineup are not aware when the witness is present. Unfortunately, no systematic evaluation of this strategy has been performed.

6.4.3. Live vs Photographic Lineups

Lineups currently differ within single sensory modes, such as the practice of eliciting identifications from photographic lineups as an alternative to corporeal (live person) lineups. In many areas of the United States, for example, photographic lineups are favored over corporeal lineups. In many foreign jurisdictions, however, identifications from corporeal lineups are required if eyewitness identification evidence is to be presented in court. Intuitively, corporeal lineups would seem to have an advantage: The detail to be obtained from a live inspection of the suspect must surely exceed the detail present in a photograph. However, the consensus from several studies is that there is either very little difference between the capacity of photographic and corporeal lineups to elicit identifications or no difference at all. An extensive review of the literature reported no notable difference between live, video, or photographic lineups. There is no evidence to suggest that media that embellish cues will aid identification accuracy or reduce false alarms.

7. THE PROSECUTION

After the police obtain a positive identification from the eyewitness that their suspect is indeed the perpetrator, they are ready to hand the case over for prosecution. The district attorney (or attorney general or director of public prosecutions) may decide not to prosecute, but in most jurisdictions eyewitness identification is considered strong evidence against the perpetrator and the case will proceed to court. A number of factors in the court process can influence an eyewitness's accuracy and can change the impact that an eyewitness's testimony will have at trial. For instance, the prosecution (or defense) can pose leading questions to the witness, eliciting false recollections, or an

expert can be called to testify on the vagaries of eyewitness identification. In the following sections, some of the research on two potentially important factors is summarized. First, we briefly discuss a debate that concerns the role and value of expert testimony by eyewitness researchers in legal trials. Second, we discuss research that has examined the effectiveness of jurors in assessing the reliability of eyewitness testimony at trial and whether juries benefit from expert assistance on eyewitness memory.

7.1. Expert Testimony

Many researchers have offered expert testimony to the courts in cases in which eyewitness evidence has been at issue, although this undertaking has been somewhat controversial within the discipline of psychology. A variety of arguments have surfaced on this issue, including disputes over the consistency of findings and the adequacy of current knowledge for presentation to the courts. Several surveys of researchers and experts in the eyewitness literature by Saul Kassin and colleagues have attempted to address these concerns by identifying areas of agreement. In 1989, this survey revealed that the following areas were considered "reliable" by the majority of respondents: limited exposure time, lineup instruction effects, prior expectations on the part of the witness, postevent misinformation, and the weak relationship between confidence and accuracy. An update to this survey of experts in 2001 demonstrated some additions to this listing that included confidence malleability, mug shot-induced biases, child witness suggestibility, the effects of alcohol intoxication, the cross-race effect, the weapon focus effect, forgetting over time, and lineup presentation manipulations (simultaneous vs sequential lineups). Given the developing nature of the science of eyewitness identification, it is reasonable to assume some shifts in experts' opinions regarding various phenomena. Nevertheless, Kassin and colleagues noted the remarkable consistency in ratings across the two surveys for the majority of topics covered.

7.2. Jurors' "Common Knowledge" of Problems with Eyewitness Identification

One basis for rejecting an eyewitness expert's testimony in court is the belief that factors affecting the reliability of eyewitness identification are common knowledge to the lay juror. Researchers have sought to determine exactly what laypersons know about factors affecting eyewitnesses. Three basic methodologies have been used to investigate this information: (i) surveying jury-eligible citizens as to their knowledge and beliefs, (ii) assessing jurors' ability to predict the outcome in an eyewitness identification experiment, and (iii) using mock trials to assess the influence of trial techniques (such as cross-examination of the eyewitness or the presence/absence of expert evidence on eyewitness memory).

First, survey studies have been conducted by administering questionnaires, such as the Knowledge of Eyewitness Behavior Questionnaire, in order to assess beliefs about factors that affect the accuracy and reliability of eyewitness identification. The results of such studies have demonstrated that respondents appeared insensitive to such effects as the age of the witness (young or old) and the retention interval prior to identification, and that respondents tended to believe (contrary to research findings) that training could improve identification accuracy. Second, studies have asked participants to read written summaries of identification experiments and then to "postdict" the accuracy of participant–witnesses. Results in such studies have indicated that participants overestimate accuracy rates, suggesting that individuals often believe witnesses to be much more accurate in their judgments than they truly are. Finally, research employing the "mock trial" as a method for assessing jurors' commonsense knowledge has manipulated different factors known to influence, or not to influence, identification accuracy and then assessed whether participant–jurors are sensitive to these factors in their verdicts. A common outcome is that witness confidence is given too much weight, with jurors believing confident witnesses to be more accurate, which may not necessarily be the case. In contrast, jurors failed to assign sufficient weight to other factors, such as opportunity to observe the perpetrator or the presence of a weapon, which should have been considered. Taken together, this research appears to demonstrate that lay jurors lack the requisite knowledge to appropriately evaluate eyewitness identification evidence, and that expert witnesses may be useful for providing such information at trial. Several studies have also attempted to assess the benefits of expert testimony within the mock trial paradigm. Their results have generally shown that exposure to an eyewitness expert leads jurors to more appropriately weight identification evidence based on factors known to influence the reliability of an identification.

8. CONCLUSION

In a 1978 paper that has been extraordinarily influential in the eyewitness literature, Gary Wells argued that the quintessence of eyewitness research is its application to a legal problem and advised that it is incumbent on eyewitness researchers to show the practical utility of their research. This approach has indeed yielded great rewards: One of the most important pieces in the eyewitness literature is the coconstruction of guidelines by psychologists, lawyers, and criminal justice professionals for collecting evidence from eyewitnesses, sponsored by the National Institute for Justice.

There is a cost, though, to the near-exclusive applied research focus taken by eyewitness researchers. An applied focus typically leads to research that is interested in improving practice (e.g., lowering the rate of false-positive identifications) but is less concerned with explaining how and why a particular intervention works. For example, we know that the sequential lineup returns a lower rate of false positives than the traditional police lineup, but we do not have a good answer for why this is the case. In general, eyewitness research has not appreciated the value of theoretical explanations and models. This is not surprising given the explicit applied orientation of researchers in the area, but it may now be time for researchers to redress the imbalance. A key reason for promoting such a redress is the belief that the applications that stem from applied eyewitness research could be more powerful if they were based on an explanatory model. If we understood the mechanism, for instance, that makes conservative instructions reduce the false-positive rate, then we might be able to design alternative forms of lineup that maximally reduce this rate.

We do not wish to propose that eyewitness research jettison its applied orientation: On the contrary, we wish to strengthen that orientation. The question is how this should be done. Our contention is that a return to the laboratory might, paradoxically, create a stronger applied foundation for the discipline.

See Also the Following Articles

Forensic Mental Health Assessment ■ Interrogation and Interviewing

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