

## 9

---

# Forensic Applications of Line-Up Research

---

Gunter Koehnken

*University of Kiel*

Roy S. Malpass

*University of Texas, El Paso*

Michael S. Wogalter

*North Carolina State University*

### LOGICAL FOUNDATIONS FOR THE IDENTIFICATION OF INDIVIDUALS

An incident that happened to one of us (RSM) may be an appropriate starting point for this discussion. But imagine that it is happening to you. While jogging across a university student parking lot, you observe three young men excitedly looking through the contents of a car. While you are still perhaps 50 meters away one sees you jogging toward them, and two of the three quickly run away. As you approach the car the third understands what has happened, and also runs away. But now you are close enough to see his face very clearly. You look into the car and see the contents of the glove box strewn around, and it seems clear that the three have broken into someone's car to steal something. Because the university security office is nearby, you jog there and report that a student car has been broken into. Further, you tell them that the three offenders ran off in the direction of the local high school. A security officer examines the car, and calls the local police. Now the problem for the police is to nominate a suspect(s) for this offense, collect whatever evidence can be had, and obtain an identification from you, the eyewitness.

This problem can be approached in a number of ways. So soon after the witnessed event you might be asked to go with the police to the high school to see if you "see" the offender(s). This is just what happened. It was a rainy day, and the offender was wearing a bright yellow raincoat (one among hundreds), had hair that was dark from being wet, which hung in his face, and which would now be dried

and combed. One person who looked remarkably like the offender was sitting near the school door, in a lobby, but there was no sign of a raincoat, and his hair was dry. The clothes under the raincoat had never been observed. The police asked whether this was the person who had been observed exiting from the broken into car.

Such an identification request is often called a show-up. One person is offered to the witness with the option to identify this person as the offender, or not. Often it is objected that this form of identification is "suggestive" (Malpass & Devine, 1984). If the witness, for whatever reason, feels constrained to make an identification, perhaps to be helpful and confirm the perceived beliefs of the investigating officer, the suspect is given the entire weight of the risk of false identification. In the example just presented, many factors were changed. The coat was present during the initial observation, but not during the subsequent viewing. The hair was of a different form and color due to initially being wet and subsequently dry and combed. What we know about the effect of disguise (see Malpass, this volume; Sporer, 1993a) and the importance of aspects of hair as identification cues in facial recognition studies tells us that by now the appearance of the person on the two occasions is sufficiently different to cause the witness to be reluctant to say that the second viewing is of the same person as the first.

But what if some innocent young man were to walk in the door with dark wet hair in his face, wearing the very same kind of yellow raincoat? The elements of similarity now are considerable, and if the face is reminiscent of the original event in some way there is a real risk of a false identification. Although it is clearly in our interest to identify and charge petty criminals like this, it is also in our interest not to start innocent young men out in life with the shadow of a criminal identification in their past. How can we accomplish both of these goals at once?

We can imagine a cartoon in which 10 young men appear in a line together, all in identical yellow raincoats, and in which a police officer is pouring a bucket of water on their heads in turn, with the eyewitness waiting in the wings. Although this nascent cartoon has its elements of humor, it also has its elements of truth. What is at issue, for the police and the eyewitness, is whether the identifiable features that have not changed between the initial observation of the offense and the subsequent observation of a suspect are sufficiently similar for the witness to claim that both observations were of the same person. In the instance described this may be very small residual amount of information. Yet it is not unusual for identifications to be made in situations like this. How do we protect the innocent suspect from the risk of such a misidentification? What is needed is a situation where only that residual set of common information (to the extent that it is discernible) is the basis for the witness' identification decision. At this point, pouring water over the heads of line-up members begins to look like a more attractive strategy.

Let's assume that there is little basis for making an identification through facial recognition alone, but that there is a high probability that the witness will perceive that the police officer knows the young man sitting in the high school lobby, and suspects him of being connected with similar offenses in the past. If the witness makes an identification it will tend to confirm the beliefs of the officer (and other

noneyewitnesses). One way to reduce the risk of an erroneous identification of an innocent suspect is to test the eyewitness' memory with the suspect arranged among a group of other individuals. All of these individuals should share (a) the physical characteristics described in the eyewitness's initial verbal report of the offender, and (b) the physical characteristics of the police suspect so that he does not stand out in some way from the group. Given a line-up meeting these two criteria, it would be up to the witness to pick the suspect out from a group of other known-to-be-innocent persons. False identification of an innocent suspect is decreased as the risk has been spread over the other persons in the line-up. The water on the head procedure begins to look even better.

Now let us offer some generalizations. Eyewitness identifications are made in a world where many (perhaps most) times the appearance of the offender will have changed between the observation of the offense and the request for identification. The identification of the offender should be made based on the common elements that are similar from the first to the second occasion. But there may be some elements in common by chance in different people, creating the possibility that an innocent person can be identified because of similar features.

There are other aspects of the identification situation that put an innocent suspect at risk of identification. Most people do not like to make incorrect judgments, and it is common to look for corroboration of evidence. So if we can find additional information that will tell us, independently of our own judgment, who is the guilty person, we might use that information to guide our decisions. Unless the police officer is careful in carrying out line-up procedures, certain kinds of information may be revealed to the witness that should not be present in fair line-ups. The goal is to keep the line-up procedure uncontaminated so that the suspect is not influenced about what certain others may think is the correct choice.

This provides a very demanding specification for the memory test that is an eyewitness identification. The identification must have the following characteristics:

1. It must be based on the contents of the witness' memory of the initial observation of the offense.
2. Accidental similarities between the attributes of the offender and the suspect must not be allowed to determine whether an identification will be made.
3. Information about the identity of the police suspect or the choice favored by others must not be available to the witness.
4. Influences on the witness to make or not make an identification must be minimized.

In general, the process of an eyewitness identification should be constructed so that the identification can only be attributed to the similarity between the individual presented for identification and the witness' memory image of the offender

In this chapter, we treat the potential errors that can be made during the recognition of individuals, which can limit the reliability of the identification or render it worthless. We have limited ourselves to the cases in which the witnesses

are cooperative and willing to give honest testimonies. We examine what types of unintentional errors occur during the identification process and their causes. Intentionally false or nonidentifications are not discussed.

### PREPARATION FOR LINE-UPS AND PHOTO SPREADS

Valid implementation of eyewitness identification using line-ups and photo spreads demands especially careful preparation. Once a mistake is made, it cannot be corrected. An identification of a suspect under suggestive conditions early in an investigation cannot simply be rectified by later conducting a fair line-up. Various psychological mechanisms result in the witness retaining the effects of errors made in previous recognition tests. There are no procedures that can reliably rule out the possibility that earlier mistakes will be maintained at a later identification.

Flawed line-ups or photo spreads can lead to innocent individuals being falsely convicted and punished. A positive identification made under biased conditions is not valid evidence and therefore, may lead to the acquittal of an actual offender due to lack of substantial evidence. An unfair line-up is not only unfair with respect to an innocent suspect, but it is also unfair to crime victims when a conviction can not be made because the line-up was thrown out by the court because it was poorly constructed. These possible consequences of improper recognition tests should be kept in mind as we discuss potential sources of error in recognition procedures and how to avoid them in the following sections.

A false identification can have three different causes: On the one hand random error may occur. In this case, the witness chooses the suspect purely by chance. Any other member of the line-up was just as likely to be selected as the alleged offender. Second, error may result from factors unknown to the investigator (e.g., from misleading postevent information obtained by the witness). The third possible cause of false identifications is systematic error. A systematic error occurs when certain properties of the line-up procedure or the composition of the line-up group leads the witness to choose the suspect even if the suspect is not the criminal.

In the following section, we first discuss the problem of random error and introduce measures for preventing this type of error. Then we discuss the most important systematic errors that may occur in the construction and execution of line-ups and photo spreads.

### PREVENTION OF RANDOM ERROR

What happens when a witness has a very weak memory or no recollection at all of what the culprit looked like? Under these circumstances, an "ideal" witness would realize that he or she cannot remember any more and therefore, cannot recognize any of the individuals present in the line-up. Unfortunately, we are not always dealing with ideal witnesses. A witness may want to present him or herself as a "good," constructive person, who can help the police catch the offender and thereby

solve the crime. Sometimes, witnesses feel themselves to be "failures" when they cannot recall what the offender looked like. Further, witnesses tend to see the whole line-up procedure as a technique to convict an already sufficiently well-known criminal (e.g., Buckhout, 1974; Doob & Kirshenbaum, 1973; Malpass & Devine, 1981, 1984). In the erroneous belief that the police are best served by a positive identification of one of the individuals in the line-up, they may choose the individual who most resembles the fuzzy picture of the offender in their memory. As long as no systematic errors are made that would direct the witness' choice to a specific individual the selection is likely to be more or less random.

There really are two problems here. The first is to test the memory of the witness. The reasoning is to structure the identification so that the witness' response to the identification situation allows us to infer whether the witness saw the suspect commit the offense in question. Let's consider some possibilities. We might show the suspect, alone, to the witness. But then if the witness felt compelled to make an identification, for whatever reason, it would not be possible to evaluate its validity. The identification could have occurred because the suspect was the offender, or for other reasons.

An alternative would be for the witness to see two people, the suspect and another person who is generally similar in appearance to the description of the offender (if any) and similar in important respects to the suspect. If the witness chooses the nonsuspect (generally called a *foil*) then he or she has failed the memory test. But there still is a 50% chance of a random identification of the suspect, so an identification of the suspect is not yet as informative as we would like. A highly informative identification would occur when the suspect is chosen from among a large pool of alternatives, so that the identification is quite unlikely to occur by chance alone (Cutler, Penrod, & Martens, 1987; Cutler, Penrod, O'Rourke, & Martens, 1986). This remains a preferred ideal, but assembling large line-ups is impractical in many settings. The use of photos or, better yet, videos are alternative ways to deal with this problem (see later).

The other problem is the protection of the rights of the suspect. Protection against false identification is a central part of the law and of identification practice. One of the purposes of a line-up is to reduce the risk to the suspect of false identification by including a number of innocent persons who can draw false identifications. The reasoning is similar to that presented here, and the solution is the same. Presenting to a witness a fairly large number of alternatives to the suspect serves to protect the interests of an innocent suspect and at the same time to test the validity of the witness' memory.

This line of thinking assumes that there is only one suspect in any given line-up, and this is an important assumption. When a line-up consists entirely of suspects (as it is sometimes the case in offenses with a large number of people involved) there are no real alternatives at all. When a witness randomly chooses one of the individuals, he or she will always choose a suspect; therefore, the risk of random error is 100%. Consequently, a line-up without foils (either a show-up or a suspect-only line-up) does not provide valid evidence (Wells & Turtle, 1986).

### Evaluating the Validity of Line-Up Foils

It is not sufficient to increase the line-up size by adding just any foils. If the criminal had been described as a young dark-haired man, gray-haired old men would not be real choice alternatives. The line-up size could be increased by an infinite number of these foils without affecting the risk of a random false identification.

There is a small literature on how to evaluate the number of valid foils in a line-up, but there are some difficulties inherent in this process. An overview of this problem is provided by Malpass and Devine (1983), and recent work evaluating some of the procedures by Brigham, Ready, and Spier (1990) is directly relevant. Generally, the approach is to determine for each foil whether it differs from the frequency of identification it is expected to have under the assumption of random/chance responding. Here is the kind of reasoning involved.

Any foil should be indistinguishable from the suspect to someone who did not see the offender. Therefore, "pseudowitnesses" or "mock witnesses" (people who did not see the offender) should choose each of the foils at a rate expected by chance ( $1/n$  where  $n$  = the number of persons in the line-up;  $n$  is also called the "nominal size" of the line-up). Thus, in a totally fair six-person line-up, each of the foils as well as the suspect should garner  $1/6$  (or 16.7%) of the mock witness' choices. The standard that all foils should draw an equal number of "identifications" from mock witnesses is very difficult to achieve with live line-ups (also called identification parades), because of the number of people who would have to be evaluated before an acceptable group of foils could be found. With photo spreads or video line-ups it is more easily achievable.

A convenient rule of thumb to use would be to establish some percentage of the expected chance identification rate (e.g., 75%) and then dismiss any foil that failed to reach that level in a mock witness study. Likewise, any foil who draws an excessively high frequency of identification (a "superfoil") will draw identifications away from the suspect, and perhaps decrease the likelihood of a valid identification of a guilty offender (if present). A standard for a percentage of chance expectation should also be established on the high side (e.g., 125%). These percentages are just guidelines that could be used in practice; there is no standard for determining the acceptable percentages of the expected chance identification rate to use in the process of selecting foils.

### The Value of Independent Witnesses

The risk of a false identification (random error) can be substantially reduced if two or more witnesses are available. If they recognize the suspect independently of each other (this is essential), the multiplication rule of independent probabilities applies for the calculation of a possible random error. According to this rule the probability for the occurrence of two or more independent events equals the product of the single probabilities of each event. As illustrated in the previous section, the probability of randomly selecting any one individual from a line-up containing six persons is  $1/6$ , or .167 (16.7%). However, if two independent witnesses choose

the same individual from a line-up with six persons, the probability for both choices combined is  $1/6 \times 1/6 = 1/36$  or .028 (2.8%). Two or more independent identifications result in a size of possible random error that would otherwise only be achieved by a single witness with a line-up containing 36 people.

To summarize, the informational value of an identification is higher with both (a) larger line-up sizes, and (b) increasing numbers of witnesses who have independently identified the same individual, provided the line-up is in no way biased toward the suspect.

### PREVENTION OF SYSTEMATIC ERRORS

A *systematic error* is present if the identification is affected by factors apart from the similarity between the witness' memory of the offender from the original event and the physical appearance of the individual selected. It should be emphasized that the mere possibility of such influences strongly calls the identification into question, and may even fully invalidate the identification as evidence. The reasoning behind this is direct.

A line-up is designed and conducted in order to test the hypotheses that (a) the suspect is the guilty party, and (b) the suspect is not the criminal (null hypotheses). The line-up recognition test thus resembles an experiment and the general methodological principles for experimental research and hypotheses testing apply (Koehnken, 1984; Wells & Luus, 1990a). One important implication of this view is the fact that a result cannot be interpreted unambiguously whenever an alternative explanation than the one stated in the hypothesis could account for the outcome. Assume, for example, that the suspect was the only person in the line-up wearing handcuffs. Under such circumstances the possibility exists that an eyewitness identifies the suspect even if he or she were completely innocent, simply because the fact that a person is wearing handcuffs strongly implies that this is the suspect. Thus, the identification response may not be determined by the similarity between the eyewitness' image of the criminal in memory and the appearance of the suspect presented in the line-up but instead by inferences drawn from the line-up procedure. This would constitute a possible alternative explanation for the outcome. As a consequence, it is impossible to unambiguously conclude from the test outcome (the identification response) that the suspect is indeed the guilty party. Therefore, the mere possibility of an alternative explanation is sufficient to invalidate the identification. It is not necessary to positively prove that this alternative factor did indeed produce the outcome. Proof of the effectiveness of a potential confounding variable is impossible to construct in the case of a single witness and a single identification.

#### Types of Systematic Errors

We can distinguish two types of systematic errors:

1. The composition of the line-up or the arrangement of the photographs can lead to the suspect standing out from the other individuals. Malpass and

Devine (1983) referred to this as a *structural error*. A structural error is present, for example, if the suspect is the only one in the line-up who is unshaven or has long hair.

2. Errors can occur during the procedure of the recognition test that would lead the witness to select the suspect. In this case we are dealing with a "procedural error." For instance, when a witness can observe the suspect being accompanied to the line-up by two police officers and sees the rest of the members of the line-up appear without an escort, then a procedural error is present because the witness can easily conclude from the police escort that the person being accompanied is most likely the suspect.

### **Structural Errors and the Selection of Alternatives for a Line-Up**

In a fair line-up or photo spread, the suspect does not stand out from the foils. The importance of a fair line-up is illustrated in an experiment by Lindsay and Wells (1980). Subjects were witnesses to a mock crime, following which they were to identify the offender in a photo spread. Some subjects were shown a photo spread that did not include a picture of the culprit. In these target-absent photo spreads, the offender's picture was substituted with another picture that was either similar to the other alternatives or noticeably different from the rest. Thirty-one percent of the subjects identified the uninvolved substitute as the alleged offender when he was similar to the other individuals. However, when there was a discernible difference between the substitute and the other alternatives, then more than twice as many subjects (70%) identified the substitute.

In this context, an apprehension is sometimes expressed, that too much similarity between the suspect and the foils may hinder the identification, and perhaps, decrease the likelihood that an identification of the actual offender will be made. A study by Lindsay and Wells (1980) indicates that this fear is unfounded. Greater similarity protects innocent individuals from being falsely identified because witness' choices are more likely to be distributed among all of the line-up members. When the suspect is really the culprit then he is just as likely to be identified in a line-up with similar compared with less similar alternatives. However, when the suspect is innocent then similarity protects the suspect by decreasing the likelihood that he will be chosen. Thus, greater similarity between the suspect and the alternatives increases the value of an identification as evidence.

Clearly, however, level of similarity between the suspect and foils must be necessarily less than maximum; otherwise, all of the members of the line-up will be identical (clones of the suspect). This extreme level of similarity is not normally a problem because other than identical twins, no two persons are identical in appearance. Nevertheless, there still may be a problem with high similarity line-ups as they may confuse witnesses.

Recent research also casts a shadow on similarity to the suspect as the sole criterion for foil selection (Laughery, Jensen, & Wogalter, 1988; Wogalter &



Jensen, 1986). In one experiment reported by Laughery et al. (1988), face stimuli were assembled by random selection of feature sets using a computer-assisted face composite system (Mac-a-Mug Pro). Photo spreads were constructed by first generating a target ("suspect") face for each line-up, followed by a set of five foil faces each differing from the target by one feature (e.g., one having a different nose, another a different mouth, etc.). Thus, in this experiment, the line-ups were constructed so that the target was more similar to the foils than the foils were to each other (the foils differed among themselves by two features).

Laughery et al. (1988) then presented the line-ups to subjects who had never seen any of the faces before (mock witnesses) and asked them to rate each line-up face according to how familiar each looked. The results showed that the targets were judged as appearing significantly more familiar (as having been seen before) than would be expected by chance. This study suggests that line-ups based solely on the similarity of the foils to the suspect make the suspect stand out in an unexpected way. The suspect stands out because it is the most similar face in the line-up. Thus, selecting foils similar to the target in order to avoid distinctiveness, also can produce another form of distinctiveness. However, because of the extremely high similarity between the target and foils in the Wogalter and Jensen (1986) and Laughery et al. (1988) studies, they might be questioned in terms of forensic relevance. In a follow-up study, Marwitz and Wogalter (1988) and Wogalter, Marwitz, and Leonard (1992) used more realistic line-up construction procedures and permitted many more facial features to vary.

Wogalter et al. (1992) used actual photographs of faces. In the initial phase, subjects were given a suspect face and were asked to construct six-person line-ups using foil pools of 25 faces. In selecting the five line-up foils from this pool, subjects were told to select the five faces that most closely resembled the suspect. Later, another group of subjects who had never seen any of the faces before were given the line-ups and instructed to guess the suspect from each of the line-ups. The results of four experiments showed that mock witnesses were able to select the suspect significantly more often than predicted by chance alone—indicating a bias toward the suspect in these line-ups.

Wogalter et al. (1992) also investigated whether this similarity bias could be reduced in line-ups constructed using alternative methods. Three slightly different alternative methods were examined. In one method, participants constructed line-ups by selecting the face (first foil) that was most similar to the suspect, then selected the remaining foils so that they resembled both the suspect and the first foil. In the second alternative method, participants constructed line-ups by selecting two foils most similar to the target and two foils most similar to a randomly selected (first) foil. In the third method, participants were told of the similarity bias problem when all line-up foils are selected exclusively on the basis of similarity to the suspect. These participants were then told that their goal instead was to construct line-ups in which all faces are equally similar to each other. They were told to start constructing the line-up by selecting a foil that most closely resembled the suspect, then to select the next foil that most closely resembled both the target and the first foil and so on. But the instructions also emphasized that they were free to replace

any previously selected foil with another foil at any point, with the goal that the final line-up contained a set of faces in which each of the foils resembled each other and the target equally. Later the completed line-ups were shown to mock witnesses who were told to guess which face is the suspect in each line-up. The results showed suspects in the alternative line-ups were not selected greater than chance and were significantly less biased compared to conventionally constructed line-ups that were based exclusively on target-to-foil similarity. The alternative methods, which were not based exclusively on the suspect's appearance, had greater foil-to-foil similarity than conventional line-ups, and thus there were fewer cues to lead the mock witnesses to select the target.

In a follow-up study, Wogalter, Van't Slot, and Kalsher (1991) asked experienced police officers to construct line-ups in the way they usually construct photo spreads, and then had them construct a photo spread using one of the alternative methods employed by Wogalter et al. (1992). The results showed basically the same finding as the Wogalter et al. study. The alternative method produced less bias toward the target than the police officers' usual method.

Together, these studies suggest that the similarity-fairness function has an inverted-U shape. Very high and very low similarity line-ups and photo spreads are less fair than those somewhere between the two extremes (probably toward the high similarity end of the dimension).

Although alternative line-up construction methods can serve to reduce maximal similarity, another method has been recently discussed by Wells and Luus (1990b; Luus & Wells, 1991). They argued that line-ups should not be constructed around the appearance of the suspect at all, but instead should be based on the verbal description supplied by the witness. This seems like a way to decrease the similarity bias described earlier, but exclusive use of verbal descriptions to form line-ups creates its own set of problems. One source of error is that people are not fluent in describing faces and the resulting descriptions witnesses are poor (Ellis, Shepherd, & Davies, 1980; Laughery, Duval, & Wogalter, 1986; Navon, 1990; Shepherd, Davies, & Ellis, 1978; Sporer, 1989). This problem arises from the fact that witnesses have difficulty translating their memory image of a face into language (see Sporer, this volume).

A second source of error associated with verbal description occurs when the police investigator has to interpret the witness' description (i.e., translate it back to a visual image). Consider the following hypothetical witness description: The assailant was a White male, had short straight dark hair, small eyes, medium nose, and round lips. Even if the description was accurate, it has very little utility because it describes millions of persons. Moreover, interpretation of this very general description will vary from investigator to investigator. For example, how should one interpret "small eyes" when selecting foils for the line-up? Another problem with using verbal descriptions of the offender as the exclusive basis of constructing line-ups is that it opens the door to the inclusion of foils who may have only remote resemblance to the suspect, but who might still "fit" the description. Support in court is questionable because the defense side would surely complain that the range of foils allowed by most descriptions would produce line-ups in which the suspect

stands out unfairly. Clearly, this circumstance fails to protect the innocent suspect. Thus, basing a line-up entirely on verbal descriptions is probably not adequate alone. However, its use along with suspect similarity considerations is probably useful in helping investigators produce fair line-ups.

To summarize, only an identification from a fair line-up, consisting of equally valid choice alternatives, provides good evidence against the suspect. Similarity is important, but this does not mean that there should not be any variation in the appearance. Line-ups constructed so that all foil members are approximately equally similar with respect to the suspect and with respect to each other produce the fairest line-ups. Achieving a line-up that is fair to the potentially guilty suspect does not reduce the likelihood of identifying a suspect who is actually guilty.

*Objective Selection Procedures for the Selection of Foils.* All individuals in the line-up must be sufficiently similar to the suspect in a number of important characteristics. Generally, a pool of potential foils is available from which an eventual line-up is formed. From this larger pool, the selection of the foils for the line-up is a matter of culling persons from the set that substantially differ from the suspect's appearance and the witness' earlier verbal description of the culprit. In order to ensure the similarity requirement is met, two foil selection procedures should guide the construction of the line-up: one objective and one subjective.

The first step in the selection of foils is called the *objective selection procedure*. In this procedure, selection of alternatives is determined by the presence of a few objectively important personal characteristics. Some of these include size, weight, body build, age, hair style, hair color, facial hair, and race. These characteristics are also aspects of the offender that witnesses can often state in their verbal description, and are often the criteria used to search for the offender after the crime event. If, however, the suspect possesses somewhat different characteristics than an earlier obtained witness description, it is important to make sure that the foils included in the line-up match the characteristics of the suspect, not the characteristics of the verbal description. The reason for this is simple. Consider the possible case where a witness has described the suspect as having short blond hair and the person under suspicion has long black hair but otherwise fits the verbal description reasonably well. In this case, it would be unfair to the suspect to be the only one in the line-up with long black hair, while all of the foils have short blond hair, causing the suspect to stand out from the foils. This problem is particularly likely to occur when the perpetrator may have changed his appearance intentionally or due to a long time interval between the crime and the line-up procedure.

*Subjective Selection Procedure.* The selection of alternatives on the basis of the objective physical characteristics does not ensure the formation of a fair group for the line-up. Often, when comparing his or her memory of the culprit to the individuals in the line-up, the witness is guided by highly subjective impressions that are not part of the objective characteristics just described. An example of this phenomenon has been reported by Doob and Kirshenbaum (1973), which illustrates the importance of subjective impressions.

A female witness to a robbery reported that she could only remember that both of the robbers were neatly dressed and rather good looking. Although she could not give a detailed description, she later identified one of them from among 12 individuals. In a follow-up investigation of the case that employed a court-ordered psychologist, 20 women were shown photographs of the 12 individuals and were requested to rate their appearance. The study showed that on the average, the suspect was rated as more attractive than any of the other alternatives. In 220 comparisons arranged in pairs, this individual was judged as more attractive in 179 cases.

In the second phase of the investigation, another 21 mock witnesses were given the task of imagining that they were witnesses to a robbery and the only thing they could remember is that the robber was rather good-looking. Given the line-up, they were asked to identify who they thought was the robber. Eleven of the 21 mock witnesses, who had absolutely no further information and knew none of the persons in the line-up, chose the suspect.

This example shows that sometimes witnesses focus on very subjective characteristics. Thus, during the initial questioning, the investigator should ask the witness what caught his or her attention about the culprit and what their subjective impressions were of the individual. These nonobjective impressions noted by the witness should then be taken into account in selecting the foils.

*Selecting Sufficiently Similar Foils: Using Mock Witnesses.* A line-up or photo spread is fair, if and only if, the main objective and subjective characteristics of the suspect and the foils are sufficiently similar. "Sufficiently similar" does not, of course, mean the same as fully identical. It is sufficient if some characteristics or a combination of objective and subjective characteristics do not make the suspect stand out conspicuously from the foils. Similarity and conspicuousness are rather vague terms that can have very different interpretations. What is adequately similar for one person may be noticeably different for another. How can we ensure, in some measure, fair proceedings?

To begin with, the police investigator in charge of selecting the line-up participants or photographs should take the role of the defense lawyer and evaluate the line-up from this perspective. While selecting the foils, the investigator should consciously criticize the line-up by asking him or herself what objections could be made against its fairness by the defense. If any doubts arise about the line-up's fairness, we recommend an additional step to the procedure. The investigator should show the photographs or a videotape of the line-up to uninvolved persons. These individuals (also called mock witnesses) are requested either to choose one individual in the group who stands out the most from the rest or to simply guess who the suspect is. If this test shows that the suspect is chosen substantially more (or less) often than the foils, it indicates that the foils are not sufficiently similar to the suspect, and the foil selection procedure needs to be redone. A number of iterations of replacing and substituting foils might be necessary before an acceptably fair line-up is produced.

In the presence of any doubts, we highly recommend the mock witness testing procedure before the line-up is shown to the witness, so that the foils can be changed, if necessary. Unfortunately, the testing of mock witnesses may delay the identification procedure to some extent. Some time can be saved by advance preparation. Police departments should maintain a pool of potential participants or photographs that can be readily called upon if needed. The individual objective and subjective characteristics of these potential participants should be categorized. Then, when a line-up is needed, the individuals can be called upon and/or photos obtained without much delay. Although there might be some time lost by testing a line-up using mock witnesses, the circumstance of rushing to test eyewitnesses with an unfair line-up is much worse. As we have said before, unfair line-up identifications have no evidential value and mistakes cannot be rectified later.

### Procedural Errors

Procedural errors are present when peculiarities during the preparation and execution of a line-up or photo spread cause the witness to direct their attention to the police suspect. A few procedural errors and countermeasures are described in the following sections. Particular attention is given to repeated identifications, biased instructions, multiblind procedures, and clothing worn by members of the line-up.

*Repeated Identifications.* Before presenting the line-up to the witness, the witness should be questioned as to whether he or she has already participated in an identification procedure in the case. If so, the conditions and the results of the procedure should be determined (by asking the witness, checking files, etc.). Of particular importance for line-up fairness is the witness having been shown photographs that included the suspect at earlier points in the police investigation. The witness might have (a) seen pictures in the media; (b) been shown one, several, or a whole battery of photographs (mug shots) from police files in order to locate the identity of a still unknown suspect; or (c) been presented an earlier line-up containing the suspect. What are the consequences of having seen the suspect in earlier presented photographs on identification accuracy in subsequently presented line-ups?

Research shows that identification errors may increase from previous exposure to a photograph of the suspect. Although the theoretical issues regarding the reasons for these effects are not yet resolved (see Loftus, 1983; McClosky & Egeth, 1983), it is well documented that intervening postevent information may adversely affect how the witness will respond in later identification tests. At least two possible processes may occur: (a) the witness' memory is affected by the prior identification, and (b) the witness' decision making may be influenced. In the first case, it is not clear whether memory of the original crime event is changed per se, as that memory of the event may still reside in memory, but the memory used at the second identification may be more closely tied to the first identification. Related to this, is the second possibility: Once a witness comes to a decision and expresses it, he or she may feel committed and may be less willing to change the decision later. These

factors may lead to a repetition of previously made decisions in later recognition tests—even when these earlier decisions were incorrect (Brigham & Cairns, 1988; Brown, Deffenbacher, & Sturgill, 1977; Gorenstein & Ellsworth, 1980; Hilgendorf & Irving, 1978).

There is the additional circumstance where a suspect identified in a line-up had been present in an earlier exposure to a photograph, mug shots, or line-up, but the witness had failed to identify the suspect originally. This situation is ambiguous in that it is not clear whether the witness just missed the person the first time because the suspect's appearance did not correspond to the memory of the culprit (e.g., the picture may have been old, of poor quality, etc., or the suspect may have changed since the crime). In these cases, the investigator should take note of the circumstances of the earlier viewing conditions and try to determine what could have caused the participant to miss the suspect the first time.

Let us consider the fairly common case in which witnesses examine a set of mug shots in order to uncover a still unknown offender. Shepherd, Ellis, and Davies (1982) found no increase in errors in later line-ups or photo spreads when a picture of the suspect was not present in photographs examined earlier. Consider, however, the case in which the witness identifies one of the individuals in a set of earlier presented photographs as the culprit, and as a consequence of this identification that individual becomes the suspect who later appears in a line-up. The second identification has no additional evidentiary value beyond that of the first identification. In the second identification, it is impossible to determine whether the person remembers the individual from the crime scene or from an intervening exposure to the suspect. The German Supreme Court has long recognized this problem and has ruled that the second identification has no additional weight or value.

Following the crime event, confrontation with a photograph of the suspect or other information about the suspect may affect the witness' memory of the criminal, and therefore later identifications could be influenced by this altered memory. An empirical demonstration of this was shown by Loftus and Greene (1980). Subjects first viewed a target person and later were given written information about the target person's appearance. The information was misleading in that it contained misleading information that stated the target person had a mustache, when actually the person had no mustache. Shortly thereafter, the subjects were shown several photographs of individuals with and without mustaches in which the target person's picture was not included. Under these conditions, the misled subjects identified an individual with a mustache as the target person more frequently than by chance. When subjects were shown additional photographs containing the target person, all the subjects stuck to their original, incorrect decision. Davies and Jenkins (1985) reported similar results using misleading visual information (a face composite that was supposedly constructed by an earlier "witness").

An experiment by Brown et al. (1977) demonstrated that in some cases, witnesses who recognize an individual cannot discern anymore where they saw the individual. In this study, subjects were confronted with two individuals. Two days later, they were

shown a 12-person photo spread that included a picture of one of the individuals. Following an additional 4 days, a line-up test was completed. One of the members of the line-up had been in the photographs but had not been present in the original event. A significant number of subjects reported having previously seen the individual in the original event, even though they had only seen him in intervening photographs. The authors explained this as an undifferentiated "familiarity effect." The individual is somehow familiar, even though the witness cannot determine exactly where he or she had seen the person before. This sense of familiarity has the potential of producing the mistaken inference that the individual was viewed at the scene of the crime. As a consequence, this individual may be identified as the culprit. Loftus (1976) called this phenomenon *unconscious transference*. Read, Tollestrup, Hammersley, McFadzen, and Christensen (1990) suggested that this phenomenon is very difficult to produce, and the conditions under which it was found is likely to be of remote concern for real-world misidentifications.

Besides the memorial effects of repeated recognition tests, there are also witness response tendencies that could lead to misidentifications. With his or her first decision, the witness has made a public commitment in a very serious matter, which in some cases may lead to intensified police activities. Research in social psychology indicates there is a strong tendency to cling to publicly made decisions (Kiesler, 1971). This "commitment" effect has also been demonstrated in the context of eyewitness identification. Gorenstein and Ellsworth (1980) confronted their subjects with a target person during a staged incident. About 30 minutes later, half of the subjects were given a line-up task with 12 photographs that did not contain the picture of the target person. The remaining subjects did not see any photographs at this time. After an additional 4 to 6 days, all subjects completed another recognition test, but this time, there was a picture of the target as well as a photograph of the falsely identified individual in the first photo spread. The results showed that subjects who were not shown any intervening photographs identified the target significantly better than chance, whereas a significant number of subjects, who had already wrongly identified someone, reaffirmed their false identification—even when the picture of the actual target was present.

Further evidence of the commitment effect was reported in a study by Brigham and Cairns (1988). Four groups of subjects were shown a videotape of a young man attacking a woman. One group of subjects received a photo spread of 18 pictures (without the picture of the target person) and were asked to write down on a card if the man from the film appeared in one of the photographs, and if so, which one. The card was then returned to the researcher. A second group received the same photo spread but, in this condition, they were to keep their decisions to themselves. A third group was merely given the task of judging the attractiveness of the 18 individuals in the photographs. They were not asked to make any identification decision at this point. Finally, a fourth (control) group was shown no photographs. Two days later, all the subjects completed a photo spread test that was constructed to include the actual target, as well as, a photograph of the incorrectly identified individual on the first test if one had been identified.

The results showed that 69% of the subjects who had not seen a photo spread before the final test identified the target correctly. When only attractiveness was judged, but no earlier identification was requested, the hit rate was at a similar level of 64%. However, for subjects who had already had to identify one of the members of the first line-up, where no picture of the target was present, the hit rate was only 33%. This low performance can be attributed to subjects having committed themselves to an erroneous decision, especially when the first identification was public. Although a picture of the actual target person was present in the second test, 78% of the subjects who had identified a person previously chose this same person again. When the subjects kept their decision to themselves, only 45% stayed by their original choice. This experiment is an impressive example of the tendency for preservation of false identifications.

Generally, a witness who has not identified anyone since the crime can complete further identification tests. At the same time, the investigator should minimize exposure to irrelevant faces, particularly if they are known to look very similar to the offender, because these faces may change or confuse the witness' memory of the offender. Of course, later line-ups should not contain any of the individuals seen in the past presentations. These individuals are simply superfluous because the witness has already stated that as far as he or she can remember, these individuals were not involved in the crime. Therefore, they are not valid alternative choices for the witness (Wells, 1988). However, if the first test contains poor quality photographs, it is possible that witness could fail to identify the offender. Therefore, it is important to show the best possible photographic depictions to the witness in all tests because it would be a procedural error for the suspect to appear in the first photo spread and later in a second. In this case, the familiarity of the previously seen photographs could influence the witness' decision in a subsequent test. It is not possible to discern whether this familiarity is due the witness having seen the suspect involved in the crime or because the witness saw him in an earlier identification display.

In summary, the evidentiary value of repeated identifications can never be greater than the value of the first identification. The evidentiary value of a second identification is irrevocably lost (and cannot be corrected) if the suspect is exposed during an earlier recognition test. These effects are due to carryover errors such as changes to memory and the tendency to preserve an earlier decision.

*Instructions to the Witness.* Before the line-up test, witnesses are usually informed of the proceedings and their role in them. On the one hand, the instructions can be formulated so that the witnesses are led to infer that one of the individuals present in the line-up is the actual culprit and their task is only to confirm this fact. This would be one example of biased instructions. On the other hand, the instructions can be more neutral. Neutral (fair) instructions clearly indicate to the witness that the actual offender may or may not be in the line-up.

Presently, the extent to which biased instructions leads to increased risk of false identification is equivocal. Several studies (Malpass & Devine, 1981; Paley & Geiselman, 1989; Warnick & Sanders, 1980) suggest that biased instructions



increase the risk of false identification, especially when the actual offender is not present in the line-up. However, this effect has not always been found (Koehnken, 1985; Koehnken & Maass, 1988).

To exclude this kind of potential systematic error we recommend the following:

1. point out explicitly to the witness that the offender may or may not be in the line-up;
2. make it clear to the witness that the primary goal of the line-up is not just to identify one of the members of the group but that when no one is identified, this information is just as important to the police; and
3. hand the witness a response sheet on which the answers "The culprit is not present" and "I cannot remember anymore" will be seen as equally legitimate choices.

All instructions should be given orally and in written form to the witness, so that the exact wording can be verified during later court proceedings. For this same reason, the witness should note his or her decision on the response sheet to document the identification proceedings—an aspect of the identification procedure that is discussed in more detail later.

*Multiblind Procedures.* At the beginning of this chapter, the basic principle of line-up identification procedures was emphasized. No hint of who the suspect is should be present during the identification procedure to protect the innocent suspect. Such a hint could come from the nonsuspect members of a live line-up when they know who is under suspicion. For example, they may behave differently than the suspect and may glance in the suspect's direction. If they do, they may draw the attention of the witness toward the suspect (Rolph, 1957). In cases of very upsetting crimes, the other line-up members may actually distance themselves from the suspect (Shepherd et al., 1982). As a court-appointed expert, the first author has seen photographs taken of live line-ups where in some cases the foils stood very close together, showing a recognizable distance between themselves and the suspect. These and similar subtle hints can lure the witness to choose the suspect.

Such problems can only be reliably excluded in live line-ups when the other line-up members do not know who the suspect is. The line-up foils should not obtain information that would give away the identity of the suspect, either directly or indirectly (i.e., through organizational procedures, during the line-up, through the communication between police officers themselves, or with the suspect).

The widespread use of police officers as nonsuspect line-up members in live line-ups is therefore not without criticism. Even if they do not have direct information about the suspect, due to their background knowledge of their fellow officers and line-up procedures, the police acting as foils can draw conclusions and behave in ways that provide cues to the witness on who the suspect is in the group. If it is unavoidable to use police officers as foils, care and perhaps, training should be used to ensure that no differentiating cues are given during the procedure (Buchanan, 1985). Sequential line-up procedures (see later) may provide the logistics that could

help to reduce this source of bias. A video might be preferable to a live line-up as nonverbal cues could be edited out before the witness views the group. Still another way to remove this influence is to provide high-quality depictions in the form of a photo spread.

Not only might the foils provide cues, but also the police investigator conducting the identification procedures can draw unfair attention to the presumed offender. Most of the time, the police undertake identification proceedings only when there are already sufficient grounds for suspicion, and at the same time, are hoping for a positive identification to move the case toward completion. In the mind of the police, the desire for criminal identification is preeminent, so when the witness cannot make an identification, investigators may experience feelings of failure. It is a well-known psychological phenomenon that the presence of expectations can be expressed unintentionally and unconsciously in nonverbal behavior and can thereby bias others in their decision making (e.g., Rosenthal, 1969, 1976). An experiment by Fanselow (1975) demonstrates that this phenomenon can also occur in identification procedures. Identification of the target was significantly more likely when the researcher showed either favorable or unfavorable reactions while showing photographs to subjects. Thus, nonverbal behavior can produce an increase in the selection of individuals who are given special attention, regardless of the kind of attention. Likewise, findings by Smith, Pleban, and Shaffer (1982) confirm the importance of subtle influences in identification tests. Six photographs were presented to subjects from which they were to choose one as the offender observed earlier in a film. During the presentation of one of the photographs, the experimenter showed a slight change in nonverbal behavior. A significant number of the subjects falsely identified the individual in the emphasized photograph. This effect was found even though (a) subjects had been informed before viewing the film of a later identification, (b) there was only a few minutes of delay between target viewing and the recognition test, and (c) the test pictures contained a photograph of the actual target. The subtlety of the manipulation and power of the effect is further demonstrated by the fact that none of the subjects in the study was aware of the manipulation.

Such unconscious and unintentional influences can only be avoided if the police officer conducting the line-up or photo spread does not know who the suspect is. When possible, the proceedings should be entrusted to someone who was not involved in investigating the case. Moreover, care should be taken so that the person who conducts the recognition test cannot infer who the suspect is. If it is not possible to have an uninvolved police officer, the risk of a bias can be reduced if the witness looks at the line-up or the photo spread without a police officer being physically present. Voice instructions to the witness can be given before the witness views the line-up (or by an intercom system) and on a printed form that can also serve as response sheet for the witness to indicate which, if any of the line-up members, is the culprit.

*Cross-Race Bias.* A large body of research has accumulated in the past two decades showing that people are more accurate in identifying persons of their own

race than persons of another race (see Chance & Goldstein, this volume). This means that special cautions are required in cases where a line-up contains persons of a race different from the witness.

Lindsay and Wells (1983) argued that cross-race line-up identification is more diagnostic (informative) than same-race line-up identification, because the faces in a cross-race line-up are likely to appear more similar than faces in a same-race line-up and thus in order for the witness to identify the assailant, he or she has to pay close attention to the individual features of the members. Although cross-race line-ups have the characteristic of greater similarity and are fair in this respect, identification is more difficult primarily because the image of the assailant was less well encoded at the time of the incident. The amount of previous cross-race exposure can be ascertained through witness questioning, although the precision of this assessment is likely to be quite rough.

Not only is the cross-race effect likely to affect witness identification performance, but it may also affect foil selection by the police investigator. The reason for this is that investigators constructing line-ups of persons of a different race than their own might assume that he or she has constructed a fair line-up containing foils very similar to the suspect, when in fact the foils are not perceived to be similar to witnesses of the same race as the suspect. Brigham and Ready (1985) found that African-American and White subjects behaved similarly while forming White member line-ups, but behaved differently in forming African-American member line-ups. Compared to White line-ups, White subjects were less selective in forming African-American line-ups, but African-American subjects were more selective on African-American line-ups. The results of Brigham and Ready suggest that line-ups constructed by cross-race line-up constructors can be less fair than line-ups constructed by same-race line-up constructors. The recommendation suggested by this result is clear. Where possible, line-ups should be constructed by persons of the same race as the suspect.

*Line-Up Media: Photos, Video, or Real People?* Does an identification made using a photo spread provide the same evidentiary value as an identification made during a live line-up? Hilgendorf and Irving (1978) found that witnesses employ a more liberal decision-making criterion (selections are more frequent) during a photo spread than during a live line-up. This means that witnesses are more likely to identify someone when presented with photographs and thus are more likely to commit a false identification when the suspect is innocent. However, the advantage of live line-ups versus photo spreads has not always been found (Sporer, Eickelkamp, & Spitmann-Rex, 1990).

An alternative method of identification that lies between live line-ups and photo spreads is videotaped line-ups. Live and videotaped line-ups were compared in a study by Cutler, Fisher, and Chicvara (1989), who found no difference between the two presentation methods for target-present line-ups but that with target-absent line-ups, slightly fewer false identifications for live than videotaped line-ups occurred. In another study, Cutler and Fisher (1990) compared live line-ups,

videotaped line-ups, and photo spreads. In target-present line-ups, identification accuracy did not differ between line-up methods. However, when the target was absent from the line-up, live and videotaped line-ups produced significantly fewer false identifications than photo spreads, with the two nonstatic methods producing equivalent performance.

Hence, under otherwise similar circumstances, the evidential value of an identification made during a photo spread is not as reliable as a live or videotaped line-up. Thus, when investigators have a choice, live and videotaped line-ups are preferred.

As we alluded to several times in this chapter, there are certain benefits of using nonlive methods (e.g., greater control of the presentation) that make them somewhat more advantageous to use than live line-ups. Videotaped line-ups appear to have the fewest disadvantages compared to the two other methods. We recommend that police investigators take advantage of this increasingly less expensive technology in their forensic work.

*Clothing Worn by the Alternative Individuals.* An important practical question that has not been given much attention in empirical research is how the members of the line-up should be dressed in order to ensure a fair, nonbiased identification procedure. It should be quite obvious from the previous sections that the suspect must not stand out from the others through his or her clothing. But how should members of the line-up be dressed? Should they all wear the same or similar clothes to those worn by the perpetrator at the scene of the crime? Or is it better when all the individuals wear the same clothes but that differ from those worn by the perpetrator?

To address these questions, Lindsay, Wallbridge, and Drennan (1987) conducted three experiments in which all subjects first witnessed a staged theft and shortly thereafter were asked to identify the thief from six photographs. Half of the subjects were shown a photo spread containing the picture of the thief. For the others, this picture was replaced by a similar looking, but uninvolved person. The identification took place under three basic conditions: (a) only the suspect (or the substitute) wore clothes similar to those worn by the thief; (b) all the individuals were dressed differently, but none wore clothes similar to those of the thief; and (c) all the individuals wore identical clothing (e.g., a white lab coat or with an identical sweatshirt).

The results showed that when a photograph of the perpetrator is present, the manner of dress has no effect on the number of correct identifications. However, there were differences in the number of false identifications for target-absent photo spreads between the conditions. False identifications were greatest when only the innocent substitute was dressed similarly to the thief (38%) and smallest when all were identically dressed (10%). When the individuals differed in dress the rate of false identifications was 21%. Given these findings, all individuals in a line-up should be clothed identically. In the case of photo spreads, when possible, photos of potential foils should be taken with individuals in the same garb. But when control of the clothing is not possible, the depicted clothing below the face could be cropped off.

Why should the alternatives not be dressed like the perpetrator at the scene of the crime? An important but not often considered point is that the identification of the clothing can be used independently in a recognition test to assess the strength of memory the witness has of the culprit. Lindsay et al. (1987) found that subjects who correctly recognized the clothing worn by the culprit made significantly fewer errors in identifying the culprit later than subjects who failed to recognize the clothing.

In conclusion, the value of the identification as evidence is greater when the witness recognizes the clothing worn by the culprit independently of the actual recognition test. Police investigators should consider performing this test when the clothing is available.

### MITIGATION OF FUNDAMENTAL BIAS: HOW TO REDUCE FALSE IDENTIFICATIONS OF INNOCENT SUSPECTS

There are no instructions that can eliminate the assumption by the witness that the police would not go to the trouble of requesting a formal identification (line-up, photo spread, video, etc.) if they did not have a suspect to present to the witness. After all, this is a reasonable assumption. And there seem to be no instructions that can totally reverse the assumption of many witnesses that their task is to choose someone from among those offered to them in the identification process.

Under conditions where witnesses believe their task is to choose someone, they presumably compare the persons offered to them in the identification process, and choose the most likely candidate. That is, they adopt a relative judgment strategy (Wells, 1984). If the line-up or photo array has been carefully constructed and presented according to the principles outlined in the ways described in this chapter the risk to an innocent suspect will approach  $1/n$  and the nominal size will approach  $n$ , the number of individuals in the line-up (Malpass & Devine, 1983). However the problem remains that there is still some risk to the innocent suspect and there is no way of knowing with the identification alone whether the witnesses choice is due to memory of the culprit at the crime scene or to a bias to make a choice. What we need is information to help us disentangle these two possibilities.

One way address this issue is to initially show witnesses a "blank" line-up (i.e., without the suspect present) before showing the actual identification line-up. Whether witnesses have the tendency to respond in the line-up test can be seen in their performance on the first test. If they choose someone in the first suspect-absent line-ups then this is an indication that the witness has the tendency to make a choice (and therefore these persons are more likely to make a false identification in the second, suspect-present line-up). Wells (1984) tested this procedure and showed advantages to this technique. Consider first the results when the offender was absent in both the first and second line-ups. Subjects who made a false identification in the first test chose a second incorrect person (55.6%) in suspect-absent second test twice as often as those who had correctly stated in the first that the suspect was not present (23.3%). The results also showed that subjects who falsely identified someone in the first test, correctly identified the real suspect in a later test 33% of

the time. Of those subjects who correctly refused to make an identification in the first test, 60% recognized the correct person in the second test.

Practical application of the blank line-up technique is not without difficulties. For example, it is probable that word would get around that the culprit is most often not present in the first line-up, and therefore, it is better not to pick anyone. The sought-after discriminator between persons who have a bias to choose someone versus those who do not is then no longer possible. In addition, it is often difficult to find enough sufficiently plausible alternatives for one, much less two, identification procedures.

The benefit of the blank line-up technique is that it increases the evidentiary value of the identification through the exclusion of unreliable witnesses. However, elimination is hardly acceptable when only one witness is available. So, although the blank line-up technique has the potential of reducing the problem of misidentifications (and decreasing the risk to innocent suspects), it also has problems. However, recent developments have provided a solution to these problems, by the introduction of an alternative procedure from the conventional (simultaneous) line-up, the sequential line-up (Lindsay & Wells, 1985).

### Sequential Identification Procedure

In a sequential line-up, the line-up members are shown one at a time. The reasoning for this technique is fairly straightforward. In a simultaneous line-up or photo spread the witness knows from the beginning the size of the set from which a choice may be made. It is a bounded set of choice alternatives. But in a sequential presentation, the witness should not know how many people or photographs will be presented. The tendency to choose problem is reduced in a number of ways. First, if on the first one or two presentations (which should be foils), the tendency to choose someone by witnesses who believe that they have an obligation to choose someone should be apparent from the witness' responses. It is very important in using the sequential procedure that the witness is not made aware of the number of persons that will be shown to them. The reason is that witnesses knowing the size of the line-up will feel more obligation to choose someone toward the end of the sequence, especially if the witness knows the series is about to end.

Because there is no difference in the information the witness has about the identity of the actual offender, sequential presentation should have little if any effect on correct identifications in target-present line-ups, but it should reduce false identifications of innocent suspects in target-absent line-ups.

Results from research on this procedure supports these expectations. Lindsay and Wells (1985) compared recognition accuracy in simultaneous and sequential displays of photographs. Initially, 240 subjects were witnesses to a theft, and then a few minutes later, they were asked to identify the thief from six photographs. Half of the subjects were presented with a simultaneous line-up and the rest were presented with a sequential line-up. These groups were further subdivided, such that in half the line-ups

in each condition the line-up contained a picture of the real thief, and in half, the thief's picture was replaced with a similar looking, but uninvolved person.

The results of the study document the superiority of the sequential testing procedure. Although the number of correct identifications were almost the same for all witnesses given a photo display that included the thief (58% by the simultaneous and 50% by the sequential test), significant differences were shown in the rate of false identifications. For the simultaneous display that did not include the thief, 48% of the subjects falsely identified the uninvolved replacement as the alleged thief. In comparison, only 17% of the subjects chose the replacement in the sequential display. These results have been confirmed in several more recent studies (Cutler & Penrod, 1988; Lindsay, Lea, Nosworthy, et al., 1991; Parker & Ryan, 1990; Sporer, 1993b). Lindsay, Lea, and Fulford (1991) pointed out that witnesses viewing sequential line-ups should not be aware of the number of faces to be presented.

The sequential line-up procedure also reduces another problem associated with simultaneous line-ups. Wells (1984) and Lindsay and Wells (1985) suggested that with the conventional line-up test, witnesses tend to judge the relative similarity among the members of the line-up. That is, witnesses may ask themselves "Which of these individuals, in relation to the others, is the most similar to my memory of the perpetrator?" Then, they tend to choose the person who, relatively speaking, is most similar. When the actual offender is not in the line-up this judgment strategy leads inevitably to false identifications, as it increases the probability that the witness will choose someone. Somebody in the line-up always looks more like the offender than the others. Theoretically, false identifications in simultaneous line-ups, brought about in this way, can be prevented by instructing the witness to judge each of the line-up members on the basis of the absolute similarity to the perpetrator. The witness should only make an identification when the comparison of his or her mental image of the offender to one of the persons in the line-up exceeds a certain threshold. When this threshold is not reached during the presentation of the individuals, then no identification should take place. Consequently, the danger of false identification should be less with an absolute similarity strategy in comparison with a relative similarity strategy in which the members of the line-up are compared to each other. However, we cannot be sure, even with the best instructions, that the witness will use an absolute comparison strategy rather than a relative similarity strategy. The sequential line-up avoids much of this problem, because the faces are not easy to compare because they are not presented at the same time.

The findings and reasoning described here show that a simple modification to the conventional police identification procedure, the sequential line-up technique, does not make the identification of the actual offender more difficult or even hinder it in any respects but rather primarily serves as a means of protecting innocent suspects against false identification. Thereby, an identification in a sequential line-up provides much more valuable and informative evidence.

In summary, a sequential live or photographic line-up is completed according to the following rules:

1. The witness is shown only one alternative at a time.

2. The procedure should prevent the witness from knowing how many individuals will be shown. This means that the alternatives must be hidden from view before and after each is presented. If a witness arrives at a positive identification no additional line-up members should be presented—even if the suspect has not yet been shown (Sporer, 1993b).
3. A separate decision must be made for each individual as to whether he is the culprit or not. Only after this decision is the next alternative introduced.

We strongly recommend that police investigators and courts adopt the sequential line-up technique as the standard procedure in criminal investigations as it is vastly superior to the currently more common simultaneous technique.

### DOCUMENTING THE RECOGNITION TEST

In this chapter the problems of identification procedures have been discussed primarily with regard to the application of line-up tests by police investigators. We have made some suggestions for the preparation and the procedure of the test that may serve as guidelines for identification procedures. These recommendations may also serve to guide evaluations of the procedure employed and the outcomes of the eyewitness identification process in court. However, a detailed and substantial evaluation is only possible if the complete testing procedure with all the aspects that have been discussed in this chapter are documented in detail for subsequent inspection and review. This requires at least:

1. photograph(s) of the line-up (A photo, however, gives only a static snapshot and provides little or nothing about the procedures that took place in the test. Therefore, when resources are available, the whole procedure should be videotaped, including all line-up members and the verbal and nonverbal behavior of the witnesses.),
2. verbatim transcript of the instructions,
3. verbatim transcript of the description of the criminal by the witness,
4. verbatim transcript of the identification statement of the witness, and
5. documentation of all recognition tests that did not result in an identification of the suspect.

### CONCLUSIONS

This chapter reviewed the factors that influence the validity and reliability of eyewitness techniques with an eye toward making forensically relevant recommendations to police investigators. Ways to reduce random error and systematic error in the structural and procedural aspects of line-up procedures were discussed. Together they provide



procedures that will assist witnesses in choosing the offender if he or she is present in the line-up, while at the same time protecting the innocent suspect from being falsely chosen. In particular we recommend sequential testing procedures, as opposed to traditional line-ups and photo spreads, because sequential procedures are likely to reduce false identifications without reducing the likelihood of a positive identification of a guilty suspect. Finally, we emphasize that errors made during a prior identification cannot be corrected by a later one. The evidentiary value of a second identification as evidence is never be greater than that of the first identification, as witnesses tend to repeat their errors. The fundamental recommendation of this chapter is: Construct the line-up or photo spread right the first time.

## REFERENCES

- Brigham, J. C., & Cairns, D. L. (1988). The effect of mugshot inspections on eyewitness identification accuracy. *Journal of Applied Social Psychology*, 18, 1394-1410.
- Brigham, J. C., & Ready, D. J. (1985). Own-race bias in lineup construction. *Law and Human Behavior*, 9, 415-424.
- Brigham, J. C., Ready, D. J., & Spier, S. A. (1990). Standards for evaluating the fairness of photograph lineups. *Basic and Applied Social Psychology*, 11, 149-163.
- Brown, E., Deffenbacher, K., & Sturgill, W. (1977). Memory for faces and circumstances of encounter. *Journal of Applied Psychology*, 62, 311-318.
- Buchanan, D. R. (1985). Enhancing eyewitness identification: Applied psychology for law enforcement officers. *Journal of Police Science and Administration*, 13, 303-309.
- Buckhout, R. (1974). Eyewitness testimony. *Scientific American*, 231, 23-31.
- Cutler, B. L., & Fisher, R. P. (1990). Live lineups, videotaped lineups, and photoarrays. *Forensic Reports*, 3, 439-448.
- Cutler, B. L., Fisher, R. P., & Chievara, C. L. (1989). Eyewitness identification from live versus videotaped lineups. *Forensic Reports*, 2, 93-106.
- Cutler, B. L., & Penrod, S. D. (1988). Improving the reliability of eyewitness identifications: Lineup construction and presentation. *Journal of Applied Psychology*, 73, 281-290.
- Cutler, B. L., Penrod, S. D., & Martens, T. K. (1987). Improving the reliability of eyewitness identifications: Putting context into context. *Journal of Applied Psychology*, 72, 629-637.
- Cutler, B. L., Penrod, S. D., O'Rourke, T. E., & Martens, T. K. (1986). Unconfounding the effects of contextual cues on eyewitness identification accuracy. *Social Behaviour*, 2, 113-134.
- Davies, G. M., & Jenkins, F. (1985). Witnesses can be misled by police composite pictures: How and when. In F. L. Denmark (Ed.), *Socioecological psychology and the psychology of women* (pp. 103-115). Amsterdam/New York/Oxford: Elsevier.
- Doob, A. N., & Kirshenbaum, H. M. (1973). Bias in police lineups - partial remembering. *Journal of Police Science and Administration*, 1, 287-293.
- Ellis, G. D., Shepherd, J. W., & Davies, G. M. (1980). The deterioration of verbal descriptions of faces over different delay intervals. *Journal of Police Science and Administration*, 8, 101-106.
- Fanselow, M. (1975). How to bias an eyewitness: A review of research on expectancy applied to eyewitness identification testing. *Social Action and the Law*, 2, 3-4.
- Gorenstein, G. W., & Ellsworth, P. C. (1980). Effect of choosing an incorrect photograph on a later identification by an eyewitness. *Journal of Applied Psychology*, 65, 616-622.
- Hilgendorf, E. L., & Irving, B. L. (1978). False positive identification. *Medical Science and the Law*, 18, 255-262.
- Kiesler, C. (1971). *The psychology of commitment*. New York: Academic Press.
- Koehnken, G. (1984). Zum Beweiswert von Identifizierungen durch Augenzeugen: Eine methodologische Analyse [The evidential value of eyewitness identifications: A methodological analysis]. *Forensia*, 5, 1-21.

- Koehnken, G. (1985). Effekte suggestiver Instruktionen auf die Identifizierungsleistung von Augenzeugen in simulierten Ernstsituationen [Effects of biased instructions on eyewitness identifications in a field setting]. *Zeitschrift für Experimentelle und Angewandte Psychologie*, 32, 104-119.
- Koehnken, G., & Maass, A. (1988). Eyewitness testimony: False alarms on biased instructions? *Journal of Applied Psychology*, 73, 363-370.
- Laughery, K. R., Duval, G., & Wogalter, M. S. (1986). Dynamics of face recall. In H. D. Ellis, M. A. Jeeves, F. Newcombe, & A. W. Young (Eds.), *Aspects of face processing* (pp. 373-387). Dordrecht, Netherlands: Martinus Nijhoff.
- Laughery, K. R., Jensen, D. G., & Wogalter, M. S. (1988). Response bias with prototypic faces. In M. M. Gruneberg, R. Sykes, & P. Morris (Eds.), *Practical aspects of memory: Current research and issues* (pp. 157-162). Chichester: Wiley.
- Lindsay, R. C. L., Lea, J. A., & Fulford, J. A. (1991). Sequential lineup presentation: Technique matters. *Journal of Applied Psychology*, 76, 741-745.
- Lindsay, R. C. L., Lea, J. A., Nosworthy, G. J., Fulford, J. A., Hector, J., LeVan, V., & Seabrook, C. (1991). Biased lineups: Sequential presentation reduces the problem. *Journal of Applied Psychology*, 76, 796-802.
- Lindsay, R. C. L., Wallbridge, H., & Drennan, D. (1987). Do the clothes make the man? An exploration of the effect of lineup attire on eyewitness identification accuracy. *Canadian Journal of Behavioral Science*, 19, 463-477.
- Lindsay, R. C. L., & Wells, G. L. (1980). What price justice? Exploring the relationship of lineup fairness to identification accuracy. *Law and Human Behavior*, 4, 303-313.
- Lindsay, R. C. L., & Wells, G. L. (1983). What do we really know about cross-race eyewitness identification. In S. M. A. Lloyd-Bostock & B. R. Clifford (Eds.), *Evaluating witness evidence* (pp. 219-233). Chichester: Wiley.
- Lindsay, R. C. L., & Wells, G. L. (1985). Improving eyewitness identifications from lineups: Simultaneous versus sequential lineup presentation. *Journal of Applied Psychology*, 70, 556-564.
- Loftus, E. F. (1976). Unconscious transference in eyewitness identification. *Law and Psychology Review*, 2, 93-98.
- Loftus, E. F. (1983). Silence is not golden. *American Psychologist*, 38, 564-572.
- Loftus, E. F., & Greene, E. (1980). Warning: Even memory for faces may be contagious. *Law and Human Behavior*, 4, 323-334.
- Luus, C. A. E., & Wells, G. L. (1991). Eyewitness identification and the selection of distractors for lineups. *Law and Human Behavior*, 14, 43-57.
- Malpass, R. S., & Devine, P. G. (1981). Eyewitness identification: Lineup instructions and the absence of the offender. *Journal of Applied Psychology*, 66, 482-489.
- Malpass, R. S., & Devine, P. G. (1983). Measuring the fairness of eyewitness identification lineups. In S. M. A. Lloyd-Bostock & B. R. Clifford (Eds.), *Evaluating witness evidence* (pp. 81-102). Chichester: Wiley.
- Malpass, R. S., & Devine, P. G. (1984). Research on suggestion in lineups and photospreads. In G. L. Wells & E. F. Loftus (Eds.), *Eyewitness testimony: Psychological perspectives* (pp. 64-91). New York: Cambridge University Press.
- Marwitz, D. B., & Wogalter, M. S. (1988). Bias in photo-spreads of faces: A comparison of two lineup construction methods. *Proceedings of the Human Factors Society 32nd Annual Meeting* (pp. 541-543). Santa Monica, CA: Human Factors Society.
- McCloskey, M., & Egeth, H. (1983). Eyewitness identification: What can a psychologist tell a jury? *American Psychologist*, 38, 550-563.
- Navon, D. (1990). How critical is the accuracy of an eyewitness memory? Another look at the issue of lineup diagnosticity. *Journal of Applied Psychology*, 75, 506-510.
- Paley, B., & Geiselman, R. E. (1989). The effects of alternative photo-spread instructions on suspect identification performance. *American Journal of Forensic Psychology*, 7, 3-13.
- Parker, J. F., & Ryan, V. (1990). *An attempt to reduce guessing behavior in children's and adult's eyewitness testimony*. Paper presented at the meeting of the American Psychology-Law Society, Williamsburg, VA.
- Read, J. D., Tollestrup, P., Hammersley, R., McFadzen, E., & Christensen, A. (1990). The unconscious transference effect: Are innocent bystanders ever misidentified? *Applied Cognitive Psychology*, 4, 3-31.

- Rolph, C. H. (1957). *Personal identity*. London: Michael Joseph.
- Rosenthal, R. (1969). Interpersonal expectations: Effects of the experimenter's hypothesis. In R. Rosenthal & R. L. Rosnow (Eds.), *Artifact in behavioral research*. New York: Academic Press.
- Rosenthal, R. (1976). *Experimenter effects in behavioral research* (Enlarged ed). New York: Irvington.
- Shepherd, J. W., Davies, G. M., & Ellis, H. D. (1978). How best shall a face be described? In M. M. Gruneberg, P. E. Morris, & R. N. Sykes (Eds.), *Practical aspects of memory* (pp. 279-285). London: Academic Press.
- Shepherd, J. W., Ellis, H. D., & Davies, G. M. (1982). *Identification evidence: A psychological examination*. Aberdeen: Aberdeen University Press.
- Smith, J. E., Pleban, R. J., Shaffer, D. (1982). Effects of interrogator bias and a police trait questionnaire on the accuracy of eyewitness identification. *Journal of Social Psychology*, 116, 19-26.
- Sporer, S. L. (1989). Verbal and visual processes in person identification. In H. Wegener, F. Lösel, & J. Haisch (Eds.), *Criminal behavior and the justice system: Psychological perspectives* (pp. 303-324). New York: Springer.
- Sporer, S. L. (1993a). Clothing as a contextual cue in facial recognition. *German Journal of Psychology*, 17, 183-199.
- Sporer, S. L. (1993b). Eyewitness identification accuracy, confidence and decision times in simultaneous and sequential lineups. *Journal of Applied Psychology*, 78, 22-33.
- Sporer, S. L., Eickelkamp, A., & Spitzmann-Rex, D. (1990). Live-Gegenüberstellungen vs. Lichtbildvorlagen: Ein experimenteller Vergleich unterschiedlicher Präsentationsmodi zum Zwecke der Personenidentifizierung [Live lineups vs. photospreads: An experimental comparison of different presentation modes]. In D. Meurer & S. L. Sporer (Eds.), *Zum Beweiswert von Personenidentifizierungen: Neuere empirische Befunde* (pp. 48-105). Marburg: Elwert.
- Warnick, D. H., & Sanders, G. S. (1980). Why do eyewitnesses make so many mistakes? *Journal of Applied Social Psychology*, 10, 362-366.
- Wells, G. L. (1984). The psychology of lineup identifications. *Journal of Applied Social Psychology*, 14, 89-103.
- Wells, G. L. (1988). *Eyewitness identification: A system handbook*. Toronto: Carswell.
- Wells, G. L., & Luus, C. A. E. (1990a). Police lineups as experiments: Social methodology as a framework for properly conducted lineups. *Personality and Social Psychology Bulletin*, 16, 106-117.
- Wells, G. L., & Luus, C. A. E. (1990b). The diagnosticity of a lineup should not be confused with the diagnostic value of non-lineup evidence. *Journal of Applied Psychology*, 75, 511-516.
- Wells, G. L., & Turtle, J. W. (1986). Eyewitness identification: The importance of lineup models. *Psychological Bulletin*, 99, 320-329.
- Wogalter, M. S., & Jensen, D. G. (1986). Response bias in lineups with prototypic faces. In *Proceedings of the Human Factors Society 30th Annual Meeting* (pp. 725-728). Santa Monica, CA: Human Factors Society.
- Wogalter, M. S., Marwitz, D. B., & Leonard, D. C. (1992). Suggestiveness in photospread lineups: Similarity induces distinctiveness. *Applied Cognitive Psychology*, 6, 443-453.
- Wogalter, M. S., Van't Slot, L. J., & Kalsher, M. J. (1991). Bias in police lineups and its reduction an alternative construction procedure. In *Proceedings of the Human Factors Society 35th Annual Meeting* (pp. 1561-1565). Santa Monica, CA: Human Factors Society.