SYMPOSIUM: REFORMING EYEWITNESS IDENTIFICATION: CONVICTING THE GUILTY, PROTECTING THE INNOCENT

☐ BRIAN L. CUTLER, PH.D.

A SAMPLE OF WITNESS, CRIME, AND PERPETRATOR CHARACTERISTICS AFFECTING EYEWITNESS IDENTIFICATION ACCURACY
A SAMPLE OF WITNESS, CRIME, AND PERPETRATOR CHARACTERISTICS AFFECTING EYEWITNESS IDENTIFICATION ACCURACY

Brian L. Cutler, Ph.D.*

OVERVIEW

Archival and laboratory research on eyewitness memory has clearly established that eyewitness identification errors occur and have led to erroneous convictions. As of the time of this writing, the Innocence Project has uncovered 159 cases of erroneous conviction with mistaken identification as the leading precursor. To psychologists, it comes as no surprise that mistaken identification occurs, for over 100 years of research on human memory has revealed many of its limitations.

In their attempts to better understand errors in eyewitness identification, many researchers have devoted their efforts to uncovering the factors that increase or decrease the likelihood of mistaken identification. Much of the recent research has focused on system variables—factors that are under the control of investigators—such as how photo arrays are composed and presented to eyewitnesses. System variables are of interest because they can be used to increase the likelihood of...

* Brian L. Cutler, Ph.D., is Professor and Chair of the Department of Psychology at the University of North Carolina at Charlotte. He is the author of Mistaken Identification: The Eyewitness, Psychology, and the Law (with Steven Penrod, 1995, Cambridge University Press) and numerous book chapters and research articles on the psychology of eyewitness memory. He is also Editor-in-Chief of the journal Law and Human Behavior. Professor Cutler has been qualified as an expert witness in several states and federal courts and has served as a consultant or expert witness in about 100 cases.


2 The Innocence Project is a non-profit legal clinic and criminal justice resource center located at the Benjamin N. Cardozo School of Law. The Innocence Project uses post-conviction DNA testing to exonerate those who have been unlawfully convicted. The Innocence Project also works to develop and implement reforms that will help prevent unlawful convictions. For more information, see http://www.innocenceproject.org.

correct identification and decrease the likelihood of false identification. Other research, however, has examined the roles of estimator variables—factors associated with the eyewitness, the perpetrator, or the eyewitnessed event that are not under the control of investigators—such as the conditions under which the eyewitness viewed the perpetrator. Estimator variables are of interest because knowing how estimator variables influence identification accuracy gives us some basis for gauging the reliability of eyewitness identifications. The better we are able to assess identification accuracy, the better we can assess defendant culpability and ultimately determine the best way to resolve a criminal charge.

Considerable psychological research has addressed the question of whether there are reliable associations between estimator variables and eyewitness identification accuracy, and, if so, which specific estimator variables predict identification accuracy. The purpose of this paper is to summarize some of the main findings from this research and to direct the interested reader to relevant summary papers concerning these and other estimator variables.

In this paper, I will summarize six specific estimator variables. These were chosen from a more exhaustive set for the following reasons: (1) research findings point to clear conclusions regarding their effects; (2) a survey of eyewitness researchers revealed substantial agreement about (most of) their effects; (3) my personal experience in about 100 cases in which I served as a consultant or expert witness reveals that these variables are common; and (4) research shows that most of the variables are not merely a matter of commonsense—a justification often given by judges for excluding expert psychological testimony about estimator variables. An additional estimator variable, eyewitness confidence, also meets these criteria but will not be discussed in this article.

My discussion will proceed as follows: First, I will present a research summary for each factor. Next, I will summarize the results from the survey of eyewitness researchers. Finally, I will present research addressing the extent to which these factors are a matter of common sense to jurors.

---

4 Id.
5 Id.
6 See Cutler & Penrod, supra note 1 (for a more thorough review of estimator variables and related issues).
7 Id. at 79-112.
I. Estimator Variables

Where possible, I rely on conclusions from meta-analyses to explain the effects of estimator variables. Meta-analysis is a technique for summarizing the results of multiple—sometimes conflicting—studies to arrive at a general conclusion regarding the effects of a variable on identification accuracy. For example, meta-analysis can be used to average the results across numerous studies to see if, across studies, the effect of a given factor is positive, negative, or inconsequential. Meta-analysis can also be used to identify factors that qualify the effect of a given estimator variable on identification accuracy. For example, one estimator variable might have a large effect on identification accuracy in a group of studies that share a common feature but a small effect in another group of studies that do not share that feature. More specific examples are given below in the descriptions of the study findings. It is important to note that meta-analysis is a commonly accepted technique for reviewing a research literature both within and outside the field of psychology.

Another common feature of the research cited below is the use of target-present and target-absent lineups or photo arrays. The target is the person to be identified, such as the robber in a simulated robbery. Target-present lineups are those in which the to-be-identified target appears in the lineup, thus simulating the situation in which the suspect is the perpetrator. Modern research also commonly uses target-absent lineups, in which the target is replaced with someone who looks like him. Target-absent lineups simulate the condition in which the suspect is not the perpetrator. Normally, each eyewitness is shown either a target-present or target-absent lineup, not both. Use of both target-present and target-absent lineups enables the researcher to independently examine the influence of each factor on the likelihood of correct identifications (i.e., from target-present lineups) and false identifications (i.e., from target-absent lineups).

A. Own-Race Bias

Own-race bias refers to the common finding that eyewitnesses are more accurate at identifying perpetrators of their own race than perpetrators of other races. A recent meta-analysis reviewed the results of thirty-nine separate studies involving ninety-one separate experimental

---

tests of own-versus same-race identifications.\textsuperscript{9} In total, nearly 5,000 eyewitnesses participated in these studies.\textsuperscript{10} Across all studies, witnesses were 1.4 times more likely to correctly identify a previously viewed own-race face when compared with performance for other-race faces.\textsuperscript{11} Witnesses were 1.56 times more likely to falsely identify a novel other-race face when compared with own-race faces.\textsuperscript{12} White participants demonstrated a significantly larger own-race bias when compared with Black participants, but only with respect to false identifications.\textsuperscript{13} With respect to correct identifications, Whites and Blacks showed the same own-race bias.\textsuperscript{14} The own-race bias effect was larger with shorter exposure durations (i.e., the amount of time for which the eyewitness was able to view the perpetrator).\textsuperscript{15} This meta-analysis also examined recognition of other races (e.g., Hispanic, Asian), but there were many fewer studies using these groups.\textsuperscript{16}

The own-race bias is nicely illustrated in a study by Platz and Hosch (1988).\textsuperscript{17} They conducted a field study in which White, Black or Hispanic customers visited and interacted with ninety White, Black, or Hispanic convenience clerks.\textsuperscript{18} Two to three hours after each visit, an investigator asked the clerk to attempt an identification from photo arrays containing the customers.\textsuperscript{19} White clerks were more likely to correctly recognize White customers (53.2%) than Black (40.4%) or Mexican (34%) customers.\textsuperscript{20} Black clerks were more likely to correctly recognize Black (63.6%) than White (54.6) or Hispanic (45.4%) customers.\textsuperscript{21} Hispanic were more likely to correctly recognize Hispanic (53.6%) than White (35.7%) or Black (25%) customers.\textsuperscript{22}

\textsuperscript{9} Id.
\textsuperscript{10} Id. at 13.
\textsuperscript{11} Id. at 15.
\textsuperscript{12} Id.
\textsuperscript{13} Id. at 19.
\textsuperscript{14} Id.
\textsuperscript{15} Id.
\textsuperscript{16} Id. at 14.
\textsuperscript{18} Id. at 974-75.
\textsuperscript{19} Id. at 975.
\textsuperscript{20} Id. at 978.
\textsuperscript{21} Id.
\textsuperscript{22} Id.
B. Exposure Duration

Exposure duration refers to the amount of time for which an eyewitness is able to view a perpetrator at the time of the crime. Some crimes occur in a matter of seconds or minutes (in such cases the eyewitness's opportunity to view the perpetrator is very brief), while others unfold over hours or—such as in the case of kidnapping—days. Not surprisingly, the more time an eyewitness has to view a perpetrator, the more time she has to encode the perpetrator's characteristics into memory, and the more likely she is to make a correct identification at a later time. In a meta-analysis of 128 studies involving nearly 17,000 participant-witnesses, exposure duration significantly predicted identification accuracy.23

To illustrate, Memon, Hope, and Bull exposed sixty-four young adults (ages 17-25) and older adults (ages 59-81) to a videotaped reconstruction of a robbery in which the perpetrator's face could be seen for either twelve seconds or forty-five seconds.24 Each witness then attempted to identify the robber from a target-present or target-absent photo array.25 Exposure duration had a significant impact on identification accuracy;26 95% of the young adults and 85% of the older adults made correct identifications from the target-present photo arrays when the robber was exposed for forty-five seconds,27 but only 29% of the young adults and 35% of the older adults made correct identifications when the robber was exposed for twelve seconds.28 Similarly, 41% of the younger adults and 50% of the older adults made false identifications from the target-absent photo arrays when the target was exposed for forty-five seconds,29 but 90% of the younger adults and 80% of the older adults made false identifications when the robber was exposed for only twelve seconds.30

25 Id. at 343.
26 Id. at 344.
27 Id. at 345.
28 Id.
29 Id.
30 Id.
C. Masking of Hair and Hairline Cues

It is not uncommon for crime perpetrators to attempt to partially disguise themselves by wearing some kind of hat or hood that covers their hair and hairline. As this section will show, the hair and hairline have been found to be important cues for identification accuracy. In each of six studies, eyewitnesses viewed versions of a videotaped enactment of a robbery and at a later time attempted identifications from perpetrator-present or perpetrator-absent lineups.31 Across these studies, many variables were systematically manipulated to examine their impact on identification accuracy—including masking of the hair and hairline.32 In half of the crimes from each study, the perpetrator wore a hat that covered his hair and hairline, thus masking these cues. In the other half, the perpetrator wore no hat.

The results of these studies are summarized below. In data from over 1300 eyewitnesses, the percentage of correct judgments on identification tests was lower among eyewitnesses who viewed perpetrators wearing hats (44%) than among eyewitnesses who viewed perpetrators whose hair and hairlines were visible (57%). As table 1 illustrates, this trend is present in each study. This result was not qualified by type of lineup, suggesting that the masking of hair and hairline cues comparably influenced identification accuracy in both target-present and target-absent lineups.

32 Lineup Construction, supra note 31, at 283; System and Estimator Variables, supra note 31, at 240; Putting Context Into Context, supra note 31, at 631.
Table 1 Effect of Masking Hair and Hairline Cues on Identification Accuracy

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>No Hat (%) Correct</th>
<th>Hat Worn (%) Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>C P M 87a</td>
<td>165</td>
<td>45</td>
<td>27</td>
</tr>
<tr>
<td>C P M 87b</td>
<td>290</td>
<td>51</td>
<td>40</td>
</tr>
<tr>
<td>C P O M 86 I</td>
<td>320</td>
<td>46</td>
<td>30</td>
</tr>
<tr>
<td>C P O M 86 II</td>
<td>287</td>
<td>71</td>
<td>55</td>
</tr>
<tr>
<td>C &amp; P 88c</td>
<td>175</td>
<td>81</td>
<td>69</td>
</tr>
<tr>
<td>O et al 89f</td>
<td>120</td>
<td>50</td>
<td>43</td>
</tr>
<tr>
<td>Total/Unweighted Average</td>
<td>1357</td>
<td>57</td>
<td>44</td>
</tr>
</tbody>
</table>

NOTE: Studies included both target-present and target-absent lineups.

c B.L. Cutler, et al., Study 1, supra note 31.
f T.E. O’Rourke et al., supra note 31.

D. Weapon Focus

An eyewitness’s capacity for attention is limited. When a weapon is visually present, it has the potential to draw the eyewitness’s attention away from the perpetrator. This is referred to as the weapon focus effect. To the extent that an eyewitness focuses her attention on the weapon, she has less attention to focus on the perpetrator’s characteristics. Consequently, when a weapon is visually present during a crime, there is a greater potential for mistakes in subsequent identification tests than when no weapon is visually present.

Nancy Steblay conducted a meta-analysis of nineteen separate tests of the weapon focus effect involving over 2000 eyewitnesses to crime simulations. Weapon focus had a small but statistically significant ef-

---

34 Id.
fect on identification accuracy. For example, in a study by O’Rourke, Penrod, Cutler, and Stuve, 120 community members (members of a church group, parents of a local Boy Scout troop, and undergraduate summer school students) viewed videotaped crime enactments. In half of the videotapes a weapon was present, and in the other half the weapon was absent. Seven days later, each eyewitness was shown a videotape of either a target-present or target-absent lineup. The percentage of correct decisions on the lineup test was 55% for weapon-present and 37% for weapon-absent groups—a statistically significant difference. The weapon focus effect was comparable for both target-present and target-absent lineups.

E. Eyewitness Stress

While some eyewitnesses might claim that the extreme stress they experienced from seeing an excessively violent crime actually heightened their awareness and facilitated accurate memory, research shows that extreme stress has a debilitative effect on subsequent identification accuracy. A very recent meta-analysis by Deffenbacher, Bornstein, Penrod, and McGorty examined the effect of stress in twenty-seven separate tests involving over 1700 participant-witnesses. The results clearly showed that stress had a negative impact on identification accuracy. Across all studies, participants made correct identifications (which, by definition, can only occur in target-present lineups) at a rate of 59% under high-stress conditions, but 59% under low-stress conditions. The percentage of false identifications from target-absent lineups was relatively high (66%), but was not significantly influenced by stress. The rate of false identifications from target-present lineups (meaning identifications of persons other than the target even though the target is

---

35 Id. at 417.
36 T.E. O’Rourke et al., supra note 31, at 385-95.
37 Id. at 387.
38 Id.
39 Id. at 389.
40 Id. at 391.
42 Id. at 687-706.
43 Id. at 692.
44 Id. at 694.
45 Id. at 695.
46 Id.
present) was higher in the high-stress condition (34%) than in the low-stress condition (19%). Thus, although stress impacted correct identifications but was nonsignificant for false identifications, the authors made a compelling argument that stress will adversely impact the relative mix of correct and false identifications.

Consider an example of the study of stress and eyewitness performance performed by Morgan et al. Morgan et al. investigated the impact of extreme versus mild stress on identification accuracy in a sample of 530 active-duty military personnel enrolled in military survival school training. As part of their training, some participants experienced two types of interrogation: a high-stress interrogation with real physical confrontation, and a low-stress interrogation without real physical confrontation. Other participants experienced either high- or low-stress interrogations. Participants—as eyewitnesses to the interrogation—attempted to identify their interrogators from lineups which were either live (simultaneous presentation) or photographic (simultaneous or sequential presentation). Among eyewitnesses shown live, target-present lineups, the percentage of correct identifications was much higher in the low-stress condition (62%) than in the high-stress condition (30%). False identification rates from live, target-absent lineups were not affected by stress condition. The same pattern (greater accuracy in the low-stress condition) held for simultaneously presented target-present photographic lineups (76% v. 34%) and sequentially presented target-present photographic lineups (76% v. 49%, respectively). Again, stress did not significantly influence identification performance in the corresponding target-absent lineup conditions.

---

47 Id. at 696.
48 Id. at 701.
50 Id. at 268.
51 Id.
52 Id. at 269.
53 Id. at 272.
54 Id.
55 Id.
56 Id.
57 Id.
F. Passage of Time

Generally speaking, memory decays over time. The decay function is not linear; rather, greater decay occurs early on and the rate of decay lessons over time. This function has come to be known as the "forgetting curve." The impact of the passage of time was investigated in the aforementioned meta-analysis by Shapiro and Penrod. Longer time intervals led to lower likelihoods of correct identification.

For example, Krafka and Penrod conducted a field experiment in which eighty-five convenience store clerks were asked to identify—from target-present or target-absent photo arrays—a previously encountered customer either two or twenty-four hours after the encounter. False identifications from target-absent photo arrays were far more prevalent after twenty-four hours (52.4%) than after two hours (15%). When the customer was present in the photo arrays, however, the difference in retention interval did not significantly affect performance (42.9% v. 39.1%, respectively).

II. Consensus Within the Scientific Community

Kassin, Tubb, Hosch, and Memon reported the results of a study in which they identified and surveyed sixty-four psychologists with scholarly expertise in the area of eyewitness memory. Most of the respondents had doctoral degrees in social or cognitive psychology. On average, each expert had authored two books, six chapters in edited volumes, and thirteen scientific journal articles on psychology of eyewitness memory, and 78% had been asked to testify as an expert at least once. The sample of experts reported having given expert testimony

59 Id. at 143.
61 Id. at 62.
62 Id. at 65.
63 Id.
65 Id. at 407.
66 Id. at 409.
67 Id.
an average of thirty-three times each. In total, the sixty-four experts had testified 1373 times.

The experts were asked (1) whether each phenomenon in a long list is reliable enough for psychologists to present it in courtroom testimony, and (2) whether their opinion on the issue was based on published, peer reviewed, scientific research. Table 2, set forth below, illustrates the results. The numbers in the second and third columns are percentages of experts who answered affirmatively. Masking of hair and hairline cues was not included as an eyewitness factor in the survey.

**Table 2 Expert Agreement on Research Reliability**

<table>
<thead>
<tr>
<th>Eyewitness Factor</th>
<th>Reliable enough? (% Agreeing)</th>
<th>Opinion based on research? (% Answering Affirmatively)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own-Race Bias</td>
<td>90</td>
<td>97</td>
</tr>
<tr>
<td>Exposure Duration</td>
<td>81</td>
<td>93</td>
</tr>
<tr>
<td>Weapon Focus</td>
<td>87</td>
<td>97</td>
</tr>
<tr>
<td>Stress</td>
<td>50</td>
<td>77</td>
</tr>
<tr>
<td>Passage of Time</td>
<td>83</td>
<td>93</td>
</tr>
</tbody>
</table>

Several findings are noteworthy. First, 81% to 90% of the experts agreed that research findings regarding exposure duration, passage of time between the crime and the identification, weapon focus, and own-race bias are reliable enough for expert testimony. Ninety-three percent or more of the experts stated that their opinions regarding these four factors were based on the extant research. Half of the experts agreed that the research on stress is reliable enough for expert testimony. Note, however, that the Deffenbacher et al. meta-analysis described above, which provides the most compelling evidence to date on the impact of stress, had not been published at the time of this survey. The Morgan et al. study, which is a very compelling demonstration using realistic stress levels, was also published after the survey data.

---

68 Id.
69 Id.
70 Id. at 407.
71 Id. at 412.
72 Id.
73 Id.
74 Deffenbacher et al., supra notes 41-48 and accompanying text.
were collected. The addition of these publications to the existing literature should further increase the level of expert agreement on the reliability of research on stress and eyewitness identification.

III. ARE ESTIMATOR VARIABLES A MATTER OF COMMON SENSE?

Attempts to introduce expert testimony about estimator variables frequently fail. As noted above, the most common reason given by judges for refusing to admit expert testimony is that eyewitness memory is largely a matter of common sense, and that expert testimony is therefore not needed.76 A substantial body of psychological research calls this assertion into question.77 For example, Cutler, Penrod, and Dexter showed various versions of a videotaped trial simulation to 450 jurors and undergraduate students.78 Within these versions, the authors manipulated the masking of hair and hairline cues, weapon focus, stress experienced by the witness, and the amount of time between the crime and the identification, as follows:

1. **Masking of Hair and Hairline Cues.** In half of the trials, the eyewitness testified that the perpetrator wore a hat covering his hair and hairline (high masking condition).79 In the other half, the eyewitness testified that the perpetrator wore no hat (low masking condition).80

2. **Weapon Focus.** In half of the trials, the eyewitness testified that throughout the robbery a handgun was outwardly brandished and pointed at her (high weapon focus condition).81 In the other half, she testified that the robber had a gun but it was hidden in his coat for most of the time (low weapon focus condition).82

3. **Eyewitness Stress.** In half of the trials, the eyewitness testified that the robber threatened to kill her, manhandled her, fired his handgun into the floor, and pushed her to the floor before leaving (high-stress condition).83 In the other half, she testified that the robber calmly and quietly demanded the money and then left (low-stress condition).84

---

76 Cutler & Penrod, *supra* note 1.
77 See id. (for a review of this research).
79 Id. at 188.
80 Id.
81 Id.
82 Id.
83 Id.
84 Id.
4. Passage of Time. In half of the trials, the eyewitness testified that she identified the robber fourteen days after the crime (high passage of time condition). In the other half, the eyewitness testified that she identified the robber two days after the crime (low passage of time condition).

After viewing the trial, participant-jurors evaluated the evidence and rendered verdicts. The following table summarizes the impact of the four estimator variables on jurors' verdicts.

**Table 3 Impact of Estimator Variables on Juror Verdicts in Trial Simulations**

<table>
<thead>
<tr>
<th>Eyewitness Factor</th>
<th>Low Condition (% Convictions)</th>
<th>High Condition (% Convictions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masking of Cues</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>Weapon Focus</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>Eyewitness Stress</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>Passage of Time</td>
<td>63</td>
<td>63</td>
</tr>
</tbody>
</table>

As table 3 illustrates, none of the four estimator variables had any impact on jurors' decisions, suggesting that the effects of these variables are not a matter of common sense.

**Conclusions**

In summary, scientific research findings and expert consensus support the conclusion that the six variables reviewed here—own-race bias, exposure duration, masking of hair and hairline cues, weapon focus, eyewitness stress, and the passage of time—are reliable predictors of identification accuracy. These factors are not merely a matter of common sense. Therefore, individuals who must evaluate eyewitness identifications—investigators, attorneys, judges, and jurors—would benefit from education about the effects of estimator variables on identification accuracy. It should be noted, moreover, that these six variables are merely a sample of estimator variables.

Some caveats to these conclusions are also appropriate. First, the effects of the estimator variables reviewed here are likely to be qualified

---

85 *Id.*
86 *Id.*
by other factors, some of which are known and discussed in the research, while others remain unknown. Further, although psychology has made great strides in identifying reliable estimator variables, there are limitations in how this information should be used. While some may be comfortable drawing general conclusions about the effects of estimator variables (e.g., own-race recognitions are more likely to be accurate than other-race recognitions), no one should be comfortable precisely quantifying these effects. This is because reviews of the research reveal that the effects of estimator variables can vary substantially as a function of other factors, some understood and some not understood. More defensible conclusions would take the following form: Eyewitnesses are more likely to make false identifications (or correct identifications) in \( X \) condition than in \( Y \) condition. Conclusions about the accuracy of individual eyewitnesses based on estimator variables are inappropriate. The science is simply not advanced enough to permit such predictions.