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Identifying the Culprit
Assessing Eyewitness Identification

**Committee on Scientific Approaches to Understanding and
Maximizing the Validity and Reliability of Eyewitness
Identification in Law Enforcement and the Courts**

Committee on Science, Technology, and Law

Policy and Global Affairs

Committee on Law and Justice

Division of Behavioral and Social Sciences and Education

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Summary

Eyewitnesses play an important role in criminal cases when they can identify culprits.¹ Yet it is well known that eyewitnesses make mistakes, and their memories can be affected by various factors including the very law enforcement procedures designed to test their memories. For several decades, scientists have conducted research on the factors that affect the accuracy of eyewitness identification procedures. Basic research on the processes that underlie human visual perception and memory have given us an increasingly clear picture of how eyewitness identifications are made and, more important, an improved understanding of the principled limits on vision and memory that may lead to failures of identification. Basic research has been complemented by a growing body of applied research on eyewitness identification, which has examined those variables that particularly affect eyewitnesses to crimes: *system variables* (conditions such as the procedures followed to obtain identifications that can be controlled by law enforcement) and *estimator variables* (conditions associated with the actual crime, such as viewing conditions, or factors specific to the eyewitness, such as the race of the victim relative to that of the perpetrator, that cannot be controlled by law enforcement).

Through such scientific research, we have learned that many factors influence the visual perceptual experience: dim illumination and brief viewing times, large viewing distances, duress, elevated emotions, and the presence of a visually distracting element such as a gun or a knife. Gaps in sensory input are filled by expectations that are based on prior experiences with the world. Prior experiences are capable of biasing the visual perceptual experience and reinforcing an individual's conception of what was seen. We also have learned that these qualified perceptual experiences are stored by a system of memory that is highly malleable and continuously evolving, neither retaining nor divulging content in an informational vacuum. The fidelity of our memories to actual events may be compromised by many factors at all stages of processing, from encoding to storage to retrieval. Unknown to the individual, memories are forgotten, reconstructed, updated, and distorted. Therefore, caution must be exercised when utilizing eyewitness procedures and when relying on eyewitness identifications in a judicial context.

In 2013, the Laura and John Arnold Foundation called on the National Academy of Sciences (NAS) to appoint an ad hoc study committee to:

1. critically assess the existing body of scientific research as it relates to eyewitness identification;
2. identify any gaps in the existing body of literature and suggest appropriate research questions to pursue that will further our understanding of eyewitness identification and that might offer additional insight into law enforcement and courtroom practice;
3. provide an assessment of what can be learned from research fields outside of eyewitness identification;
4. offer recommendations for best practices in the handling of eyewitness identifications by law enforcement;
5. offer recommendations for developing jury instructions;
6. offer advice regarding the scope of a Phase II consideration of neuroscience research as well as any other areas of research that might have a bearing on eyewitness identification; and
7. write a consensus report with appropriate findings and recommendations.

The committee heard from numerous experts, practitioners, and stakeholders and reviewed relevant published and unpublished literature as well as submissions provided to the committee. In this report, the committee offers its findings and recommendations for:

¹Throughout this report, the term *identification* denotes person recognition. *Eyewitness identification* refers to recognition by a witness to a crime of a culprit unknown to the witness.

- identifying and facilitating best practices in eyewitness procedures for the law enforcement community;
- strengthening the value of eyewitness identification evidence in court; and
- improving the scientific foundation underpinning eyewitness identification.

OVERARCHING FINDINGS

The committee is confident that the law enforcement community, while operating under considerable pressure and resource constraints, is working to improve the accuracy of eyewitness identifications. These efforts, however, have not been uniform and often fall short as a result of insufficient training, the absence of standard operating procedures, and the continuing presence of actions and statements at the crime scene and elsewhere that may intentionally or unintentionally influence eyewitness' identifications.

Basic scientific research on human visual perception and memory has provided an increasingly sophisticated understanding of how these systems work and how they place principled limits on the accuracy of eyewitness identification.² Basic research alone is insufficient for understanding conditions in the field, and thus has been augmented by studies applied to the specific practical problem of eyewitness identification. Applied research has identified key variables that affect the accuracy and reliability of eyewitness identifications and has been instrumental in informing law enforcement, the bar, and the judiciary of the frailties of eyewitness identification testimony.

A range of best practices has been validated by scientific methods and research and represents a starting place for efforts to improve eyewitness identification procedures. A number of law enforcement agencies have, in fact, adopted research-based best practices. This report makes actionable recommendations on, for example, the importance of adopting “blinded” eyewitness identification procedures. It further recommends that standardized and easily understood instructions be provided to eyewitnesses and calls for the careful documentation of eyewitness' confidence statements. Such improvements may be broadly implemented by law enforcement now. It is important to recognize, however, that, in certain cases, the state of scientific research on eyewitness identification is unsettled. For example, the relative superiority of competing identification procedures (i.e., simultaneous versus sequential lineups) is unresolved.

The field would benefit from collaborative research among scientists and law enforcement personnel in the identification and validation of new best practices that can improve eyewitness identification procedures. Such a foundation can be solidified through the use of more effective research designs (for example, those that consider more than one variable at a time, and in different study populations to ensure reproducibility and generalizability), more informative statistical measures and analyses (i.e., methods from statistical machine learning and signal detection theory to evaluate the performance of binary classification tasks), more probing analyses of research findings (such as analyses of consequences of data uncertainties), and more sophisticated systematic reviews and meta-analyses (that take account of current guidelines, including transparency and reproducibility of methods).

In view of the complexity of the effects of both system and estimator variables and their interactions on eyewitness identification accuracy, better experimental designs that incorporate selected combinations of these variables (e.g., presence or absence of a weapon, lighting conditions, etc.) will elucidate those variables with meaningful influence on eyewitness performance, which can, in turn, inform law enforcement practice of eyewitness identification procedures. To date, the eyewitness literature has

²Basic research on vision and memory seeks a comprehensive understanding of how these systems are organized and how they operate generally. The understanding derived from basic research includes principles that enable one to predict how a system (such as vision or memory) might behave under specific conditions (such as those associated with witnessing a crime), and to identify the conditions under which it will operate most effectively and those under which it will fail. Applied research, by contrast, empirically evaluates specific hypotheses about how a system will behave under a particular set of real-world conditions.

evaluated procedures mostly in terms of a single diagnosticity ratio or an ROC (Receiver Operating Characteristic) curve; even if uncertainty is incorporated into the analysis, many other powerful tools for evaluating a “binary classifier” are available and worthy of consideration.³ Finally, syntheses of eyewitness research has been limited to meta-analyses that have not been conducted in the context of systematic reviews. Systematic reviews of stronger research studies need to conform to current standards and be translated into terms that are useful for decision makers.

The committee here offers a summary of its key recommendations to strengthen the effectiveness of policies and procedures used to obtain accurate eyewitness identifications.

RECOMMENDATIONS TO ESTABLISH BEST PRACTICES FOR THE LAW ENFORCEMENT COMMUNITY

The committee’s review of law enforcement practices and procedures, coupled with its consideration of the scientific literature, has identified a number of areas where eyewitness identification procedures could be strengthened. The practices and procedures considered here involve acquisition of data that reflect a witness’ identification and the contextual factors that bear on that identification. A recurrent theme underlying the committee’s recommendations is development of and adherence to guidelines that are consistent with scientific standards for data collection and reporting.

Recommendation #1: Train All Law Enforcement Officers in Eyewitness Identification

The committee **recommends** that all law enforcement agencies provide their officers and agents with training on vision and memory and the variables that affect them, on practices for minimizing contamination, and on effective eyewitness identification protocols.

Recommendation #2: Implement Double-Blind Lineup and Photo Array Procedures

The committee **recommends** blind (double-blind or blinded) administration of both photo arrays and live lineups and the adoption of clear, written policies and training on photo array and live lineup administration.

Recommendation #3: Develop and Use Standardized Witness Instructions

The committee **recommends** the development of a standard set of easily understood instructions to use when engaging a witness in an identification procedure.

Recommendation #4: Document Witness Confidence Judgments

The committee **recommends** that law enforcement document the witness’ level of confidence verbatim at the time when she or he first identifies a suspect.

Recommendation #5: Videotape the Witness Identification Process

The committee **recommends** that the video recording of eyewitness identification procedures become standard practice.

³T. Hastie, R. Tibshirani, and J.H. Friedman, *The Elements of Statistical Learning: Data Mining, Inference, and Prediction* (New York: Springer, 2009).