

Human Memory and the Reliability of Eyewitness Testimony: An Empirical Analysis of Misidentification, Memory Distortion, and Evidentiary Reliability

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ABSTRACT

Eyewitness testimony remains one of the most influential forms of evidence in criminal adjudication, yet empirical research demonstrates that human memory is vulnerable to systematic distortion. This study examines the reliability of eyewitness testimony through an empirical analysis of publicly available exoneration data, experimental research, systematic reviews, and documented eyewitness-identification cases. Rather than relying upon fabricated primary-survey responses, the study employs secondary empirical data from the Innocence Project, the National Registry of Exonerations, the National Research Council, and peer-reviewed psychological research available up to December 2024. The analysis demonstrates that eyewitness misidentification is a recurring contributor to wrongful convictions and that its significance cannot be explained solely by individual memory failure. The Innocence Project's dataset of 375 DNA exonerations in the United States records eyewitness misidentification in 69% of cases, with 42% involving cross-racial misidentification, 32% involving multiple misidentifications of the same person, and 84% involving misidentification by a surviving victim. The National Registry of Exonerations further recorded mistaken witness identification as a contributing factor in 43 of the 158 exonerations reported for 2024, representing approximately 27% of those cases. Experimental research indicates that post-event misinformation, suggestive questioning, stress, weapon focus, cross-racial identification, lineup procedures, and feedback can influence memory and identification accuracy. The empirical evidence also demonstrates an important distinction between witness confidence and accuracy: confidence may be affected by post-identification procedures and therefore cannot automatically be treated as an independent measure of reliability. The study argues that the legal system should replace a predominantly confidence-centered approach with a procedure-centered model of reliability assessment. It recommends systematic recording of initial witness statements and confidence, blind administration of identification procedures, fair lineup construction, neutral instructions, careful judicial treatment of estimator and system variables, greater use of scientifically grounded expert testimony, and corroborative evaluation of eyewitness evidence. The findings suggest that eyewitness reliability is not merely a psychological issue but an institutional and evidentiary problem requiring coordinated legal reform.

Keywords: Eyewitness Testimony; Human Memory; Eyewitness Misidentification; Wrongful Conviction; False Memory; Misinformation Effect.

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1. Introduction and Research Problem

Eyewitness testimony has traditionally been regarded as an important evidentiary mechanism because it appears to provide direct human access to events that occurred in the past. In criminal proceedings, the testimony of a person who claims to have seen an offender can influence investigation, charging decisions, plea negotiations, trial strategy, and judicial outcomes. Its persuasive force is particularly strong where the witness appears confident and provides a detailed account of the event. Yet the scientific study of memory has demonstrated that the apparent immediacy of eyewitness testimony does not guarantee factual accuracy. Human memory is reconstructive rather than reproductive: individuals do not retrieve an exact recording of an earlier experience but reconstruct aspects of that experience using stored information, contextual cues, expectations, and subsequent information (Loftus, 2005; Schacter, 1999). The legal consequences of this finding are considerable. A witness can be honest, sincere, and highly confident while nevertheless being mistaken. The central empirical problem is therefore not whether eyewitnesses can be accurate—they clearly can—but under what conditions their recollections and identifications become unreliable. This question has acquired particular importance because wrongful-conviction research provides an unusual opportunity to compare testimony presented as persuasive at trial with later objective evidence demonstrating innocence. DNA exoneration cases are especially valuable because biological evidence can establish that the convicted person was not the perpetrator, thereby providing an empirical basis for examining the factors that contributed to the original conviction. The Innocence Project's national dataset of 375 DNA exonerations through 2020 found that 69% involved eyewitness misidentification. Within those misidentification cases, 42% involved cross-racial identification, 32% involved multiple misidentifications of the same person, and 84% involved misidentification by a surviving victim. The dataset also identified several different identification mechanisms, including lineups, photo arrays, show-ups, in-court identification, composite sketches, and other procedures (Innocence Project, 2020). More recent exoneration data reinforce the continuing importance of the problem. The National Registry of Exonerations reported 158 exonerations in 2024, of which 43—approximately 27%—involved mistaken witness identification. These figures should not be interpreted as an estimate of the overall error rate of eyewitness testimony. Exoneration datasets are highly selected: they contain cases in which wrongful convictions were discovered, proved, and formally remedied. Nevertheless, they demonstrate that eyewitness error can have exceptionally serious consequences. The present study therefore addresses three research questions. **RQ1:** What does publicly available empirical evidence reveal about the prevalence and characteristics of eyewitness misidentification in wrongful-conviction cases? **RQ2:** Which cognitive and procedural variables are most consistently associated with eyewitness error and memory distortion? **RQ3:** What evidentiary and procedural reforms are justified by the empirical findings? The study adopts a secondary empirical research design. It does not claim to have conducted a primary survey or laboratory experiment. Instead, it analyses publicly available quantitative data from exoneration datasets and integrates those findings with peer-reviewed experimental and meta-analytic research. This methodology is appropriate because the research question concerns the relationship between scientific findings and legal reliability rather than public attitudes toward eyewitness testimony. It also avoids the methodological weakness of constructing artificial respondent data merely to make a legal article appear empirical. The article advances the hypothesis that **eyewitness**

misidentification is significantly associated with both estimator variables arising from the circumstances of observation and system variables arising from investigative and identification procedures, and that procedural safeguards can reduce avoidable identification error. A second hypothesis is that **witness confidence, particularly confidence measured after repeated exposure or feedback, should not be treated as a sufficient proxy for identification accuracy.** The significance of the study lies in connecting psychological evidence with legal institutional design. The problem is not simply that memory is imperfect. The deeper problem is that criminal justice procedures may either preserve the reliability of memory or unintentionally transform uncertain recollection into confident but inaccurate testimony. A legally sophisticated approach must therefore examine eyewitness evidence across its entire lifecycle—from perception at the crime scene, through memory consolidation and investigative questioning, to identification procedures and courtroom testimony.

2. Research Methodology, Data Sources, and Analytical Framework

The study employs a **secondary-data empirical methodology** combining descriptive quantitative analysis with interdisciplinary synthesis of experimental research. The principal empirical dataset is the Innocence Project's publicly available record of 375 DNA exonerations in the United States covering the period from 1989 through 2020. This dataset is particularly useful because it contains identified contributing factors and detailed categories of eyewitness misidentification. The dataset records 375 DNA exonerees, 69% of whose cases involved eyewitness misidentification. It further reports that 34% of misidentification cases involved an in-person lineup, 52% involved a photo array, 7% involved a mugshot book, 16% involved a show-up, 5% involved a one-on-one photograph, 27% involved a composite sketch, 11% involved voice misidentification, 2% involved hypnosis, and 54% involved in-court misidentification. Importantly, the categories overlap because a single case could involve more than one identification procedure. The dataset reports that 77% of misidentification cases involved multiple procedures, 84% involved misidentification by a surviving victim, 42% involved cross-racial misidentification, 32% involved multiple misidentifications of the same individual, and 18% involved at least one failure to identify the exoneree in a procedure (Innocence Project, 2020). The second principal source is the National Registry of Exonerations. Its 2024 data record 158 exonerations during the year, with mistaken witness identification present in 43 cases, or approximately 27.2%. The same dataset records false confessions in 22 cases and false or misleading forensic evidence in 44 cases, demonstrating that eyewitness error frequently exists alongside other institutional or evidentiary failures. For contextual comparison, the Registry's 2023 annual report recorded 153 exonerations occurring during 2023, including 50 cases involving mistaken witness identification. The empirical analysis therefore does not rely on a single organization or a single type of evidence. Instead, it compares two major wrongful-conviction databases and supplements them with experimental psychological research. The National Research Council's *Identifying the Culprit* is used as a principal scientific synthesis of eyewitness identification research, particularly regarding estimator and system variables (National Research Council, 2014). The study also incorporates peer-reviewed experimental research concerning misinformation, source monitoring, weapon focus, own-race bias, and confidence-accuracy relationships. The 2024

systematic review by Brassil et al. is particularly important because it provides contemporary evidence concerning individual cognitive differences and susceptibility to misinformation. The review examined nine studies and 23 associations between cognitive abilities and misinformation susceptibility and concluded that higher levels of several cognitive abilities were generally associated with reduced susceptibility, while no individual characteristic completely protected participants from misinformation (Brassil et al., 2024). For purposes of analysis, the study distinguishes **estimator variables** from **system variables**. Estimator variables arise from the conditions surrounding the original event and are generally outside the control of criminal justice institutions. Examples include lighting, distance, and duration of observation, stress, weapon presence, disguise, age, familiarity, and cross-racial identification. System variables are generated or influenced by investigative procedures, including lineup construction, instructions, administrator behavior, photographic procedures, repeated exposure, post-identification feedback, and documentation. The distinction is analytically important because estimator variables primarily require judicial evaluation, whereas system variables can be modified through institutional reform. The study uses descriptive percentages rather than inferential statistics because the available exoneration datasets are not random samples of all criminal cases. Calculating a population-level probability of eyewitness error from exoneration data would be methodologically inappropriate. Instead, the percentages are interpreted as **descriptive indicators of the contribution of eyewitness misidentification within known wrongful-conviction cases**. This limitation is essential. DNA exonerations disproportionately arise from serious crimes for which biological evidence was preserved and subsequently tested; therefore, the findings cannot simply be generalized to all eyewitness testimony. Nevertheless, the combination of exoneration evidence and controlled experimental research creates a strong triangulated empirical basis for assessing reliability. The analytical framework consequently proceeds through three levels: first, descriptive analysis of wrongful-conviction data; second, synthesis of experimental evidence concerning memory distortion and identification; and third, legal interpretation concerning the admissibility, weight, and procedural treatment of eyewitness evidence. The methodology is thus empirical without pretending that observational exoneration data can establish causal relationships on their own.

3. Empirical Findings: The Scale and Pattern of Eyewitness Misidentification

The empirical evidence demonstrates that eyewitness misidentification is not an isolated or anecdotal phenomenon. In the Innocence Project's dataset of 375 DNA exonerations, 69% involved eyewitness misidentification. This represents approximately 259 of the 375 cases. The magnitude of the percentage is significant, but its interpretation requires caution. The figure does not mean that 69% of all criminal convictions involving eyewitnesses are wrongful. Instead, it means that eyewitness misidentification was documented in a large majority of this particular set of DNA-confirmed wrongful convictions. The dataset therefore establishes the importance of eyewitness error within wrongful-conviction cases rather than the general prevalence of eyewitness error in the criminal justice system.

Table 1. Selected empirical indicators from the Innocence Project's 375 DNA-exoneration dataset

Variable	Reported proportion
DNA exonerations in dataset	375
Cases involving eyewitness misidentification	69%
Misidentification cases involving photo arrays	52%
Misidentification cases involving in-person lineups	34%
Misidentification cases involving cross-racial identification	42%
Misidentification cases involving multiple witnesses identifying the same person	32%
Misidentification cases involving a surviving victim	84%
Misidentification cases involving multiple identification procedures	77%
Misidentification cases involving an in-court identification	54%
Misidentification cases involving a show-up	16%
Misidentification cases involving composite sketches	27%
Misidentification cases involving voice identification	11%
Misidentification cases involving failure to identify the exoneree in at least one procedure	18%

Source: Innocence Project, DNA Exonerations in the United States (1989–2020). Categories may overlap and therefore should not be summed.

The distribution of identification procedures is particularly revealing. Photo arrays were present in 52% of the misidentification cases, while in-person lineups appeared in 34%. These figures should not be interpreted as evidence that photo arrays are inherently less reliable than live lineups because the dataset does not provide the denominator—the total number of photo arrays or lineups conducted across all cases. Instead, the figures demonstrate that wrongful identification can arise across multiple identification mechanisms. The fact that 77% of misidentification cases involved multiple procedures is particularly important. It suggests that identification error may be reinforced through repeated exposure. A witness who initially fails to identify a suspect may later encounter the same individual in another procedure, potentially creating familiarity that is mistaken for memory of the original event. The 18% figure involving at least one failure to identify the exoneree is also significant. A non-identification can be evidentially informative because it indicates that the witness did not initially recognize the innocent suspect under at least one procedure. Subsequent identification after repeated exposure may therefore require particularly careful scrutiny. Cross-racial identification provides another important empirical pattern. Forty-two percent of the misidentification cases in the Innocence Project's 375-case dataset involved cross-racial identification. This does not establish that cross-racial identification always produces error, but it supports the extensive experimental literature showing that recognition of unfamiliar racial-category faces can be more difficult than recognition of own-race faces (Meissner & Brigham, 2001). The finding is particularly relevant to jurisdictions characterized by racial, ethnic, linguistic, or culturally diverse populations. The data concerning multiple witnesses are equally important. Thirty-two percent of misidentification cases involved multiple witnesses incorrectly identifying the same person. This challenges the intuitive assumption that multiple consistent eyewitnesses necessarily provide independent corroboration. If witnesses communicate with each other or are exposed to the same investigative information, their memories may become socially convergent. Multiple witnesses can therefore reproduce the

same error rather than independently confirming truth. The 2024 National Registry data provide a contemporary institutional comparison. Of 158 exonerations occurring in 2024, 43 involved mistaken witness identification, representing approximately 27%. This is lower than the 69% observed in the Innocence Project's historical DNA-exoneration dataset, but the two percentages should not be directly interpreted as evidence that eyewitness error has declined. They measure different populations, periods, and forms of exoneration. The Innocence Project dataset is limited to DNA exonerations, whereas the National Registry covers exonerations more broadly. The difference nevertheless illustrates the importance of dataset construction in empirical legal research.

Table 2. Comparison of selected exoneration datasets

Dataset	Period / scope	Exonerations	Eyewitness-related finding
Innocence Project DNA dataset	1989–2020	375	69% involved eyewitness misidentification
National Registry of Exonerations	2023	153 occurring in 2023	50 involved mistaken witness identification
National Registry of Exonerations	2024	158 occurring in 2024	43 involved mistaken witness identification

Sources: Innocence Project (2020); National Registry of Exonerations (2024/2025 reporting). Percentages are descriptive and datasets are not directly interchangeable.

The 2023 and 2024 Registry figures further illustrate the persistence of the problem. Fifty of 153 exonerations occurring in 2023 involved mistaken witness identification, while 43 of 158 in 2024 involved that factor. The decline in absolute number should not be interpreted as evidence of a meaningful trend without a longer time series and appropriate statistical controls. Nevertheless, both years demonstrate that mistaken identification continues to appear in a substantial proportion of known exoneration cases. The empirical evidence therefore supports the first research question: eyewitness misidentification is a recurring contributor to wrongful convictions, and the problem occurs across different identification procedures and circumstances.

4. Memory Distortion and the Empirical Determinants of Eyewitness Reliability

The exoneration data establish the legal consequences of eyewitness error, but they do not by themselves explain the psychological mechanisms through which mistakes arise. Experimental memory research provides that explanatory dimension. One of the most robust findings concerns the misinformation effect. Loftus et al. (1978) demonstrated that information introduced after an event can influence later memory reports. Loftus (2005) subsequently documented decades of research showing that post-event information can become incorporated into recollection. In legal contexts, this is particularly important because witnesses are rarely questioned only once. A witness may initially provide an account, encounter other witnesses, see media coverage, receive information from investigators, view photographs, participate in identification procedures, and later testify in court. Each stage can potentially alter memory. Source-monitoring theory provides a mechanism for understanding such errors. Johnson et al. (1993) argued that remembering includes judgments concerning the origin of remembered information. A witness may therefore remember a face or detail but

misattribute its source, believing that it was part of the original event when it was actually encountered later. This helps explain why memory errors can be sincere rather than deceptive. The witness is not necessarily inventing information; the witness may simply misattribute information that genuinely entered the cognitive system. Stress represents another important variable. Criminal events can be highly stressful, and emotional arousal may affect attention and encoding. Weapon-focus research suggests that the presence of a weapon can direct attention toward the threatening object and reduce attention to other features, including the perpetrator's face (Loftus et al., 1987). The implication is not that stress always destroys memory. Rather, stress can affect which elements of an event receive attention and how accurately peripheral information is subsequently recalled. Cross-racial identification is another established factor. Meissner and Brigham's (2001) meta-analysis of research concerning the own-race bias found substantial evidence that recognition performance can differ according to the racial relationship between witness and target. Such findings are particularly important because legal systems may otherwise treat face recognition as a universal cognitive capacity. The empirical evidence indicates that familiarity and perceptual experience matter. The confidence-accuracy relationship is perhaps the most legally consequential issue. Witness confidence is psychologically compelling, but confidence can be influenced by factors occurring after the original identification. Feedback from investigators, repeated exposure to a suspect, and courtroom reinforcement can increase confidence even when accuracy does not increase correspondingly. This is why the National Research Council (2014) and contemporary identification reforms emphasize recording initial confidence at the time of identification. The distinction between initial and later confidence is critical. A witness who immediately says, "I am not sure," but later states in court that the identification was certain has undergone a confidence trajectory that the court should examine rather than simply accepting the later statement. Recent research confirms that memory vulnerability is not eliminated by individual cognitive strengths. Brassil et al. (2024) systematically reviewed nine studies and 23 associations concerning cognitive abilities and misinformation susceptibility. The review found generally lower susceptibility among participants with higher levels of several cognitive abilities, but no individual cognitive characteristic completely prevented misinformation effects. This finding supports a procedural rather than personality-based approach to eyewitness reliability. The empirical implication is that legal systems should not attempt to identify a special class of witnesses who are presumed to have "good memories." Even individuals with strong cognitive abilities remain capable of memory distortion under appropriate circumstances. The focus should instead be placed on the conditions under which memory is acquired and tested. System variables are particularly important because they are amenable to institutional intervention. Blind administration can reduce administrator influence. Fair lineup composition can reduce suspect conspicuousness. Neutral instructions can prevent witnesses from assuming that the perpetrator is necessarily present. Immediate recording of confidence can preserve the diagnostic value of the original identification. Avoiding repeated exposure can reduce familiarity-based contamination. These interventions transform psychological findings into legal safeguards. The empirical evidence therefore supports the second research question: eyewitness reliability is influenced by an interaction between cognitive processes and

institutional procedures, and the latter provide a particularly important opportunity for legal reform.

5. Empirical Findings and Evidentiary Implications for Criminal Adjudication

The empirical findings have direct consequences for the law of evidence. The first implication concerns the distinction between **credibility and reliability**. Credibility concerns whether a witness appears honest, consistent, and sincere. Reliability concerns whether the witness's recollection is likely to be accurate. The two concepts overlap but are not identical. A witness can be highly credible but factually mistaken. This distinction is essential because traditional courtroom practice may place considerable emphasis on demeanor and confidence. Scientific research suggests that such intuitive indicators are insufficient. The second implication concerns identification procedures. The empirical data show that wrongful identification occurs through photo arrays, live lineups, show-ups, composite sketches, in-court identifications, and other mechanisms. The appropriate legal response is therefore to evaluate the reliability of the particular procedure rather than assume that identification itself establishes guilt. The National Research Council recommended systematic safeguards concerning the administration and documentation of eyewitness identification, reflecting the scientific evidence concerning system variables (National Research Council, 2014). The third implication concerns repeated identification. The Innocence Project dataset indicates that 77% of misidentification cases involved multiple procedures. This does not prove that multiple procedures cause misidentification, because the data are observational. However, the finding is consistent with the psychological concern that repeated exposure can increase familiarity and potentially inflate confidence. Courts should therefore ask whether the witness's later identification was genuinely independent or whether it followed earlier suggestive exposure. The fourth implication concerns cross-racial identification. With 42% of the relevant Innocence Project misidentification cases involving cross-racial identification, courts should treat racial familiarity as a potentially relevant estimator variable where the evidence supports its significance. This does not justify a categorical rule that cross-racial identification is unreliable. Rather, it requires contextual assessment. The fifth implication concerns multiple eyewitnesses. The finding that 32% of misidentification cases involved multiple witnesses identifying the same innocent person demonstrates that corroboration must be assessed carefully. Multiple witnesses are not necessarily independent if they communicate or are exposed to common information. The law should therefore distinguish **numerical corroboration** from **independent corroboration**. Two witnesses repeating the same contaminated information do not necessarily provide the same evidentiary strength as two witnesses whose observations were independently recorded before they encountered one another. The sixth implication concerns non-identification. Eighteen percent of the Innocence Project misidentification cases involved at least one failure to identify the exoneree in an identification procedure. A failure to identify should not automatically prove innocence, but neither should it be disregarded when later identification occurs. A witness who initially rejects the suspect and later selects the same person after exposure to additional information presents a materially different evidentiary situation from a witness who makes a confident first identification under a properly administered blind procedure. The seventh implication concerns judicial instructions and expert testimony. Courts and juries cannot be expected to

possess intuitive knowledge of cognitive psychology. Expert evidence may therefore be appropriate where it helps explain established phenomena such as misinformation, weapon focus, cross-racial identification, confidence inflation, and the distinction between estimator and system variables. Such evidence should not tell the fact-finder what conclusion to reach. Its purpose should be educational: to correct misconceptions that ordinary experience may generate. The eighth implication concerns corroboration. Eyewitness evidence should be assessed in conjunction with independent evidence where available. Digital records, forensic evidence, alibi evidence, surveillance material, telecommunications records, and other objective evidence may strengthen or weaken an identification. Importantly, corroboration should be genuinely independent. Evidence derived from the same contaminated eyewitness source cannot necessarily provide meaningful corroboration. The ninth implication concerns constitutional and fair-trial safeguards. An identification procedure that is highly suggestive may undermine the fairness of criminal proceedings, particularly where the identification becomes the principal evidence against the accused. Although legal standards differ between jurisdictions, the empirical evidence supports a general principle: procedural fairness and evidentiary reliability are closely connected. The tenth implication concerns judicial reasoning. Courts should avoid the assumption that a witness who appears emotionally affected, detailed, or certain must necessarily be accurate. Scientific evidence indicates that subjective experience and objective accuracy can diverge. The appropriate judicial inquiry should instead consider the witness's opportunity to observe, the conditions of observation, the delay before identification, exposure to post-event information, the structure of the identification procedure, the witness's initial confidence, and the presence of independent corroboration. This represents a movement from **testimonial appearance** toward **evidentiary provenance**; an evaluation of how the evidence came into existence and how likely it is to have been altered before reaching the court.

6. Discussion: Toward a Procedure-Centered Model of Eyewitness Reliability

The empirical findings support a broader theoretical proposition: eyewitness reliability should be treated as a product of both human cognition and institutional procedure. Traditional evidentiary thinking may implicitly conceptualize the witness as the source of the evidence and the courtroom as the place where its credibility is tested. The scientific evidence demonstrates that this model is incomplete. Eyewitness evidence is produced through a sequence of interactions beginning at perception and extending through investigation, identification, preparation, and testimony. Every stage can potentially strengthen, preserve, or distort the original memory. A procedure-centered model should therefore begin with **early preservation**. The witness's initial narrative should be recorded as soon as practicable, preferably through audio or video recording. Investigators should use open-ended questions before introducing specific information. The initial statement becomes an evidentiary baseline against which subsequent changes can be evaluated. Second, identification procedures should be administered neutrally. The administrator should ideally be blind to the suspect's position. The witness should be told that the perpetrator may or may not be present. Fillers should be selected so that the suspect does not stand out. The procedure should be documented in sufficient detail to allow later judicial review. Third, initial confidence should be recorded immediately. This is particularly important because confidence can change after feedback or

repeated exposure. Fourth, witnesses should be separated where practicable to reduce memory conformity. If multiple witnesses independently report the same information before communicating with one another, their accounts possess greater evidentiary value than if their recollections converge after discussion. Fifth, courts should require particular scrutiny where identification follows a non-identification, suggestive photograph, show-up, social-media exposure, or repeated lineup. Such circumstances do not necessarily invalidate the evidence, but they increase the need for careful reliability assessment. Sixth, judicial education should incorporate basic findings from cognitive psychology. Legal decision-makers should understand that memory is reconstructive, that misinformation can alter recollection, that confidence may be affected by feedback, and that cross-racial identification may present distinctive challenges. Seventh, legal systems should establish accessible standards for expert testimony. Expert evidence should be based on peer-reviewed research and should distinguish well-established findings from contested propositions. Eighth, appellate courts should develop clearer standards for reviewing eyewitness evidence. Appellate review is particularly important where trial courts have placed substantial reliance on confidence without considering the conditions under which that confidence developed. Ninth, law-enforcement agencies should treat eyewitness memory as evidence requiring preservation, just as physical evidence requires preservation. The Innocence Project has aptly emphasized that memory should be handled carefully because investigative practices can alter it. Finally, reforms should be evaluated empirically. Legal reform should not end with the adoption of a statutory requirement. Agencies should collect data on identification procedures, non-identifications, confidence statements, lineup composition, and subsequent outcomes. The Northern California Innocence Project, for example, has undertaken a project involving public-record requests to hundreds of California law-enforcement agencies to assess eyewitness-identification policies, procedures, and training. Such initiatives illustrate how legal reform itself can become an empirical object of study. A significant limitation of the present research must nevertheless be acknowledged. Exoneration data cannot provide the true error rate of eyewitness testimony. They are subject to selection effects, because only a small proportion of wrongful convictions are detected and formally exonerated, and DNA evidence is available in only a subset of criminal cases. The Innocence Project itself cautions that its DNA-exoneration dataset represents a particular universe of cases rather than all criminal proceedings. Further, percentages across different datasets should not be treated as directly comparable because the underlying populations and definitions differ. The study also does not conduct a new laboratory experiment or primary field study. Its contribution lies instead in triangulating established empirical evidence with real-world exoneration data and translating that evidence into legal implications. This limitation does not weaken the central conclusion. Laboratory research provides causal evidence about specific cognitive mechanisms, while exoneration data demonstrate that the mechanisms identified experimentally can have severe consequences in real criminal cases. The two forms of evidence are complementary. The strongest legal response is therefore not to choose between psychology and legal doctrine but to integrate them. Eyewitness reliability should become an interdisciplinary evidentiary question in which legal standards are continuously informed by empirical research.

7. Conclusion and Policy Recommendations

The empirical evidence examined in this study demonstrates that eyewitness testimony is neither inherently unreliable nor sufficiently reliable to justify uncritical acceptance. Its evidentiary value depends upon the conditions under which the original observation occurred, the processes through which the memory was preserved, the investigative procedures used to obtain identification, and the extent to which independent evidence supports the witness's account. The Innocence Project's dataset of 375 DNA exonerations provides particularly strong evidence of the consequences of eyewitness error: 69% involved eyewitness misidentification, 42% involved cross-racial identification, 32% involved multiple witnesses misidentifying the same person, and 77% involved multiple identification procedures. Contemporary National Registry data demonstrate that mistaken witness identification remains relevant in recent exonerations, appearing in 43 of 158 exonerations occurring in 2024. These findings should not be transformed into an exaggerated claim that eyewitness evidence is generally inaccurate. Exoneration datasets are not representative samples of all criminal cases. Their principal value is different: they demonstrate the capacity of eyewitness error to produce serious and sometimes irreversible consequences. Experimental research explains why these errors occur. Memory is reconstructive, post-event misinformation can influence recollection, source monitoring can fail, stress can affect attention, weapon focus can alter encoding, cross-racial identification can present additional difficulties, and investigative procedures can influence identification and confidence. The 2024 systematic review literature further indicates that individual cognitive strengths may reduce susceptibility to misinformation but do not eliminate it. The policy implications are consequently clear. **First**, law-enforcement agencies should record initial witness statements before exposing witnesses to unnecessary external information. **Second**, identification procedures should be blind or double-blind wherever practicable. **Third**, witnesses should receive neutral instructions making clear that the perpetrator may not be present. **Fourth**, lineups and photo arrays should contain fair fillers and avoid making the suspect conspicuous. **Fifth**, the witness's confidence should be recorded immediately after the identification and before any feedback. **Sixth**, multiple witnesses should be separated before identification and interviewing to reduce memory conformity. **Seventh**, non-identifications should be preserved and disclosed rather than treated as irrelevant. **Eighth**, courts should receive structured information concerning estimator and system variables. **Ninth**, expert psychological testimony should be available where scientific principles are beyond ordinary judicial or juror knowledge. **Tenth**, courts should distinguish confidence from accuracy and later confidence from initial confidence. **Eleventh**, eyewitness evidence should be evaluated against genuinely independent corroborating evidence wherever available. **Twelfth**, legal institutions should collect and publish identification-procedure data so that reforms can be evaluated empirically. These measures do not weaken eyewitness evidence. On the contrary, they can increase its probative value by reducing avoidable sources of error. A properly administered identification accompanied by an immediately recorded confidence statement and supported by independent evidence provides a substantially stronger evidentiary foundation than an identification generated through repeated exposure, suggestive questioning, and later confidence reinforcement. The deeper lesson is that the reliability of eyewitness testimony is partly constructed by the legal system itself. The criminal process cannot control whether a witness encountered poor lighting or experienced acute stress during a crime. It can, however, control whether investigators

contaminate the memory, whether an identification procedure communicates expectations, whether initial uncertainty is preserved, and whether later confidence is mistaken for original certainty. The most defensible legal approach is therefore a **procedure-centered model of eyewitness reliability**. Under this model, courts do not ask simply whether a witness appears confident or sincere. They ask how the memory was formed, how it was preserved, how it was tested, and how much opportunity existed for contamination. This approach is consistent with the empirical nature of memory and with the fundamental objectives of evidence law. The ultimate objective of criminal adjudication is not merely to produce convictions but to produce accurate and legitimate determinations of responsibility. Eyewitness testimony can contribute significantly to that objective when properly collected and evaluated. But when confidence substitutes for scientific reliability, the same evidence can become a pathway to wrongful conviction. The integration of cognitive science, empirical data, and evidence law is therefore not an optional intellectual exercise. It is a necessary condition for a criminal justice system that seeks to treat human memory with the evidentiary caution that its scientific properties require.

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