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Reconstructive Memory and Eyewitness Error: Cognitive Neuroscience Insights for Police Investigative Practice

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RECONSTRUCTIVE MEMORY AND EYEWITNESS ERROR: COGNITIVE NEUROSCIENCE INSIGHTS FOR POLICE INVESTIGATIVE PRACTICE

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Abstract: The general public and the legal system often assume that human memory is mostly accurate. However, decades of psychology research reveal that eyewitness memory, which is often critical during criminal investigations, can be easily contaminated after the event occurs and is far from infallible. Instead, memory retrieval is a reconstructive process influenced by neural activity in the hippocampus, amygdala, and the prefrontal cortex, rendering it vulnerable to suggestion, stress, and other sources of bias during police interviews. Incorporating scientific insights into the vulnerabilities of eyewitness testimony can help minimize the harmful and often fatal consequences of mistaken eyewitness identification in wrongful convictions and meaningfully advance both procedural and substantive due process. This article explores (1) the neural mechanisms of memory, including an overview of memory encoding, storage, and retrieval, as well as the roles the hippocampus, prefrontal cortex, and amygdala play; and (2) how and when false memories tend to form, focusing on the misinformation effect, stereotypic memory errors, the weapon focus effect, and stress. The article concludes by providing evidence-based recommendations, such as the cognitive interview, that reduce memory distortion and improve the reliability of eyewitness testimony.

Despite advancements in forensic techniques, eyewitnesses remain central to criminal investigations and prosecutions. They provide vital information that guides police inquiries and influences judgments about the defendant's guilt.[2] The general public and the legal system often

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[2] Michel Ginet and Jean Py, "A Technique for Enhancing Memory in Eyewitness Testimonies for Use by Police Officers and Judicial Officials: The Cognitive Interview," *Le Travail Humain* 64, no. 2 (2001): 173–91.

assume that human memory is mostly accurate, particularly when the witness appears confident in their recollections.[3] However, memory research has consistently shown that memory is far from immune to mistakes and biases. Instead, eyewitness memory can be contaminated, as with all other forms of forensic evidence.[4] Notably, the U.S. Supreme Court's standard for determining whether a suggestive eyewitness identification poses a "substantial likelihood of irreparable misidentification" dates back to 1977.[5] This judicial failure to incorporate up-to-date scientific understandings of the fallibility of memory has significant and often deadly consequences. As of January 2020, there have been 375 documented DNA exonerations in the U.S.,[6] and mistaken eyewitness identification played a role in 75% of those cases.[7] These errors are not simply procedural failures. They reflect the fundamental nature of human memory, which is a reconstructive process shaped by hippocampal-prefrontal interactions and contextual influences, making it vulnerable to distortion from stress, attentional narrowing, and post-event suggestion during both encoding and retrieval. Because high-arousal memories of crime are especially susceptible to these biases, the criminal justice system must ground investigative practices in cognitive neuroscience and adopt techniques such as the cognitive interview to improve the reliability of eyewitness identifications and reduce wrongful convictions.

Far from being a passive recorder of past events, human memory is a flexible process that integrates new memories into existing networks of knowledge. Beyond attentional biases and situational factors that influence how information is initially encoded, the process of

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[3] Jessica W. Lacy and Craig E. L. Stark, "The Neuroscience of Memory: Implications for the Courtroom," *Nature Reviews Neuroscience* 14, no. 9 (2013): 649–58.
[4] Laura Mickes, Benjamin M. Wilson, and John T. Wixted, "The Cognitive Science of Eyewitness Memory," *Trends in Cognitive Sciences* (2025).
[5] Gary L. Wells and Deah S. Quinlivan, "Suggestive Eyewitness Identification Procedures and the Supreme Court's Reliability Test in Light of Eyewitness Science: 30 Years Later," *Law and Human Behavior* 33, no. 1 (2009): 1–24.
[6] Innocence Project, "Research Resources," accessed November 23, 2025, https://innocenceproject.org/research-resources/.
[7] Lacy and Stark, "Neuroscience of Memory."

reconsolidation during retrieval can modify earlier neural representations, producing false or incomplete recollections.[8] Central to this reconstructive process is the dynamic interaction between the hippocampus and prefrontal cortex. During retrieval, the prefrontal cortex guides the selection of memories most relevant to the current context, while the hippocampus retrieves associated details and activates the most fitting schema.[9] Thus, when an eyewitness recalls the experience of a crime, the present context and the retrieval cues supplied by law enforcement can become integrated with the original memory. Because the retrieval process automatically activates relevant schemas, eyewitnesses may unknowingly blend past perceptions with current expectations, reflecting a core function of human memory: using prior information to guide present behavior.[10] This automatic retrieval of related memories yields significant evolutionary benefits in everyday life, as knowledge about how events usually unfold can fill in missing details regarding what is most likely to happen.[11] However, in the context of eyewitness testimony, this susceptibility to false memory formation is problematic, particularly when the legal system presumes that confident, detailed recollections of the past are always reliable.[12]

Building on this understanding, decades of neuroscience and psychological research have demonstrated through controlled laboratory experiments that individuals often recall events they never actually experienced. The classic Deese-Roediger-McDermott paradigm tasks participants with remembering a list of semantically related words and tests their memory with either a recall or recognition test. The list centers on a missing word. For example, a list consisting of bed,

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[8] Andre G. Lentoor, "Cognitive and Neural Mechanisms Underlying False Memories: Misinformation, Distortion, or Erroneous Configuration?" *AIMS Neuroscience* 10, no. 3 (2023): 255–72.
[9] Alison R. Preston and Howard Eichenbaum, "Interplay of Hippocampus and Prefrontal Cortex in Memory," *Current Biology* 23, no. 17 (2013): R764–R73.
[10] Lacy and Stark, "Neuroscience of Memory."
[11] Selin Ikier, Can Dönerkayalı, Özlem S. Halıcı, Zeynep A. Kaymak Gülseren, Hande Göksal, and Burak Akbaş, "When Is Memory More Reliable? Scientific Findings, Theories, and Myths," *Applied Neuropsychology: Adult* 31, no. 1 (2024): 77–94.
[12] Lacy and Stark, "Neuroscience of Memory."

dream, nightmare, and night revolves around the related but excluded word "sleep." Across laboratory experiments, participants frequently report remembering related but missing critical words, thus retrieving a false memory.[13]

Elizabeth Loftus's pioneering work on eyewitness suggestibility in the 1970s extended these laboratory findings to real-world contexts, providing ecologically valid evidence that subtle post-event misinformation can induce false memories. In this research paradigm, after participants watch a visual sequence depicting a forensically relevant event, such as a traffic accident or theft incident, the researchers ask them about the event they just witnessed. The key manipulation here is the wording of the questions themselves. Comparisons of participants' subsequent eyewitness reports reveal that suggestive interview questions can generate significant errors in memory accuracy. One of Loftus's original studies concluded that subtle differences in word choice, such as using "smashed" instead of "hit" when asking participants how fast two vehicles were going during a video of a car accident, influenced participants' estimates of the cars' speeds and whether they had seen broken glass.[14] Taken together, these experiments show that contextual circumstances during encoding and retrieval powerfully reshape memory, systematically skewing people's reports of past events. The implications for eyewitness testimony are even more profound, as witnessing a crime typically involves intense emotional arousal and divided attention. In the aftermath of such a traumatic event, witnesses must recall both central and peripheral details that they may never have fully encoded, making their recollections especially susceptible to distortion.

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[13] Stephan Kuehnel, Matthias Mertens, Felix G. Woermann, and Hans J. Markowitsch, "Brain Activations during Correct and False Recognitions of Visual Stimuli: Implications for Eyewitness Decisions—An fMRI Study Using a Film Paradigm," *Brain Imaging and Behavior* 2, no. 3 (2008): 163–76; Andre G. Lentoor, "Cognitive and Neural Mechanisms Underlying False Memories: Misinformation, Distortion, or Erroneous Configuration?" *AIMS Neuroscience* 10, no. 3 (2023): 255–72.

[14] Maria S. Zaragoza, Robert F. Belli, and Kimberly E. Payment, "Misinformation Effects and the Suggestibility of Eyewitness Memory," in *Do Justice and Let the Sky Fall* (London: Psychology Press, 2013), 35–63.

To explain why such memory errors consistently occur, researchers have converged on two dominant frameworks: the Fuzzy-Trace Theory and the Source Monitoring Framework. The Fuzzy-Trace theory distinguishes between two types of memory traces that are often retrieved simultaneously but differ in the amount of detail contained. Verbatim traces include concrete details of the experience, and people forget them more quickly. Gist traces, on the other hand, consist of the individual's interpretation and summary of the event.[15] The recall of verbatim details usually suppresses inaccurate recollections. However, when detailed information is missing or when gist traces are especially salient due to other contextual factors, people may misinterpret a vivid but fake memory as if it had been experienced.[16] This explanation aligns with the brain's reliance on schemas to organize knowledge, as people are more prone to false memory formation when presented with information consistent with preexisting schemas.[17] Moreover, because recollection is a reconstructive process, memories become less episodic and more semantic over time. As the information is repeatedly retrieved and re-encoded under various conditions, the memories become broader and more generalized.[18] Thus, over time, fuzzy traces of past events can misdirect memory, and the neural resources required to distinguish between genuinely experienced and merely familiar information may not always be available, especially under conditions of high cognitive load or stress.[19]

Building on the insights of the Fuzzy-Trace Theory, the Source Monitoring Framework offers a complementary explanation of false memories, focusing on failures to identify the origins of remembered details. Although memories from different sources typically differ in perceptual, semantic, and affective content, these cues can become blurred during retrieval.

[15] Ikier et al., "When Is Memory More Reliable?"
[16] Lentoor, "Cognitive and Neural Mechanisms Underlying False Memories."
[17] Ikier et al., "When Is Memory More Reliable?"
[18] Lacy and Stark, "Neuroscience of Memory."
[19] Ikier et al., "When Is Memory More Reliable?"; Kuehnel et al., "Brain Activations during Correct and False Recognitions."

When individuals misattribute internally generated information or details encountered after the event to the original experience, false memories emerge.[20] This misattribution is especially likely in eyewitness testimony, as there is substantial overlap between the witnessed event and recollection during the police interview. When answering questions about what they saw, witnesses actively retrieve and reconstruct the original event in their mind.[21] If suggestive questions unintentionally introduce misinformation during the interview, the witness may misattribute that post-event misinformation to their original memory. Once reconsolidated into the neural representation of the witnessed event through long-term potentiation, this may lead to misrepresentations of the past, particularly for peripheral details that the witness was only exogenously attending to. Moreover, schema-driven source misattribution errors compound this effect, where people increasingly rely on group stereotypes as their memories fade.[22] Ultimately, both the Fuzzy-Trace Theory and the Source Monitoring Framework highlight why leaning on preexisting expectations about how the world tends to operate can contribute to false memory formation in the context of eyewitness testimony.

Beyond documenting the prevalence of false memories, researchers have increasingly focused on specific contextual and cognitive conditions that render eyewitness memories vulnerable to distortion. Pioneered by Loftus, one of the most well-documented sources of memory bias is the misinformation effect, where exposure to misleading post-event information leads eyewitnesses to report details they never encountered.[23] Although disagreements remain about whether this effect is due to destructive updating of the underlying memory or retrieval

[20] D. Stephen Lindsay, "Autobiographical Memory, Eyewitness Reports, and Public Policy," *Canadian Psychology / Psychologie Canadienne* 48, no. 2 (2007): 57–66; Zaragoza, Belli, and Payment, "Misinformation Effects."
[21] Zaragoza, Belli, and Payment, "Misinformation Effects."
[22] Heather M. Kleider, Kathy Pezdek, Stephen D. Goldinger, and Aaron Kirk, "Schema-Driven Source Misattribution Errors: Remembering the Expected from a Witnessed Event," *Applied Cognitive Psychology* 22, no. 1 (2008): 1–20.
[23] Zaragoza, Belli, and Payment, "Misinformation Effects."

failure,[24] the subtle nature of misinformation is alarming when applied to real-life witness testimony, as slight variations in the wording of a question can significantly affect recall accuracy.[25]

To investigate the neural mechanisms underlying the misinformation effect, neuroimaging studies have examined how patterns of brain activity differ during the retrieval of true and false memories. For example, a 2010 functional magnetic resonance imaging (fMRI) study presented participants with photographs of actors performing routine everyday activities. During a subsequent misinformation phase, participants viewed either critical items containing subtle alterations to the original scenes or control items that matched the initial photographs. A day later, participants completed an item memory recognition test and a conflict test, where they indicated whether they noticed any discrepancy between the initial photo and the written description. The behavioral results align with the misinformation effect. When the written descriptions conflicted with the photograph, participants chose the misinformation version on 33% of the trials. fMRI data indicate that ventral visual areas are more active during the retrieval of subsequent true memories than false memories, suggesting that accurate recall is associated with greater reactivation of the sensory cortex. Thus, strong encoding of specific details of an event may minimize the formation of false memories.[26] Two limitations of this experiment are its small sample size of eighteen participants and the use of non-forensic stimuli. However, these neuroimaging results provide valuable insights into how distinguishing between conflicting information about past events requires additional neural resources and how weak encoding of

[24] Ibid.
[25] Lacy and Stark, "Neuroscience of Memory."
[26] Crystal L. Baym and Benjamin D. Gonsalves, "Comparison of Neural Activity That Leads to True Memories, False Memories, and Forgetting: An fMRI Study of the Misinformation Effect," *Cognitive, Affective, & Behavioral Neuroscience* 10, no. 3 (2010): 339–48.

specific object features during an event renders that representation vulnerable to false memories.[27]

Importantly, eyewitness memory can be systematically biased even in the absence of explicit post-event misinformation. The contextual model of eyewitness identification explains how the type of crime committed may also influence memory accuracy. The perpetrator's social identities, including race and gender, may activate specific stereotypes that push eyewitnesses to encode prototypical facial features preferentially. This enhanced encoding will then make those prototypical features more accessible during retrieval.[28] Kleider et al.'s 2012 experiment powerfully illustrates this preference for stereotype-consistent information. Participants viewed a series of images of Black male faces, then they rated how believable each would be as an actor auditioning for the role of artist, teacher, or drug dealer. After a twenty-minute distraction task, participants identified each actor's role from the beginning. Notably, faces that were scored higher on perceived Black stereotypicality were more likely to be correctly recategorized as a drug dealer compared to the artist or teacher labels. Yet, there was no significant difference in the recategorization accuracy of stereotypical faces for any other categories. These findings demonstrate how the stereotypical association of African American males with criminality serves as a memory cue that people default to when their memory of an individual falls short.[29] Although not situated in a forensic context, this experiment illustrates that memory encoding and retrieval do not happen in a vacuum. Instead, schemas provide a backdrop of related knowledge, and new encounters become integrated with previously acquired information.[30] As memories of

[27] Ibid.; Kuehnel et al., "Brain Activations during Correct and False Recognitions."
[28] Danny Osborne and Paul G. Davies, "Crime Type, Perceived Stereotypicality, and Memory Biases: A Contextual Model of Eyewitness Identification," *Applied Cognitive Psychology* 28, no. 3 (2014): 392–402.
[29] Heather M. Kleider, Sarah E. Cavrak, and Lauren R. Knuycky, "Looking Like a Criminal: Stereotypical Black Facial Features Promote Face Source Memory Error," *Memory & Cognition* 40, no. 8 (2012): 1200–13.
[30] Alison R. Preston and Howard Eichenbaum, "Interplay of Hippocampus and Prefrontal Cortex in Memory," *Current Biology* 23, no. 17 (2013): R764–R73.

details of a witnessed crime fade, people become increasingly reliant on schematic processing, rendering them particularly susceptible to stereotypic memory biases.[31]

In addition to retrieval failures, eyewitness errors often originate during the initial experience of an event, as attention and emotional arousal powerfully shape what information is encoded.[32] One example of conflicting attentional priorities is the weapon focus effect, which refers to the correlation between the presence of a weapon and reduced memory accuracy. A meta-analysis of 28 studies concludes that the presence of weapons negatively affects feature and identification accuracy under experimentally controlled conditions.[33] The most likely explanation for this reduced memory performance is the unusual item hypothesis, which suggests that because weapons are unexpected in most contexts, additional attentional resources are required for resolving the apparent conflict between the weapon and one's schema for that environment.[34] The heightened attention to the unexpected stimulus weakens the witness's processing of peripheral details, such as the perpetrator's clothing, impairing their ability to identify the culprit.

Carlson et al. (2017) affirm this attentional narrowing effect. Using a mock robbery video, researchers compared lineup identification accuracy across three conditions: visible weapon, concealed weapon, and no weapon. Demonstratively, those in the visible weapon condition produced significantly fewer correct identifications than both the concealed weapon and no weapon conditions. Further analysis revealed that participants' ability to differentiate between the perpetrator and lookalike suspects was significantly lower when a gun was present.[35]

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[31] Heather M. Kleider, Kathy Pezdek, Stephen D. Goldinger, and Aaron Kirk, "Schema-Driven Source Misattribution Errors: Remembering the Expected from a Witnessed Event," *Applied Cognitive Psychology* 22, no. 1 (2008): 1–20.
[32] Ikier et al., "When Is Memory More Reliable?"
[33] Jonathan M. Fawcett, Emma J. Russell, Kristen A. Peace, and James Christie, "Of Guns and Geese: A Meta-Analytic Review of the 'Weapon Focus' Literature," *Psychology, Crime & Law* 19, no. 1 (2013): 35–66.
[34] Curt A. Carlson, Jessica L. Dias, Daniel R. Weatherford, and Melissa A. Carlson, "An Investigation of the Weapon Focus Effect and the Confidence–Accuracy Relationship for Eyewitness Identification," *Journal of Applied Research in Memory and Cognition* 6, no. 1 (2017): 82–92.
[35] Carlson et al., "Weapon Focus Effect and the Confidence–Accuracy Relationship."

The attentional principles guiding how the human brain boosts certain representations account for the enhanced resources dedicated to salient and unusual stimuli, such as a weapon. Thus, memory biases can take root during the original encoding of the witnessed event, which may later become amplified by post-event misinformation and stereotypical memory errors.

Another major factor that undermines eyewitness reliability is stress, which disrupts hippocampal-prefrontal functioning and impairs both the encoding and retrieval of episodic memories. The body releases adrenaline and cortisol during high arousal, modulating memory consolidation and strengthening the encoding of some memories. However, the relationship between stress hormones and memory performance follows an inverted U-shaped pattern. While moderate arousal can enhance encoding, extremely high levels of stress, such as those elicited during a crime, tend to impair it.[36] In the context of eyewitness testimony, the catastrophe model holds: high levels of psychological arousal and cognitive anxiety during encoding generally weaken memory.

Valentine and Mesout's 2009 study provides an ecologically valid demonstration of the influence of anxiety on eyewitness accuracy. To examine how real-world threats affect facial recognition under stress, researchers recruited volunteer visitors to the London Dungeon, an immersive haunted attraction. After walking through a high-arousal maze, during which they encountered a planted actor who startled them as part of the experience, participants completed a state-anxiety questionnaire. Without being instructed to attend to the actor's facial features, they subsequently provided a written description, completed a cued-recall task, and attempted to identify the actor from a nine-person lineup. Strikingly, 75% of participants who scored below the median on the state anxiety scale correctly identified the actor. Only 17% of eyewitnesses who scored below the median made a correct identification. Performance on the recall tasks

[36] Lacy and Stark, "Neuroscience of Memory."

revealed a similar negative correlation, where participants who experienced higher anxiety levels reported fewer correct descriptions than their less anxious counterparts.[37] The methodology here, namely not providing participants prior warnings that they would need to identify one of the actors in the labyrinth and situating them within a high-arousal environment, renders these observable differences in memory accuracy particularly insightful.[38]

Taken together, misinformation effects, stereotype-consistent distortions, weapon focus, and stress illustrate how both internal states and external conditions systematically skew memory across encoding, consolidation, and retrieval. Fortunately, some conditions enhance the reliability of eyewitness recall, particularly when the initial test assesses uncontaminated memory.[39] Researchers emphasized that, like other types of forensic evidence, the methods of evidence collection have significant consequences for the accuracy of eyewitness testimony.[40]

One of the most well-studied, evidence-based solutions to these vulnerabilities is the cognitive interview, a structured technique designed to enhance accurate recall while minimizing suggestibility. Developed by psychologists in 1984, the cognitive interview technique has been studied in over 50 experiments and found to be more effective than standard police practices.[41] The cognitive interview consists of four components: context reinstatement, hypermnesia, change in narrative order, and use of different perspectives. The police ask the witness to (1) return to the environmental and emotional context of the crime scene; (2) recall the maximum amount of information they can remember; (3) retell the scene in a different chronological order;

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[37] Tim Valentine and Julie Mesout, "Eyewitness Identification under Stress in the London Dungeon," *Applied Cognitive Psychology* 23, no. 2 (2009): 151–61.
[38] Ibid.
[39] John T. Wixted, Laura Mickes, John C. Dunn, Steven E. Clark, and Gary L. Wells, "Estimating the Reliability of Eyewitness Identifications from Police Lineups," *Proceedings of the National Academy of Sciences* 113, no. 2 (2016): 304–9.
[40] Gary L. Wells and Elizabeth F. Loftus, "Eyewitness Memory for People and Events," in *Handbook of Psychology: Forensic Psychology*, vol. 11, ed. Irving B. Weiner (Hoboken, NJ: Wiley, 2003), 149–60.
[41] Michel Ginet and Jean Py, "A Technique for Enhancing Memory in Eyewitness Testimonies for Use by Police Officers and Judicial Officials: The Cognitive Interview," *Le Travail Humain* 64, no. 2 (2001): 173–91.

and (4) recount the scene from a different perspective.[42] These instructions should help mitigate the misinformation effect, as the free recall method minimizes the use of suggestive questions and prevents witnesses from failing to report details that they may mistakenly deem irrelevant to the criminal investigation. Retelling the event in different orders and from another perspective should reduce eyewitnesses' reliance on schemas and stereotypes, as they cannot depend on retrieval cues such as sequentiality and may need to activate additional scripts to reconstruct the scene.[43]

This method is grounded in the principle of encoding specificity, which holds that memory retrieval is most effective when the retrieval context closely resembles the original encoding environment.[44] A recent electroencephalogram (EEG) study by Bramao et al. provides a clear demonstration of this phenomenon. The researchers found that increasing overlap between encoding and retrieval conditions, through either physical or mental reinstatement, significantly improved recall accuracy. In the experiment, participants learned word pairs presented alongside background context, such as the library or train station. Participants then engaged in context reinstatement, either by mentally reconstructing the original scene or by viewing an image of it. Afterward, they attempted to recall the second word of each pair when cued with the first. EEG analyses revealed that both mental and physical reinstatement elicited similar neural patterns, suggesting they rely on overlapping memory mechanisms. Moreover, participants were more accurate on the recall task when the encoding-retrieval context overlapped than when it did not. The comparable benefits yielded by mental and physical reinstatement demonstrate that both bottom-up processing (by physically seeing or being in the

[42] Ibid.
[43] Ibid.
[44] Ibid.

context of encoding) and top-down strategy (by imagining the contextual details of the original episode) meaningfully improve memory accuracy.[45]

This memory advantage of context reinstatement applies outside the laboratory setting. In 2001, psychologists Ginet and Py compared outcomes from three interview techniques used with students who viewed a mock crime: a standard police interview, a structured interview (where researchers reminded the investigators of the common pitfalls of traditional strategies), and the cognitive interview. Notably, students in the cognitive interview condition provided 27% and 36% more accurate information during the interview than the standard and structured approach, respectively.[46] This significant increase in the number of correct details retrieved illustrates the effectiveness of the cognitive interview. Asking the witness to reimagine the event's original context and provide all the details they can remember, regardless of how irrelevant they may seem, seems to maximize the likelihood of accurate retrieval by reactivating the neural representation of the witnessed event and other related schemas.

Beyond police interview techniques, psychologists have also developed lineup procedures that reduce false identification rates. Specifically, each lineup should contain only one suspect who should not stand out from the fillers, non-suspects selected based on the eyewitness's description of the alleged perpetrator. Moreover, police investigators should always remind the witness that the real perpetrator may not be in the lineup. Lastly, a sequential lineup, where suspects are shown one at a time, produces fewer false identifications than a simultaneous lineup that presents all potential suspects together.[47] Sequential lineups require eyewitnesses to compare each suspect with their memory of the perpetrator. On the contrary, simultaneous

[45] Inês Bramao, Anders Karlsson, and Mikael Johansson, "Mental Reinstatement of Encoding Context Improves Episodic Remembering," *Cortex* 94 (2017): 15–26.
[46] Ginet and Py, "Enhancing Memory in Eyewitness Testimonies."
[47] Lacy and Stark, "Neuroscience of Memory."

presentations encourage relative comparisons, which are more prone to stereotypic memory errors based on prototypicality.[48] Another recommendation from the memory literature is to assess the witness's confidence in their identification, as it is typically a reliable indicator of accuracy.[49] However, the confidence-accuracy relationship is strongest when confidence is assessed immediately after the identification decision and collected under optimal conditions, where participants are attentive and tested after a short retention interval.[50] Using an uncontaminated measure of confidence is key, as continuous reconstruction of memory after lineup identification may alter that perception of confidence.

This body of evidence demonstrates that traditional legal assumptions about memory reliability are inconsistent with scientific findings, underscoring the need for revised standards governing suggestive testimony. Although many laboratory experiments are limited in ecological validity, they collectively suggest that human memory is far from infallible and that having a confident memory does not necessitate a truly accurate recollection of the past.[51] Eyewitnesses' memories of real-life crimes are undeniably more complex than those based on mock videos or images in laboratory experiments. However, these studies intentionally use forensically relevant stimuli and place participants in naturalistic contexts to evoke anxiety, partially imitating the actual experiences of witnessing a crime.[52] Thus, legal actors, including judges, juries, and police investigators, must reexamine their assumptions about the reliability of eyewitness memory and ground their practices in empirical research.

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[48] Osborne and Davies, "Crime Type and Memory Biases."
[49] John T. Wixted, Laura Mickes, John C. Dunn, Steven E. Clark, and Gary L. Wells, "Estimating the Reliability of Eyewitness Identifications from Police Lineups," *Proceedings of the National Academy of Sciences* 113, no. 2 (2016): 304–9.
[50] Carlson et al., "Weapon Focus Effect and the Confidence–Accuracy Relationship."
[51] Lacy and Stark, "Neuroscience of Memory."
[52] Zaragoza, Belli, and Payment, "Misinformation Effects."

Although practical challenges remain, the benefits of implementing neuroscience-informed procedures outweigh the logistical costs. Ginet and Py's 2001 study shows that law enforcement officers can adopt cognitive interview techniques with minimal disruption. The training period was short, the investigators properly followed the instructions, and there was no significant increase in interview length. However, one consequential decision the criminal justice system must make is where to strike the balance between false positives and false negatives, particularly regarding police lineups. Although sequential lineups reduce the number of wrongful identifications of innocent suspects, they may increase the likelihood of failing to identify the real culprit.[53] However, under the American commitment to innocent until proven guilty, police investigative procedures should err on the side of caution and prioritize reducing the probability of wrongful convictions. Incorporating current memory research into forensic practice helps ensure that eyewitness evidence is collected accurately, reduces the risk of wrongful convictions, and aligns legal standards with the realities of how memory functions.

[53] Lacy and Stark, "Neuroscience of Memory."