EYEWITNESS TESTIMONY: ACTUAL OCCURENCE OR HALLUCINATION?

Memories are fragile

Conventional wisdom has held that an eyewitness account is the best evidence in trial of what happened.[1] But 100 years of research has shown that eyewitness testimony is easily manipulated, has gaps, fades over time and is altogether inaccurate to convict someone of a crime on its own.[2] Judges and juries have been assigned the role of determining if eyewitness testimony is accurate,[3] but we are not well-equipped to make decisions about the unreliability of eyewitnesses' memory.[4] With an understanding of how memories are created and how they can be contaminated, eyewitness testimony can be improved,[5] but in the end it is imperative that if we are to continue to place great reliance on eyewitness testimony that we also have a healthy skepticism about eyewitness accuracy.

How We Make Memories

Perception or Acquisition Stage

The first step in creating a memory is our perception of something. Our senses are on alert. We may hear the blare of a car horn and the screeching of tires on pavement, see the color of the traffic light and the blur of the two cars colliding, smell the tire rubber burned onto the pavement or maybe even feel the whoosh from the cars going by our body. All of our senses send information to our brain, but our eyes are the most important line of communication to our brain as about half of our brain activity is involved in visual processing.[6] When we see a complex scene, we can't absorb the entirety of it and must choose where to focus our view and consequently only a very

small part of the scene is perceived.[7] It is physically and mentally impossible to create an accurate memory because we are not able to perceive the entirety of the experience.

Storage or Retention Stage

It is tempting to think of our memories as video recordings of what actually happened, like a home movie, or as pictures taken by a camera. That is just not how our memory works. According to John Medina in "Brain Rules, "when information enters our head, our brain acts like a blender left running with the lid off. The information is chopped into discrete pieces and splattered all over the insides of our mind."[8] Pieces of information related to an experience are stored in different places in the brain; lines are stored by direction, diagonal in a separate place from vertical or horizontal, colors in still a different place, action separately from still pictures, and vowels stored discretely from consonants.[9] A video recorder stores an entire movie of what is happening all in one place while it appears our brain stores a multitude of elements of the event in discrete areas of the brain to be reassembled at some later time as a memory of an event.

In addition to only perceiving a part of an event, what I perceive is different from what you perceive because the processes in my brain are individually created by my experiences and will not be anything like the processes in your brain.[10] Although we think of seeing as being completely trustworthy, accurately representing what is there to be seen and simple, it is not. Our brains, based on our personally created internal processes, are actually constantly filling in the gaps in what we see.[11] We have blind spots in our retinas where no information is perceived and our brain finishes the picture

for us. The information sensed by each eye is at a different angle and our brains interpolate that information to create one visual scene. The information gaps caused by our limited area of focus are completed with guesses based on expectations, experiences, personal prejudices and past memories.[12] Because we are filling in the gaps and perceiving things that do not exist, are we hallucinating?[13] In essence our brain is a very complex Photoshop program completing the details around our small window of vision and perception. Is it even possible to make an accurate and reliable memory of the limited information perceived to which we can testify under oath?

At the inception of a memory there is a transition from the first few seconds of encoding what has been perceived in our temporary or short-term memory to the process of creating a long term memory. That transition from perception to long-term memory was previously called short-term memory, but is more properly called working memory because of the variety of information processed simultaneously.[14] The working memory holds small bits of information for a few seconds acting like a buffer zone keeping the last few seconds of information available for us to complete the math equation or read a paragraph or reason through a problem.[15] The working memory enables us to discern differences in meaning and context by allowing us to recall the words in the sentence or numbers in the equation. The working memory has a bit of extra storage capacity in the form of the "phonological loop," which provides temporary additional storage for small amounts of words and numbers and is key to acquisition of new vocabulary.[16] Ultimately, the buffer zone of working memory has limited storage ability and so information that is no longer necessary disappears to allow for new incoming information to be stored.[17]

After the working memory has held information, if it is important to us, we encode the memory into long-term memory by thinking and talking about it.[18] This process is called consolidation.[19] At the early stages of consolidation, the memory is "flexible, labile, subject to amendment, and at great risk for extinction."[20] If we don't attend to the memory by thinking or talking about it, that event will fade quickly. We can remember what we did yesterday fairly accurately, but something that happened a week ago will be less exact, and something from a year ago will be quite general.[21] Revisiting and retelling a memory strengthens the neural connections that encode that memory.[22] There is growing evidence, however, that when consolidated memories are recalled from long-term storage, they are "reconsolidated" permitting new information to be added to the original memory, while also strengthening the memory.[23] This new research means there cannot be a memory that is unchanging (and accurate) if every time we recall the memory it is subject to amendments and additions of new information. Repetition to learn static information like words and numbers can strengthen a memory but repetition of a story with facts that are subject to interpretation and incorporation of external information creates a corrupted memory which is not trustworthy. Care must be taken to make sure the retelling of the memory is not infected with unrelated information during consolidation and reconsolidation.

Retrieval and Forgetting

Medina writes that there are two ways of retrieving memories. First, for very recent memories, retrieval is believed to occur as if the brain were a library with

memories like books on the shelf to reproduce a detailed account.[24] As memories fade, however, there are no books on the shelf.

As difficult as it is to comprehend that vowels are stored in a completely discrete area of the brain from consonants, even more amazing is that after disassembling the different aspects of what we perceive to store them in different areas, the brain must reassemble the various pieces of information from all the locations to retell the memory. The blender-created fragments of our memories are reconstructed and the gaps between the fragments are filled in various ways.[25] Our brains make inferences about what should be included based on past experiences and what might go with the fragments, guesses on other parts, adds current information to the old memory as if it originally existed as a part of the memory and can even add in memories not related to this event.[26] We are bombarded by new information and so our brain seeks to organize the input, finding patterns and storing new information in places where similar information has already been stored.[27] The similar information in these storage places can merge with the current information and we no longer realize that two memories have been combined into one. To compound the unreliability of a recalled memory, it can take years for a memory to become stable and not be contaminated by other memories when it is recalled.[28] Further, memories involving cross-cultural identification, stress, violence or a weapon seem to be more difficult to recall.[29]

Why do we forget? Our ancestors needed to forget to free up space for knowledge relevant to survival; anything irrelevant to that task was wasting brain power.[30] Those brain processes still exist today even though we are not trying to out

run a sabre toothed tiger. There are many types of forgetfulness, or 'sins of memory' as Schacter calls them, but the most important to eyewitness testimony are transience, misattribution, suggestibility and biases.[31]

ERRORS OF MEMORY

Transience. Transience is the fading of memories over time.[32] The particulars get blurred by more recent, similar experiences and the nature of how the blender fragments are stored along with similar experiences. Our recollections become more heavily based on general knowledge of what happens and not specific memories. Retrieval and recounting is necessary to avoid the fading of memories. Studies have shown that information thought to be lost can be retrieved, at least in fragments of an experience, general knowledge or familiarity, by cues about how the experience was initially encoded.[33]

Misattribution. Misattribution is a mistaken assignment of current memories or experiences to a different source.[34] Unconscious transference is incorrectly attributing a memory from one context to another, like seeing someone repeatedly in another context and that familiarity becomes the basis for identifying that person in another situation.[35] Source misattributions are thought to result from a problem in memory binding (the gluing together of the parts of a memory into one experience).[36] When certain portions of the event are encoded into memory but are not bound together, the source and the memory become independent and can be tied to other memories. The failure to bind can occur at the time of the event or may be confusion about whether an event actually occurred or we just thought about it. How many times have you asked yourself whether

you said something out loud or just thought about saying it? I know I have locked the car a million times, but did I lock it this time? I don't have a specific recollection. Misattribution can also be a result of a breakdown of the memory retrieval process.[37]

Suggestibility. Suggestibility is the tendency to merge into one's personal memories inaccurate information received from outside sources such as pictures, readings and conversations.[38] The key distinction between suggestibility and misattribution is suggestibility concerns the melding of externally provided information into an existing memory as opposed to misattribution which is creating an inaccurate memory from within one's own memories. Suggestibility is a sin of reconsolidation where new information corrupts the original memory.

Bias. Schacter details five major biases.[39] Consistency and change biases cause us to make our past either like or unlike our present based on our view of ourselves (and whether we want to be consistent with our past or escape from it). Hindsight bias is our tendency to look at our past in light of what we know today. Egocentric bias is our ability to change our memories based on our views of ourselves and stereotypical biases are how we view the world based on unspecific or generic memories.

IMPROVING EYEWITNESS IDENTIFICATION AND TESTIMONY

Eyewitness testimony is among the most commonly provided and convincing evidence in criminal trials.[40] The memory can be corrupted because the information was not perceived initially, or if appropriately perceived, the memory may be forgotten or contaminated upon recall and reconsolidation, or even if perceived and remembered,

the memory may not be recallable.[41] There are several issues known to undermine accurate eyewitness testimony including cross-racial identification, stress, event violence, question wording, and new information.[42] According to The Innocence Project, 72% of the 321 wrongful convictions overturned by DNA evidence in the United States involved mistaken eyewitness identification. There are many competing desires impacting a witness statement as detailed by Loftus:

> Most people, including eyewitnesses, are motivated by a desire to be correct, to be observant, and to avoid looking foolish. People want to give an answer, to be helpful, and many will do this at the risk of being incorrect. People want to see crimes solved and justice done, and this desire may motivate them to volunteer more than is warranted by their meager memory. The line between valid retrieval and unconscious fabrication is easily crossed.[43]

Several procedures with respect to recall, questioning and identification can be implemented to improve the reliability of eyewitness identification and testimony. None of these suggestions alone is sufficient and it is likely that all together are still inadequate, but the consequences of mistaken identification are so great that we must make every effort to give the eyewitness the best possible chance of providing accurate testimony.

Elaborative Rehearsal. Medina believes it critical to enhancing memories to have witnesses recall information immediately after they witness an event and to consistently re-expose themselves to the basic facts and their impressions in spaced intervals.[44] He calls this elaborative rehearsal. We know repetition is important to encoding, but given the potential problems of suggestibility and misattribution that can occur during reconsolidation, it is key to avoid introducing new information from external sources to the recall[45] or to confuse old memories with the current information.

Questioning. Differences in the way a question is asked can impact the quality of a memory. Consider the use of "a" versus "the." Did you see a stop sign or did you see the stop sign? Asking about "a" stop sign doesn't assume there was a stop sign, but asking about "the" stop sign indicates there was a stop sign and can introduce that concept into the witness' memory.[46] Witnesses will give more information, including information outside of their actual memory of the event, to persons of authority so questioning by any police officer or detective can elicit elaborate and unsupported details. [47] Open ended questions where the witness can give a narrative of whatever details they choose, without prompting, tends to be of higher quality and accuracy even though the quantity of information is lower.[48]

The cognitive interview format initially developed by Ronald Fisher and Edward Geiselman expands on the narrative concept.[49] The first of four steps is the open ended narrative. The narrative is followed by asking the witness to put himself back into the experience to stimulate recall of details. Next, the witness is asked to change the order of the events, reciting them in order or in reverse order. Lastly, the witness is asked to look at the event from different viewpoints, such as perpetrator, victim, other witness.

The questioner first should ask open-ended questions calling for a narrative response and then move to more detailed but still narrative seeking questions. At all times the suggestiveness of the wording of the questions should be of great concern. Trying to remember the time of the event can help with recall of details as can recalling events in a different order or from different perspectives. At all times, it is important to

remind the witness that they should not guess or volunteer information that is not supported by their memory of the event. These procedures should minimize the intrusion of new information into the recall of the event and, consequently, misattribution and suggestibility.[50]

Identification Procedures.

Similar Environment. Memory appears to work better if the environment when trying to recall the memory is similar to the environment when the memory was encoded.[51] It has been suggested that identifications will be more successful if the witness looks at the potential suspects in the same place and in the same manner as the original event occurred. This is problematic because it is likely that if the police take the witness to the scene of the event, they won't be able to bring an entire line-up and will bring only the suspect, creating issues with familiarity/misattribution and suggestibility. With today's technology, it would be relatively simple to recreate the actual scene in the police station with a green screen and a projection of the crime scene at the proper time of day and from the proper angle. It would even be possible to manipulate the viewing angles, the lighting and the distance to the scene creating a very realistic re-creation of the scene. This technology could also be used in the cognitive interview method to help the witness put him/herself back into the experience to stimulate detail recall and to also aid in the witness looking at the experience from the different perspectives of perpetrator, victim or other witness.

Administrator Neutrality. If the administrator of the identification process knows who the suspect is, there is a danger that verbal or nonverbal indications of who the suspect is will be available and sway the witness.[52] If neither the administrator nor the witness know the suspect beforehand, the process will have more integrity and be less vulnerable to suggestibility.

Composition of Lineup. It is obvious that the makeup of the lineup can be manipulated to draw attention to the suspect. The lineup should be made up of people conforming to the witness' description of the perpetrator and not to the person suspected by the police to be the perpetrator.[53] Care should be taken to avoid a misidentification based on general familiarity of any person in the lineup. Choosing lineup members similar to the witness description should reveal whether familiarity is the basis for the identification because all participants will be somewhat familiar as they are close to the witness description. Research has also shown that witness identification is more accurate after viewing a line-up without the suspect, a filler lineup.[54]

Sequential Presentation of Lineup Members. Misattribution is an issue in standard identification lineups, because people tend to choose the person, compared to the others in the lineup, who looks more like the perpetrator relying on general similarities and not the particulars of the perpetrator or any specific recollection of the perpetrator, making a relative rather than independent decision.[55] Sequential lineups and computerized sequential lineups where a determination is made for each individual

sequentially and not in a group, reduce mistaken identification without reducing accurate identifications when compared to simultaneous lineups.[56]

Instructions Regarding the Lineup. To prevent a witness from feeling they need to identify someone in the lineup, the instructions should state that the perpetrator may not be in the lineup.[57] The witness should also be told the investigation will not stop if the witness identifies someone in the lineup so they don't feel pressure to identify someone, perhaps incorrectly, as it is just as important to clear an innocent person as it is to convict a guilty person.[58] Additionally the neutrality of the administrator should be stated directly to the witness so the witness won't be looking for verbal and non-verbal clues from the administrator or finding clues where there are none.

Statements of Confidence. A statement of the witness' level of confidence in the identification is a requirement suggested by The Innocence Project. However, eyewitnesses can be very confident in their identification and be no more accurate than the less confident eyewitnesses.[59] Additionally, confidence can be increased by the minutest confirming feedback. Nevertheless, if a witness is not confident that they can identify a perpetrator initially but is very confident of their identification at a later time, that is important to the assessment of the reliability of the identification and may be a positive addition to eyewitness testimony procedures.

Documentation of Lineup. A recording or other documentation of the lineup should be preserved so any questions about the procedure can be reviewed.

The overarching issue with eyewitness testimony is the widely held belief that it is accurate and unassailable.[60] To that end, the following trial issues should be considered:

Require Corroborating Evidence. It is unlikely that eyewitness testimony will be excluded as evidence, but it is generally appropriate to require some corroborating evidence for conviction.[61] With DNA evidence becoming more common, corroborating evidence is often available and should not be discounted just because there is eyewitness testimony. On the other hand, if the eyewitness knows the identified person well so there is very little chance the identification is incorrect, the lack of corroborating evidence should not undermine that testimony. There must be a balancing of the available evidence, eyewitness and corroborating. If the fallibility of eyewitness testimony and of other evidence is understood, the trier of fact can make a better decision.

Jury Instructions. Instruct the jury that eyewitness testimony can be unreliable and corrupted. The effectiveness of Federal and State jury instructions regarding eyewitness testimony is beyond the scope of this paper.

Expert Testimony. Often, expert testimony that would highlight the limitations of eyewitness testimony is excluded and eyewitnesses are not often challenged by cross-examination.[62] There is a wealth of evidence that undermines the widely held belief that eyewitnesses are the best evidence of what happened. We are not equipped to evaluate the accuracy of eyewitness testimony and jurors deserve to hear about the reliability and unreliability of eyewitness testimony.[63] Armed with such information,

juries will be enabled to make a better decision, but whether they can change their assumptions about the quality of eyewitness testimony is an entirely different challenge.

Schacter devotes his last chapter to extolling the virtues (and vices) of our faulty memories. Certainly, there are evolutionary and utilitarian reasons for how our brains work and the human brain is an amazing thing. But whether we, as a society, are willing to continue to put such reliance on eyewitness testimony when dealing with a person's freedom is the real question.

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[1] Gary L. Wells, R.C.L. Lindsay, and Tamara J. Ferguson, *Accuracy, Confidence, and Juror Perceptions in Eyewitness Identification,* 64 J. Appl. Psychol. 440 (1979); Elizabeth Loftus, Eyewitness Testimony, 10 and 16 (1996).
[2] Hugo Munsterberg, On the Witness Stand, (1907) questioning eyewitness reliability.
[3] *See generally,* George Fisher, The Juries Rise as Lie Detector, 107 Yale L.J. 575 (1997).
[4] http://www.innoncenceproject.org/understand/Eyewitness-Misidentification.php, noting that eyewitness misidentification played a role in 72% of the cases overturned through DNA testing. Referred to at The Innocence Project.
[5] *See generally,* Loftus, *supra*.
[6] John Medina, Brain Rules, 190 (2d ed. 2014). "Striding across our brain like an out-of-control superpower, giant swaths of biological resources are consumed by [our visual sense]. In return our visual system creates movies, generates hallucinations, and consults with previous information before allowing us to see the outside. It happily bends the information from other senses to do its bidding . . . ."
[7] Loftus, *supra,* at 21; Jennifer K. Robbennolt and Jean R. Sternlight, Psychology for Lawyers, Understanding the Human Factors in Negotiation, Litigation, and Decision Making, 8 (2012) discussing inattentional blindness and change blindness and our inability to recognize our failure to notice objects or substantial changes, inattentional blindness blindness and change blindness blindness.
[8] Medina, *supra,* at 131.
[9] Id.
[10] Id. at 95, "Learning results in physical changes in the brain, and these changes are unique to each individual. Not even identical twins having identical experiences possess brains that wire themselves exactly the same way."
[11] Id. at 189.
[12] Loftus, *supra*, at 37. Robbennolt and Sternlight, *supra*, at 12: "Schema define our expectations about how the world operates, fill in gaps in information, and facilitate an ability to "make inferences and judgments with heightened ease, speed, and subjective confidence". . . Scripts structure our understanding of the typical course of an episode . . . Stereotypes are schemas that categorize people." Further, "[t]here is evidence that people pay more attention to information that is consistent with a stereotype and less attention to stereotype-inconsistent information . . ."

[13] Id. at 187 and 194.
[14] Id. at 142.
[15] Daniel L. Schacter, The Seven Sins of Memory, How the Mind Forgets and Remembers, 26 (2002).
[16] Id. at 46; Medina, *supra*, at 143.
[17] Id. Schacter includes working memory as part of the 'Sin of Transience."
[18] There are two main forms of long-term memory, episodic and semantic. Personal experiences occurring in a particular place and time are stored in episodic memory, for example, the World Trade Center negotiation in Psychology of Conflict class on the afternoon of February 7, 2015. Knowledge and facts of a general nature, such as Pete Carroll is coach of the Seattle Seahawks and previously coached at USC, is acquired and retrieved through semantic memory. Schacter at 44. Medina, *supra*, at 148.
[19] Medina, *supra*, at 144.
[20] Id.
[21] Schacter, *supra*, at 32.
[22] Id. at 33-34. Schacter explains that memories that appear to have been lost may be recovered if sufficient clues or hints are provided to remind us of the initial experience. He further refers to Willem Wagenaar's diary study which "reveals a common result of transience…: incomplete rather than total forgetting that leaves in its wake scattered shards of experience."
[23] Cecilia Forcato, Rodrigo S. Fernandez and Maria E. Pedreira, *The Role and Dynamic of Strengthening in the Reconsolidation Process in a Human Declarative Memory: What Decides the Fate of Recent and Older Memories?*, http://www.journals.plos.org/plosone/aritcle?id=/journall.pone.0061688, April 26, 2013.
[24] Medina, *supra*, at 146-7.
[25] Id.
[26] See Transience, Suggestibility, Misattribution, Bias sections below.
[27] Medina, *supra*, at 147.
[28] Id. at 154.
[29] Loftus, *supra*, at 31-36 and 136-142.
[30] Id. at 155.
[31] *See generally*, Schacter, *supra*. The Sins of Memory are Transience, Absent-mindedness, Blocking, Misattribution, Suggestibility, Bias and Persistence. *See also,* Medina, *supra*, at 156.
[32] Schacter, *supra*, at 12.
[33] Id. at 33.
[34] Id. at 93. Robbennolt & Sternlight, *supra*, at 34, discussing source monitoring, "people do not call up a perfectly accurate real-time recording of the event, [but] access a range of source of information including their own "internal mental representation of the event." Other basic information they have about how the world works, their schemas for how events such as this one typically happen, what they have been told by others about what happened, their experience sin other similar situations, stereotypes, what they imagined doing, and so on."
[35] Id. at 92.
[36] Id. at 94.
[37] Id. at 96.
[38] Id. at 113.
[39] Id. at 138-139 and Note 12, *supra*.
[40] The Innocence Project, *supra*, and Note 1, *supra*.
[41] Loftus, *supra*, at 22. *See also,* Richard A. Wise and Martin A. Safer, *A Method for Analyzing the Accuracy of Eyewitness Testimony in Criminal Cases,* (2012). Court review: The Journal of the American Judges Association. Paper 387. http://digitalcommons.unl.edu/ajacourtreview/387. Frequently, involved enforcement officers make three errors: failing to obtain all relevant information the witness knows, contaminating eyewitness recall with post-event information, and increasing an eyewitness' confidence in his/her recall. The article contains an informative list of factors to consider when analyzing the accuracy of eyewitness testimony.
[42] Id. at 172-177.
[43] Id. at 109.

[44] Medina, *supra*, at 149. *See also,* Loftus, *supra*, at 54, citing Marshall's 1996 study, "subjects were consistently more accurate when they answered items immediately than when they answered . . . after a one-week interval." *And see*, Schacter, *supra*, at 31.
[45] Loftus, *supra*, at 56, "[i]t appears that when possible many witnesses will compromise between what they have seen and what they have been told later on."
[46] Id. at 95.
[47] Id. at 98.
[48] Id. at 91-92. Robbennolt & Sternlight, *supra*, at 16 citing research findings that interviewers ask more questions consistent with a person's guilt if they believe the person is likely guilty (guilt-presumptive questions) confirming their expectations for guilt.
[49] Schacter, *supra*, at 119-120. Ronald P. Fisher, R. Edward Geiselman, *The Cognitive Interview Method of Conducting Police Interviews: Eliciting Extensive Information and Promoting Therapeutic Jurisprudence*¸ 33 Int'l. J. L. & Psychiatry (2010) 321-328.
[50] Another technique using open questioning and attempting to uncover deception is Philip Maltin's READ System, research, examine, analyze and doubt. http://www.icanreadyou.com/.
[51] Medina, *supra*, at 137; Loftus, *supra*, at 90, "[t]here is a large conceptual leap between viewing of photographs is an experimental laboratory and viewing a criminal during a real-life incident."
[52] Loftus, *supra*, at 72-73. The Innocence Project, *supra*.
[53] The Innocence Project, *supra*.
[54] Id.
[55] Schacter, *supra*, at 97. *See also,* R.C.L. Lindsay and Gary L. Wells, *Improving Eyewitness Identifications From Lineups: Simultaneous Versus Sequential Lineup Presentation*¸ 70 J. Appl. Psychol., (1985) at 558 screening eyewitnesses most prone to making relative judgments by the use of a lineup containing no suspect.
[56] Id; Gary L. Wells, Nancy K. Steblay, and Jennifer E. Dysart*, A Test of the Simultaneous vs. Sequential Lineup Methods, An Initial Report of the AJS Annual Eyewitness Identification Field Studies*, (2011), http://www.popcenter.org/library/reading/PDFs/lineupmethods.pdf.
[57] *See* Note 48 and Note 49 indicating results were more accurate when a filler lineup was used before the lineup containing the suspect.
[58] The Innocence Project, *supra*; Technical Working Group for Eyewitness Evidence of the U.S. Dept. of Justice, Office of Justice Programs, Nat'l. Inst. Of Justice, *Eyewitness Evidence, A Guide for Law Enforcement* (Oct. 1999), https://www.ncjrs.gov/pdffiles1/nij/178240.pdf.
[59] Schacter, *supra*, at 116.
[60] See Note 1.
[61] Loftus, *supra*, at 188.
[62] Loftus, *supra*, at 180.
[63] Lindsay & Ferguson, *Accuracy, Confidence and Juror Perceptions in Eyewitness Identification, supra;* Loftus at 171-177, *supra*, Chapter 9, *Common Beliefs about Eyewitness Accounts*.