The Fallibility of Eyewitness Testimony: An Examination of memory and Its Role in Inaccurate Testimony

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PROJECT TITLE: The Fallibility of Eyewitness Testimony: An Examination of Memory and Its Role in Inaccurate Testimony

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Senior Honors Paper

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An Examination of Memory and its Role in Inaccurate Testimony

Dr. Mahadevan, Faculty Mentor
Abstract

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An Examination of Memory and Its Role in Inaccurate Testimony

Eyewitness testimony can play a large role in the conviction of a defendant for the commission of a crime. The testimony witnesses give is made up of memories that formed from events that occurred weeks, months, sometimes even years in the past. The reliability of memory is essential in order for trials to result in a fair verdict and for justice to be served. Psychological studies have repeatedly shown that memory does not work like a tape recorder, people do forget, omit, and replace details, whether consciously or unconsciously. It is the unconscious misrepresentation of events that is the main focus of concern with the importance memory plays in the judicial system.

Eyewitness testimony is fallible, memory is neither absolute nor complete, yet on the basis of this testimony individuals are incarcerated, sometimes even put to death for crimes they did not commit. There are organizations such as the Innocence Project and the Center of Wrongful Convictions that work to free persons wrongfully convicted of crimes by using testing of DNA evidence. They have found that eyewitness testimony played a large role in those wrongful convictions; in fact, eyewitness testimony has been identified at the “single greatest cause of wrongful convictions in the U.S. criminal justice system.” There are many cases where DNA evidence is no longer available or was never present at all. In these cases, the testimony of eyewitnesses is even more essential. Psychological studies and eyewitness expert testimony can provide invaluable information to the judicial process to ensure that judges and juries are fully informed when making decisions based on eyewitness testimony.
The Fallibility of Eyewitness Testimony:
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Introduction

Eyewitness testimony is an important aspect of the judicial process. Individuals are sometimes convicted based solely on the evidence that eyewitnesses have to offer. Memory is malleable, from the moment events are perceived through the storage and retrieval of information, there are various opportunities for memory to be influenced and interpreted, which can lead to inaccurate recollection. Various psychological studies have shown the fallibility of memory and worked to identify aspects of questioning and identification that can undermine eyewitness accuracy. Studies have also worked to improve accuracy of memory and recall, hoping to ensure accurate testimony. The implications of a wrongful conviction can destroy the lives of those mistakenly identified, be it figuratively through time lost to jail and loss of job and family, to literally being executed for a crime they did not commit. Expert testimony about the fallibility of memory and its implications for eyewitness testimony is essential for the jury to make a fully informed decision.

Eyewitness testimony can play a large role in the conviction of a defendant for the commission of a crime. The testimony witnesses give is made up of memories that formed from events that occurred weeks, months, sometimes even years in the past. The reliability of memory is essential in order for trials to result in a fair verdict and for justice to be served. Psychological studies have repeatedly shown that memory does not work like a tape recorder, people do forget, omit, and replace details, whether consciously or unconsciously. It is the unconscious misrepresentation of events that is the
main focus of concern with the importance memory plays in the judicial system. Eyewitness testimony is fallible, memory is neither absolute nor complete, yet on the basis of this testimony individuals are incarcerated, sometimes even put to death for crimes they did not commit. Psychological studies and eyewitness expert testimony can provide invaluable information to the judicial process to ensure that judges and juries are fully informed when making decisions based on eyewitness testimony.

There are many individuals and organizations that have been working on examining the aspects of eyewitness testimony, its impact on trials, the fallibility of memory, and ways to improve the system as well as to exonerate those wrongfully convicted. From Munsterberg, who first began to study the affects of memory and its connections with trials around a century ago, to Loftus, a leading expert witness about the fallibility of memory who has published several works illustrating her theories, psychologists have been working to understand how and why memory sometimes fails. There are organizations such as the Innocence Project and the Northwestern Law School’s Center of Wrongful Convictions that work to free persons wrongfully convicted of crimes by using testing of DNA evidence. They have found that eyewitness testimony played a large role in those wrongful convictions, in fact, eyewitness testimony has been identified at the “single greatest cause of wrongful convictions in the U.S. criminal justice system” (Warden, 2001).

**Background of Eyewitness Testimony and Memory**

Munsterberg was the first to explore the different aspects of memory and its role in the court system at the beginning of the twentieth century. He noted that juries are not asked to make distinctions based in their lay knowledge of whether blood is animal or
human, yet are asked to determine whether a witness' memories are objective or tainted. He asked some very important questions that have led to research in this field over the past century. Munsterberg questioned the notion that people perceive things in a consistent way and asserted that there are many ways for events to be perceived by different individuals and that there are several influences weighing in on our memories. “We never know from the material itself whether we remember, perceive, or imagine, and in the borderland regions there must result plenty of confusion which cannot always remain without dangerous consequences in the court-room” (Munsterberg, 1908, p. 61).

Though these discoveries about the malleability of memory date back well over a century, the court system of the U.S. has yet to fully acknowledge the impact this can and does have on testimony and, ultimately, the result of the trial. As Buckhout (1982) wrote,

It is discouraging to note that the essential findings on the unreliability of eyewitness testimony were made by Hugo Munsterberg...years ago, and yet the practice of basing a case on eyewitness testimony and trying to persuade a jury that such testimony is superior to circumstantial evidence continues to this day...Eyewitness testimony is also based on a theory, constructed by a human being (often with help from others), about what reality was like in the past; since that theory can be adjusted or changed in accordance with personality, with the situation or with social pressure, it is unwise to accept such testimony without question (1982, p.125).
Eyewitness testimony is one of most influential aspects of the courtroom experience. Hearing someone positively identify a perpetrator has great weight and influence on the decision of the jury. Given the importance that jurors place on memory, the importance that we, as a society, give our memories, it is important to examine their reliability. “Memory is malleable...usually the scrambled memory does not matter very much. But if you are an eyewitness to a crime, your scrambled recall could send someone to prison” (Loftus, 2003, p. 232). Memories can have no greater weight than when they lead to the incarceration a fellow human being.

Memory is a very important aspect of day to day functioning. Every movement, conversation, action, from simple to complex each involves the use of memory. The way that information is stored and retrieved affects many aspects of daily thoughts and actions, from remembering to pick up a gallon of milk on the way home to reciting a speech in front of a large audience. Individuals cannot pay attention to and remember every detail about everything and everyone they see and experience, so as people go throughout life they learn to pay attention to some things and not others, to develop a unique sorting system for how to remember and recall information.

There are times though, when people are asked to recall specific details, details that they generally would discard as insignificant aspects of a normal day. The reliability of this information is of the utmost magnitude, for witnesses to crimes play a large role in the apprehension and conviction of criminals. “If someone is a little unreliable, if he trims the truth a bit in describing what he has seen, it ordinarily does not matter too much. When he is a witness, the inaccuracy escalates in importance” (Buckhout, 1982, p. 117). These insignificant aspects suddenly gain importance when called upon to give
information about a crime. Most people, in telling stories, remember the basic facts and fill in other details about things that one would generally expect to be there based on the schemas they have formed of those situations. In times when asked to recall specific information, reliability is questionable because it is impossible to differentiate between what the witness actually saw and what they expected to be there and thus assumed was.

**Perception and Memory**

The processes of perception and memory are used during the recollection of details. Observations, feelings, touches, tastes, smells, as well as other things that an individual senses at any given moment are turned into a meaningful experience; are perceived. The act of perception relies on an individual’s interpretations of their surroundings, which leads to the formation of memories that are not entirely accurate because they are based on the interpretation of what an individual experienced (Bartol and Bartol, 1994). Errors are made before the memory is even stored, each individual having varying degrees of correct observation and judgment of events (Munsterberg, 1908).

“Yes, we fill the blanks of our perceptions constantly with bits of reproduced memory material and take those reproductions for immediate impressions” (Munsterberg, 1908, p. 61). During this process information can be misinterpreted, lost, ignored, or discarded, all based on how our schemas operate, on how we have learned to select and store information (Bartol and Bartol, 1994). Individuals also have to contend with social aspects of perception, acting in ways to garner approval from others, which can impact how they perceive and recall events (Buckhout, 1982).
“Human memory and perception are selective, generative, decision-making processes: to view them as copying processes is both wrong and dangerous” (Bull and Clifford, 1979, p. 152). People are selective in their attention processes, so there is very little, if any, memory for events that were unattended to upon perception. This has application to the notion that time of exposure will lead to a more accurate recollection and identification. Individuals may not have been focusing on information about the perpetrator; they may have been thinking about how scared they were or looking for an escape route. Stress and level of arousal of witnesses also affects the recollection of accurate details (Bull and Clifford, 1979).

“The limitations and selectivity found in attentional and perceptual processes are also found in memory” (Bull and Clifford, 1979, p. 154). Once events have been organized according to the individual, they are stored in the brain, into memory. Memory can be broken down into three parts; input, storage, and retrieval. Input occurs once the events are perceived (Bartol and Bartol, 1994). The information is encoded into memory and then stored into a structured system based on schemas, grouping and classifying information in efficient ways so that the information is ready to be recalled (Yarmey, 1979).

The way that the information was perceived, encoded, and stored will then affect how it is retrieved (Yarmey, 1979). Bull and Clifford (1979) outline several factors that contribute to problems with accurate memory. They include retrieval failure, motivated forgetting, systematic distortion, passive decay, displacement of existing memories, and interference that causes similar memories to not be distinguishable. “People’s memories are fragile things. It is important to realize how easily information can be introduced into
memory, to understand why this happens, and to avoid it when it is undesirable” (Loftus, 1979, p. 87).

The Yerkes-Dodson law can be used to explain how stress can affect the accurate recollection of information. “The relationship between arousal and performance can best be represented by an inverted u-shaped function: very low or very high levels of arousal reduce perceptions and inhibit memory, while moderate levels facilitate them” (Bartol and Bartol, 1994, p. 226). Stress will improve perception and memory if it is at a moderate level, but at either extreme it will hamper accuracy. The implication for eyewitness testimony is that times of crimes are generally high-stress situations which, according to the Yerkes-Dodson law, can cause a range of misrepresented details. According to this law, witnesses would be under less stress than victims and more likely to have an accurate memory of the events, while those that are greatly distressed by the incident or were the actual victims will have a less complete recollection of the events.

**Schemas**

In order to remember information, individuals will use past events to organize and store memories into schemas. Prior knowledge that a person has about various topics are sorted and organized together, somewhat like a filing cabinet. As an individual experiences more and more things, their schemas become more defined and are modified to allow for new information. Cohen (1993) identifies five characteristics of schemas: they represent simple and complex knowledge, are linked to each other with some being subsets of others, they have slots for fixed and compulsory values include both facts and generalizations, and several schemas operate simultaneously to best categorize events.
They allow an individual to surmise the cause of events that are not readily comprehensible, such as seeing someone walking down the street talking to himself. The general assumption in today’s society would be that he is probably talking into the headset of his cell phone. The individual does not know this to be true, but the man is dressed in a suit and appears to be in a hurry, so schemas are used to infer why he’s talking to himself. However, a man talking to himself a hundred years ago might have been thought to be psychotic, society can influence schemas as well. Schemas are also helpful in aiding retrieval, if an individual has trouble remembering something, they can use other schemas to sort through and remember the term or event (Cohen, 1993).

Schemas affect what is chosen to be stored into memory, what aspects of the situation an individual finds to be important, which leads to some generalizations and the loss of specificity. Schemas can lead to the misreporting of information that does not readily fit into previously formed schemas. People are apt to report what they expected to see, because that is what fits into their schemas, when in fact that is not what they saw. An example of this would be someone hearing the phrase “the paratrooper leaped out of the door” might remember it as “the paratrooper jumped out of the plane” (Cohen, 1993, p. 41). This fits into the schema of what a paratrooper does, and could lead to inaccurate testimony. These pragmatic implications lead to people making inferences based on existing schemas and they cannot differentiate the actual statement from what they believed to be implied.

**Context**

Context is a very important aspect in the input of memory. All memories are associated within the context of an event, with details such as the time, place, or clothing
worn (Bartol and Bartol, 1994). The main issue complicating retrieval of information is finding the appropriate term to cue the retrieval of the information, which is specific to the circumstances surrounding the original input of the information into memory. This leads to problems with helping witnesses recall information, because it is the original encoding that determines how the information will be recalled. So while there are methods to improve memory if it is known from the outset that that information will need to be recalled, there are few that have been discovered to help with the retrieval of information that seemed insignificant to the individual when perceived (Morris, 1979).

When witnessing an event, individuals often do not know that details of this particular event will be important later. Since they are not aware that those particular details will need to be recalled, information may not be encoded resourcefully to allow for precise retrieval. One of the strategies used by individuals in attempt to recall unavailable information is important in eyewitness recollection; the encoding specificity principle (Henderson, 1999). The individual is asked to reconstruct the context of the situation, hoping this will allow the witness to garner more details. An example would be if a woman lost her purse, she would think back through the day, remembering the details of her daily routine and noting any variations from it in hopes to jar her memory of where the purse could be found (Morris, 1979).

The encoding specificity principle relies heavily on context. When meeting a new friend for the first time, individuals remember external contexts about them: their appearance, name, the time and place, perhaps what was said, and who they were with. On a more unconscious and personal level individuals also add an internal context to their memory of this new person, including what they were feeling at the time. If some of these
contexts are available when an individual tries to remember information about their new friend, then they likely will. However, when some of the contexts are not present, individuals will have a harder time recalling the information they are looking for (Henderson, 1999).

**Influences on Memory**

The reports of eyewitnesses become more complete and precise as the progression is made from the initial reports through questioning and finally to the trial itself. This is not to suggest that witnesses are intentionally fabricating evidence, but that as they are questioned they tend to fill in the gaps to make their stories more cohesive. There are many factors that can contribute to the filling in of the gaps in witness memory (Bartol and Bartol, 1994).

**Influences Recognized by Law**

There are several factors that are recognized by law as having an influence on eyewitness identification and were identified by the Supreme Court in *Neil v. Biggers* (1972). They were outlined by Lipton (1996) and included opportunity to view, degree of attention, accuracy of prior descriptions, level of certainty, and time lapse. Courts have also shown a tendency to more readily accept the witnesses of individuals that are deemed to be of high stature, such as lawyers, police officers and security guards.

Opportunity to view works as a combination of distance, time observed, and amount of light. It is up to the individual state courts to decide the limits and constraints of these factors in allowing identification to be made. Degree of attention is considered to be elevated when circumstances would draw an unusual amount of attention to a defendant, such as being the only person of their race in that town that day. Some courts
will not allow an identification if it was made after an unreliable description, but they are more likely to believe descriptions when they resemble or are someone that the witness knows. Witness confidence is not an indicator of accuracy, but the courts still seem to hold to the idea that confidence predicts reliability. Time lapse has also been given little real attention; the courts seem very lenient about allowing a long lapse between the crime and the identification (Lipton, 1996).

**Influence from Law Enforcement**

Many other influences on recollection have been identified by psychologists and those related to law enforcement include type of lineups, photo lineups, show-ups, and the manner of questioning. Lineups can be biased, if the victim had identified her robber as being a tall black man and there is only one black man in the lineup, this could lead to a mistaken identification. Also the witness can be influenced if the detective indicates that the suspect is actually in the lineup, which could lead a witness to choose a suspect when they normally would have just said that they did not see the perpetrator.

Photo lineups can be biased in the same way or if particular photos are of a different size or quality which would lead them to stand out. Show-ups involve the police showing a witness one suspect and directly asking if this is the one. They are regarded less favorably by the courts but have yet to be found to constitute a due process violation by the Supreme Court, though some individual state courts do rule them to be in violation, such as in New York (Lipton, 1996).

**Influences Specific to the Individual**

Aspects of the witnesses themselves can also affect their ability to accurately recall details of the crime and perpetrator. Stereotypes that individuals possess can have
an impact on remembering events. Witness gender does not play a large role, though there is a slightly greater accuracy of correct identifications from females than from males. Race can play an important role. Individuals are better at identifying people from their own race than others, and show poor identification of suspects from other races (Narby, Cutler, and Penrod, 1996).

Other factors specific to the situation can influence witness recollection. The number of people around can influence identification. A large crowd can create a poor perceptual salience and less reliable identifications. The direction of attention of the witness is also important; if they are not paying much attention to the face of the perpetrator then their testimony is likely to be inaccurate. An aspect of this is weapon focus. Studies have shown that when weapons are present, witnesses tend to focus less on the characteristics of the perpetrator and focus most of their attention on the weapon (Narby, Cutler, and Penrod, 1996). A theory about this is that attention is narrowed as the level of stress increases. Crimes involving dangerous weapons are more stressful, leading to narrowed level of focus on behalf of the victims and witnesses. Due to this narrowed focus, they are likely to concentrate on the most threatening aspect in the room, the weapon itself, and often fail to accurately describe the perpetrator (Loftus, 1979).

**Influence of Questioning**

The role of the police investigator is also an essential aspect of how the witness will recall information. If, consciously or unconsciously, they display signals to indicate that they believe a certain person to be the perpetrator, witnesses are likely to pick up on these subtleties and it can affect their decisions (Buckhout, 1982). Geiselman (1994) notes that “some lab studies have shown that even when the perpetrator is not present in a
photo array; witnesses tend to select someone 30-65% of the time anyway” (p. 70). This reemphasizes the importance of how witnesses are presented with questions and also to how leading questions can affect eyewitness recall.

One set of experiments had an individual smile or show a gesture of social approval when the witness looked at a particular photograph. That small amount of social approval increased the frequency that the select photograph was chosen (Buckhout, 1982). Research has shown that individuals are more likely to alter their testimony in the presence of figures of authority, be it their boss, a doctor, or someone they believe to be of higher status in order to earn their approval. The likelihood of a witness choosing a suspect is increased if they are told that another witness has already identified the perpetrator (Geiselman, 1994).

Parker (1980) reports on a study done by Loftus in 1974 that examined how the way a question is asked will influence the response from the witness. Students were shown a clip of an accident, and those students in the first group were asked whether they saw a particular object, and others in the second group were asked if they saw the particular object; the latter being a leading question. This was meant to imply in the second groups that object being inquired about was actually there and to see if it would influence their recollection. It was found that those asked the the questions were more likely to report having seen the object. This study alone has major implications for the way that witnesses should be questioned. If there is a slight suggestion that the suspect is actually in the lineup then it could lead to a misidentification. This also has applications to leading questions asked by attorneys in the courtroom. From the original acquisition of
the information to the testimony at trial, there are several times the witness is questioned and could be erroneously influenced if questioned improperly.

Another study of Loftus’ showed a film of an accident and asked the subjects to approximate the speed that the car was driving. Each group was asked the question in a different way: “smashed, collided, bumped, or contacted” (Parker, 1980, p. 80). Loftus found that the way they were asked the question yet again influenced their response, with smashed garnering higher speed estimates than that of the others.

**Post-event Influences**

As a matter of principle, people tend to believe that the testimony of several witnesses would be more reliable than that of a single person. While at times this is true, there are several documented cases of several witnesses mistakenly identifying the suspect. One factor that can contribute to multiple misidentifications is witness conformity. Individuals can be led to agree with the majority opinion even when they know it to be untrue. So the context of the situation is important, if the witnesses do not have the opportunity to discuss details with each other their recollection will not have the outside influence from other witnesses (Buckhout, 1982). The mere fact that several witnesses or victims identify a suspect does not necessarily point to the suspect’s guilt. Loftus (1991) notes several cases: Berson was mistakenly identified by five women as their rapist, Schrager and Priolo were both mistook for a man who molested several women, and Doto was wrongfully accused by seventeen witnesses as a robber and cop killer.

There is also a tendency to associate witness confidence with witness accuracy. However, studies have shown that, “the confidence of the witness in his or her ability to
make a correct identification should not be used to assess the accuracy of identification” (Narby, Cutler, Penrod, 1996, p. 32). In the case of the mistaken identity of Schrager and Priolo, Schrager stated (of the witnesses): “they were so intelligent and so convincing that they almost made be believe I did it” (Loftus, 1991, p. 72).

Witness recollection can be influenced by information that they hear or see once the event has already taken place. As Loftus (1979) states, “post-event experiences such as exposure to newly released information can dramatically affect our memory of the original event...[they] can not only enhance existing memories but also change a witness’s memory and even cause nonexistent details to become incorporated into a previously acquired memory” (p. 54-55). During questioning, the mentioning of an object that was actually not present can later influence witness recollection of that nonexistent object, especially if the object in question was a peripheral as opposed to a primary detail (Loftus, 1979; Geiselman, 1994). “The biasing effects of post event information typically are substantial, decreasing accurate recall performance by as much as 20 to 30%” (Geiselman, 1994, p. 73). Loftus (1979) warns that “external information provided from the outside can intrude into the witness’s memory, as can his own thoughts, and both can cause dramatic changes in his recollection” (p. 87).

Witnesses frequently recall events in their own minds, thinking about them over and over and talking about them with others. “In doing so, they may unconsciously fill in gaps and details and alter memory so that their memories conform to information learned about the incident after the incident” (Geiselman, 1994, p. 72). This method eradicates discrepancies between information they remember and what they have seen or heard. However, in the process of making the story more cohesive, essential details will be lost.
A common example of this would be a fisherman’s tale. He talks about the size of the fish he caught back a few years ago, telling the story so many times that eventually even he comes to believe that the fish was in fact that big.

Another problem in witness recollection can attributed to unconscious transference. An individual seen by the witness in one type of situation is mistaken for the person that actually committed the crime. In essence, the person looks familiar from a prior brief exposure, but the witness is not sure where they remember them from, and assume the reason they remember this individual is because they committed the crime. One example of this was a sailor that was mistakenly identified by a vendor that he regularly bought newspapers from as his robber, when in fact the vendor recognized him from his previous purchases (Loftus, 1979; Bartol and Bartol, 1994; Geiselman, 1994).

Further evidence of these problems was illustrated in the sniper attacks in Washington DC in 2002. A white van was reported as having been seen fleeing the scene at several of the crime scenes. Loftus (2003) reports that the media coverage from one of the early shootings contaminated witnesses’ memories about details of later attacks. Due to the frequency with which they heard about the white van, they were led to report having seen white trucks as well. The suspects were apprehended in a blue car, so Loftus raises the viable question of whether “we were observing unwitting memory contamination on a nationwide scale” (p. 231).

Disconcertingly enough, “it also appears that eyewitnesses are prone to misidentify the same person again when subsequently shown the actual perpetrator as an alternative to the wrongfully accused” (Geiselman, 1994, p. 75). Such was the case in the mistaken identity of Ronald Cotton, convicted of two counts of rape and burglary based
on eyewitness testimony. Though DNA evidence has proved that Cotton was not the rapist, the victim, Jennifer Thompson states “...the science tells me that we had the wrong guy...it is almost frightening how similar they look to each other...I still see Ronald Cotton...I would do anything to erase that face out of my mind. But I can’t” (http://www.pbs.org/wgbh/pages/frontline/shows/dna/interviews/thompson.html). Loftus (1979) explains this as the freezing effect where “early comments are frozen into place in one's memory and pop up frequently when the witness recalls his experiences at later times” (p. 84).

**Theories about Original and False Memories**

Several theories have been developed to explain what happens to memories once they are proven to be false, attempting to explain whether they are still stored in memory or are irrevocably lost. For example, say a witness originally saw a white Camry driving away from the scene of the crime. If they later hear from a policeman or through the news that the suspect was apprehended in a light blue Camry, they may unconsciously change their story to corroborate what they believe to be the truth. These hypotheses are outlined by Cohen (1993) and Cohen (1996):

1. The vacant-slot hypothesis claims that the original information was never stored at all, so the false misleading information is simply inserted into a vacant slot in the memory representation.
2. The co-existence hypothesis states that both the original true version and the false misleading version are retained in memory and coexist.
3. The substitution hypothesis states that the false misleading information displaces or transforms the original true information which is then irrecoverably lost.

4. The demand characteristics hypothesis also claims that both memories coexist, but argues that they are equally accessible.

5. The response bias hypothesis…claims that misleading post-event information has no effect on the original memory, but simply biases the response.

6. The source monitoring hypothesis…links the effects of misleading information…to failures of source-monitoring.

The vacant slot hypothesis has been discredited because witnesses were able to recall correct information when questioned before being presented with misleading information. Subjects were unable to recall both the original and false information when asked about it, which tends to discredit the demand characteristics hypothesis. Studies have shown that source-monitoring failures are the problem with some misleading information (Cohen, 1996).

Two methods, the warning and second guess techniques, have been used in attempt to discover whether original memories are actually recoverable, and also to discern which hypothesis has the most validity. Witnesses who were given information then warned to disregard it because it was false information fared no better than witnesses that were not told to disregard the information. Allowing subjects a second guess showed no greater likelihood to choose the correct answer having answered wrongly on the first attempt, which has implications for the validity of the co-existence, demand
characteristics, and response bias hypotheses. Cohen (1993) states that “on the whole, evidence for the recoverability of the original memory is very slight, so...the substitution hypothesis is more likely to be correct” (p. 41). The substitution approach is favored by Loftus, but different psychologists back different hypotheses, so it is likely that several of these hypotheses do play a role in the loss of original memory.

**Improving Accuracy: The Cognitive Interview**

In light of the fallibility of eyewitness testimony, research has been done to develop ways to improve witnesses’ recollections and led to the development of the cognitive interview technique. This interview is based on principles known about the retrieval of information and works to maximize the number of retrieval routes used. G. Cohen et al. (1993) outlines the four principles of the cognitive interview: mentally recreating the context at the time the event was witnessed, asking the witness to report all details no matter how trivial they thought them to be, telling the story backwards and forwards, and telling the story from different viewpoints. This goes back to the concepts of schemas, context, and the encoding specificity principle by placing oneself back in the situation an individual is more likely to remember details that could trigger the retrieval of new information.

Studies have shown that this technique can garner up to 30% more information without a loss of accuracy than normal interview techniques and some police forces are now being trained to use this type of interview. It allows the witness more flexibility; they do not have to answer yes or no, but have room to admit that they are not sure or do not recall (Cohen, G. et al., 1993). Upon further examination, the first two principles of
the cognitive interview have been emphasized as well as thirteen basic skills added to a revised version of the cognitive interview. Cohen (1996) outlines these skills

1. Establishing rapport
2. Listening actively
3. Encouraging spontaneous recall
4. Asking open-ended questions
5. Pausing after responses
6. Avoiding interrupting
7. Requesting detailed descriptions
8. Encouraging intense concentration
9. Encouraging the use of imager
10. Recreating the original context
11. Adopting the rememberer's perspective
12. Asking compatible questions
13. Following the sequence of the cognitive interview (p. 95).

**DNA and its Role in Exoneration**

The Innocence Project was created in 1992 at the Benjamin N. Cardozo School of Law as a clinic for law students to handle cases where DNA evidence can be used to prove the innocence of the wrongfully convicted. The Innocence Project reports that in 60 of the first 82 DNA exonerations eyewitness testimony played a major role in the conviction (http://www.innocenceproject.org/causes/mistakenid.php). In a 2000 study by the Northwestern Law School Center of Wrongful Convictions of the first group of
defendants to be exonerated by DNA testimony, 51 of the 67, or 76.1%, involved eyewitness testimony as an aspect of the trial (Warden, 2001).

The Center on Wrongful Convictions did an analysis of 86 death row inmates to be exonerated through the use of DNA evidence since 1972, and of those 86 cases, eyewitness testimony played a role in 46, or 53.5% of the cases and was the only evidence against 33 defendants, or in 38.4% of the cases. The testimony of one eyewitness was used in 32 of the eyewitness cases, or 69.6% and the testimony of two or more witnesses was used in the remaining 14, or 30.4%. The average amount of time between arrest and exoneration for those 86 death row inmates was twelve years (Warden, 2001).

Though DNA evidence and other methods have helped to exonerate innocent people convicted of crimes, the impact that conviction and imprisonment has on these individuals lasts a lifetime. There are others out there whose cases do not have DNA evidence or testing that can be done to prove their innocence. Some have been unable to overcome the stigma of being a convicted felon, some have lost years of their life in prison, and others have made the ultimate sacrifice and lost their lives, innocent of the crimes that sent them to death row.

Case Studies

Clark McMillan, an African American, was convicted of rape and robbery of a white teenager. Though McMillan had an alibi, he was convicted based on the identification of the witness and her boyfriend. In their descriptions they did not mention that the perpetrator had a limp, but McMillan wore a leg brace and walked with a limp. By the time the trial arrived, they testified to the presence of a limp in their attacker. In
the initial photo lineup the victim picked no one out and her boyfriend picked out a filler suspect and did the same at the line-up, though in that case the victim did pick out McMillan. At the trial they both identified McMillan in a lineup.

This raises the question as to whether being repeatedly exposed to his photo caused an unconscious transference, leading them to pick out McMillan because he was the familiar face, not because they were sure that he was the one that attacked them. Also the issue of cross racial identification could have played a role in this mistaken identification. He was exonerated through DNA semen testing having spent 22 years in prison, wrongfully convicted. The real perpetrator has yet to be identified and McMillan has not received compensation


Loftus (1991) tells the sad story of Steve Titus; a man mistakenly identified and convicted who was never able to conquer the problems that this brought upon his life. Titus matched the general description and had a similar car type as the man accused of raping a young woman. The victim was showed a photo lineup that included Titus, but the lineup was biased. All the other photos in the lineup were mug shots, yet the picture of Titus was a smiling Polaroid. The witness said that Titus was the closest, so he had to be the one. Titus did have an alibi; he was driving from his parents’ house to pick up his girlfriend and was, on the night in question, wearing dark clothes. The time of the rape was given by the victim in her statement as having been 6:45 pm. The victim described the rapist as having worn a three piece beige suit and that there was a beige folder in the back of his car. There was no physical evidence that linked Titus to the crime; in fact there were tire marks at the scene that did not match that of his car.
By the time the case came to trial Titus’ lawyer was confident in their case, because there was no physical evidence linking Titus to the crime and there was no way he could have picked up and raped this girl at 6:45 and been back in his apartment to make a phone call at 7:00 pm. However, when the victim testified to the time of the rape, she said she was picked up at 6:30, not 6:45 as the original report stated. This left Titus conceivably enough time to have committed the rape. Still, her testimony was the sole thing that the prosecution had linking him to the crime. Upon cross examination the defense asked the victim, “If I could prove to you that Steve Titus was somewhere else when the rape occurred, would you still say he’s the one who did it?” “Yes” (Loftus, 1991, p. 45). In spite of this, he was convicted of rape.

Titus refused to give up and contacted a reporter and told him his story, begging for his assistance. Titus went through the trial transcripts, reports, and other legal documents and found seventy discrepancies. Titus lost his job and was broke from paying attorneys’ fees. The reporter, Henderson, checked out to see if other rapes had occurred in the same area and ended up finding the man that had actually committed the rapes. When the victim was shown her actual rapist, she “began to cry. ‘Oh, my God,’ she said, sobbing. ‘What have I done to Mr. Titus?’” (Loftus, 1991, p. 51).

Though his name was cleared, Titus still lived with the stigma of having been convicted of rape. He was not offered his job back, the prosecutor’s office did not publicly apologize, and he lost his fiancée and all of his savings. His life had “been shattered into so many little pieces” (Loftus, 1991, p. 55). He decided to file a civil suit against the police department because he believed the detective involved in his case had lied on the stand, and that he had led the victim to believe that Titus was her rapist.
Loftus was asked to testify at the trial about how eyewitnesses can be manipulated through biased instructions and how they believed the detective had suggested that Titus might be the guy and convinced her to roll back the time she was raped. It took four and a half years for Titus’ case to finally get a trial date, but the stress was too much for Titus and eleven days before the date of the trial he died of a heart attack at age 35. His estate was awarded $2.8 million several months after his death (Loftus, 1991).

Arvin McGee was convicted of rape, kidnapping, robbery, and forcible sodomy based largely on the victim’s eyewitness identification. The victim originally picked someone else from the photo lineup, but four months after the incident she picked him out of a lineup. The victim’s descriptions of the attacker had changed several times and McGee had an injury that made it physically impossible for him to have committed this crime. In spite of these facts he was convicted and served 14 years of a 298 year sentence before he was exonerated through DNA testing, and the actual perpetrator was found. He has yet to receive compensation (http://www.innocenceproject.org/case/display_cases.php?sort=year_exoneration).

**Expert Eyewitness Testimony**

These cases as well as numerous others help to bring to light the importance of understanding the way memory works and how it can influence witness recollection. The trauma and disruption that occurs in the lives of those wrongly accused cannot be taken lightly. The problem arises that some eyewitnesses are accurate in their testimony, yet others are not. The jury cannot be expected to differentiate between true and altered memories. The testimony of expert witnesses about the fallibility of memory is essential
to informing the jury. They need to base their decision on all the facts, realizing that people do make mistakes, not just accepting the testimony of the witness at face value. Especially when there is evidence to the contrary that would point to the defendant’s innocence as it was in the cases discussed above.

While the focus of this paper has been on the fallibility of memory and eyewitness testimony, it should be noted that memory distortion can also lead to the failure to convict a guilty person. Since it is known that eyewitness testimony is not always accurate, a guilty person could be exonerated if an expert witness influences the jury that the witness does not really know what they are talking about. The witnesses themselves may begin to doubt their testimony. This underscores the importance of research into memory and how it works as well as the need for law enforcement officials and those involved in the trial process to be aware of the recent scientific findings on memory to reduce the number of decisions made based on lay assumptions about the way memory works (Loftus, 2003).

“The purpose of eyewitness expert testimony is to assist a judge or jury in more fully understanding the capabilities and limitations of eyewitness performance” (Geiselman, 1994, p. 10). The testimony of experts about the fallibility of memory may help to substantiate concerns that are already present in the minds of the judge or jury about the accuracy of eyewitness testimony. Parker (1980) notes that, “in general, however, legal opinions including those rendered by the...US Supreme Court, provide ample evidence of the fact that there is still a reluctance to give full weight to the scientific findings of behavioral scientists” (p. 89).

The credence that is placed on eyewitness testimony by the courts and the general public as a whole is entirely unjustified based on the fallibilities memory is known to
have. Often other evidence is cast aside or overlooked in light of the fact that identification is made (Parker, 1980). All individuals are aware of the limitations of their own memory, so it is rather astonishing that many people will take eyewitness testimony at face value and not question its validity. Individuals still adhere to the old saying “seeing is believing and that any individual who claims to have observed a particular event with his own eyes and who provides an intelligible account should be trusted” (Parker, 1980, p. 31). Many individuals are unaware of the many things that can wrong between the original perception of an event and the testimony that is given at trial, which is why the testimony of eyewitness experts on the fallibility of memory needs to be more widely accepted by the courts.

Conclusion

Memory is not absolute. Eyewitness testimony is fallible, yet courts still place a lot of emphasis on eyewitness identifications. There are many psychological theories as to how memory is affected and how it can be improved. Higher awareness of these principles would lead to fewer wrongful convictions based on errors resulting from inaccurate eyewitness testimony and identifications. Eyewitnesses can be accurate in their identifications, but they can just as easily be wrong. It is imperative that the courts have all the latest information about memory and eyewitnesses so that an informed, intelligent decision can be made.

With the technological advances in recent years, DNA testing has been able to exonerate numerous individuals wrongfully convicted. Hopefully, given the progress of science, many cases that are tried will now have forensic evidence in addition to eyewitness testimony. Eyewitness testimony and identification is still an important aspect
of the criminal justice system and should not be discarded as a viable avenue of
apprehending suspects and convicting them of crimes. However, courts should be aware
of both sides of the issue, of the factors that inhibit and improve memory. Expert
witnesses testify for both the prosecution and defense on a wide array of scientific
evidence and theories that are presented at trials. Eyewitness testimony should be subject
to the same scrutiny as are other aspects of the trial, with testimony from experts on both
sides of the issues to ensure a balanced and, hopefully, just decision.
References


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http://www.innocenceproject.org/case/display_cases.php?sort=year_exoneration