



Short Article

Reliability of Eyewitness Testimonies: Increasing Accuracy through Forensic Science and Psychology

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Abstract: *Eyewitness testimonies refer to the descriptions given by people to a crime/event they have witnessed. In Indian criminal jurisprudence, such testimonies are legally admissible as evidence in a Court of law, as understood by Section 3(1) of the Indian Evidence Act, 1872. Eyewitnesses and their testimonies can provide cogent and persuasive evidences in a criminal investigation and trial; however, these testimonies are susceptible to the malleability of human memory; extreme and sole dependence on them can prove disastrous and risk incarcerating an innocent. This paper evaluates the unreliability of eyewitness identifications and testimonies in light of the factors such as the decaying nature of memory, weapon focus effect, informational interferences and weak nexus between confidence and accuracy. At the same time, the paper will also stress upon the importance of eyewitnesses in ensuring a fair trial, and the pressing need to surge the accuracy of their testimonies through the intersection of science and psychology with criminology, by adopting, promoting and augmenting the practice of narco-analysis, Brain Electrical Oscillation Signature and DNA profiling.*

Keywords: *Eyewitness Testimonies, Unreliability, Wrongful Convictions, Increasing Accuracy, Forensic Psychology.*

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1. Introduction

Eyewitness testimony is the statement of a victim or a spectator before the investigating officer or the court, during criminal investigation or trial, to a crime they witnessed. Such testimonies are pivotal to the justice system in reconstructing the events surrounding the crime. In India, these testimonies are recognised under Section 3(1) of the Indian Evidence Act (IEA), 1872, as a ‘Fact’ capable of being perceived through senses; and admissible in court under Section 9 of the aforementioned Act to introduce vital information crucial to the proceedings.¹ Eyewitnesses can be examined by the investigating police officer under Section 161 of the Criminal Procedural Code (CrPC), 1973, but their statements before the commencement of the trial can only be recorded as evidence by any Metropolitan or Judicial Magistrate under Section 164 CrPC.

Eyewitnesses can provide compelling evidences that are presumed to hold veracity because they are delivered under oath. The Supreme Court has acknowledged their importance and contribution to the criminal justice system in promoting the fundamental principle of fair trial.² However, being under oath is far from being accurate. A study conducted on cases of wrongful conviction, has attributed 52% of such convictions to misidentified or falsely identified eyewitness testimonies.³ It is for this precise reason that eyewitness testimonies are “hopelessly unreliable”.⁴ This paper will evaluate the fallibility of eyewitness testimony taking into consideration the malleable and decaying nature of human memory, and will conclude itself by suggesting methods for the Indian justice system to enhance its dependability.

2. The Deficiencies in Eyewitness Testimonies

To begin with, a high level of anxiety is associated with witnessing a crime. Anxiety felt by a witness at the time of a crime can adversely affect the quality of testimony. High stress initiates a person’s mental state to go into survival mode due to which focus on details is significantly diminished. The ability to observe and recall things in great detail is reduced to a reasonable extent. This is because stress can alter memory formation. The first stage in the process of memory formation is the sensory register where the human brain takes in information through the five senses of human body. This information immediately becomes our short-term memory that retains it for a limited period of 18-30 seconds after which it gets stored in our long-term memory

¹ Indian Evidence Act 1872, sec 9

² *Vikas Kumar Roorkeval v State of Uttarkhand & Ors* (2011) 2 SCC 178

³ Rattner Arye, ‘Convicted but innocent: Wrongful conviction and the Criminal Justice System’ (1988) 12(3) Law and Human Behaviour

⁴ *State v Dubose* 2005 WI 126 (Wis. 2005)

where it is held indefinitely, only if recalled and rehearsed.⁵ Levels of stress impede creation of short-term memories making it difficult to be recalled and rehearsed to become long-term.⁶ It may also happen that high stress and anxiety experienced at a crime scene may render the human senses of the people involved to become numb. Due to this, information might not make it through the sensory register which definitely reduces their ability to accurately observe details that human brain would have in normal conditions. This is the reason retrieving information during the investigation and trial of a crime that was witnessed in stress will become exhausting, rendering the testimony completely untrustworthy.

Additionally, the human fight or flight response provokes what is called the weapon focus effect *i.e.*, the visual attention of the eyewitness to the perpetrator's weapon, if any.⁷ This can decrease the credibility of their testimonies as they fail to give major attention to peripheral view like the wrongdoer's appearance being the foremost. Presence of a weapon can further engage stress, which as previously discussed can contribute to a damaged testimony. This can have serious consequences as investigating officers and judges depend on the eyewitness's identification of the culprit from a line-up of suspects. Therefore, in cases that involve weaponries, eyewitness testimonies should be proceeded with delicacy and be considered evidence only if buttressed through other circumstantial or scientific evidences.

When someone comes forward as an eyewitness, it is highly likely that at the time between the occurrence of the event and the recording of their testimony, they come across various information, news, and interpretations regarding the events surrounding the concerned crime. This subsequent information, popularly referred to as interferences, could be misleading and untrue. Exposure to interferences might lead to alteration of the original memories of the crime by overwriting it with post-event information, leading to an impaired memory.⁸ This is called the Misinformation Effect. When asked to testify, the eyewitnesses must be able to distinguish between their prior and post-event knowledge, for which they would need to identify the source of their memories. This is known as Memory Source Monitoring.⁹ However, at times people fail to identify the same, which is called "source confusion". People often tend to mix up memories and recollect witnessing things differently. The reason why source monitoring is difficult is because the interferences in an eyewitness

⁵ Robert S. Feldman, *Essentials of Understanding Psychology* (McGraw-Hill 2008)

⁶ *Ibid*

⁷ Jonathan Fawcett *et. al.*, 'Looking Down the Barrel of a Gun: What Do We Know About the Weapon Focus Effect' (2016) 5(3) JARMAC 257, 258

⁸ Joyce Lacy and Craig Stark, 'The Neuroscience of Memory: Implications For The Courtroom' [2013] 14(9) Nat Rev Neurosci 649, 652

⁹ D Stephen Lindsay, 'Memory Source Monitoring and Eyewitness Testimony' in D. Ross *et. al.* (eds), *Adult eyewitness testimony: Current Trends and Developments* (Cambridge University Press 2010)

case are generally not mutually exclusive. Any given piece of testimony could be an amalgamation of actual and post event.¹⁰ Besides, the manner of questioning a witness could also alter their memories. Study by psychologists Loftus and Greene has indicated that misleading questions make memories vulnerable to reconstruction.¹¹ It is therefore vital that the police investigators and cross examiners beware of their manner of questioning the witnesses.

In the realm of facial recognition, research alludes that, “memory for a face is affected by the introduction of subsequent misleading information about that face, indicating that memory for faces is susceptible to what others have called interference”.¹² Any additional information through media, police, fellow witnesses or other sources can contaminate the eyewitness’s memory of a face, increasing the chances of misidentifying the perpetrator. One would wonder the reason behind the face of the suspect being covered with a black cloth when taken into police custody. Furthermore, delay in adjudication makes memory more prone to interferences.

In India, delay in legal procedures is not uncommon. The notorious Nirbhaya gang rape case, had to wait 7 years to see the light the justice. There are umpteen cases that have had to await years to taste justice. The long-time lapse between the commission of the crime to the adjudication of the case, is an important indicator of the quality of eyewitnesses. It is well established that human memory fades with time. The theory of decay states that with the passage of time the power of retrieving information from the long-term memory wears away.¹³ Research studying memory decay has shown than memory especially of unfamiliar faces decreases over time by an amount that is far greater than people assume.¹⁴ In a laboratory experiment conducted by Psychologist Ellis, Shepherd, and Davies, participants were shown one face and were asked to describe it immediately after one hour, the next day and next week. The outcome concluded that participants remembered considerably lesser details after a week compared with shorten retrieval intervals.¹⁵ As a result, if witnesses are asked to make identifications months, years and after a substantially long time-period it can be quite problematic as the chances of wrongful identifications are significant. If the crime involved weaponries

¹⁰ Karen J. Mitchell *et. al.*, ‘Source Monitoring and Suggestibility to Misinformation: Adult Age-Related Differences’ [2003] 17(1) Applied Cognitive Psychology 107, 108

¹¹ Elizabeth Loftus and Edith Greene, ‘Warning: Even Memory for Faces May be Contagious’ [1980] 4(4) Law and Human Behavior 323, 324

¹² *Ibid*

¹³ Feldman (n 5) 211

¹⁴ Richard A. Wise *et. al.*, ‘How to Analyze the Accuracy of Eyewitness Testimony in a Criminal Case’ [2009] 42(2) CONN. L. REV. 435, 505

¹⁵ *Ibid*

and/or the witness experienced anxiety while being a witness to a crime, the long-time gap can further impair their ability to testify correctly.

In the case *Daya Singh v. State of Haryana*, an accused for murder was arrested but his refusal to participate in the identification line-up procedure resulted in his identification taking place after 8 years.¹⁶ One eyewitness of the case claiming to have developed weak eyesight after the occurrence of the incident took five minutes to raise suspicion on an accused named Daya Singh as he had “similar” features from what she remembered since the date of occurrence of the crime 8 years back. Despite this she asserted that her identification was confident. Her testimony was considered reliable because it seemed natural, confident, and also matched with the identification of her husband, the other eyewitness. The accused was thus convicted. This decision of the Supreme Court is an erred precedent for future cases. The eyewitness testimonies backed by no other form of evidences crippled with warnings. Identification after a long-time gap of 8 years, “similar” but not exact features with the real offender were clear indicators of the likelihood of memory decay. The said conviction therefore does not rule out the possibility of grave miscarriage of justice. Moreover, the confidence rating considered to gauge the accuracy of the eyewitness was inherently flawed, the justification of which is elucidated below.

An eyewitness can be fallible for the reasons discussed above, but what makes it plausible is the confidence with which it is testified. Data indicates that high-confidence implies a high-accuracy identification under “pristine conditions”.¹⁷ But such conditions in the form of fair line-up identifications, manner of interrogations, lesser time gaps rarely exist in India. Justice D.P. Wadhwa comments on the condition of witnesses in India as:

*“The witnesses... are harassed a lot... It has become more or less a fashion to have a criminal case adjourned till the witness tires and gives up. It is the game of unscrupulous lawyers to get adjournments for one excuse or the other till a witness is won over or is tired. Not only that a witness is threatened; he is abducted; he is maimed; he is done away with; or even bribed. There is no protection for him.”*¹⁸

The ‘*tareek pe tareek*’ nature of Indian cases make human memory more susceptible to malleability through extra or erroneous information provided by fellow witnesses, police, or media, increasing the probability of

¹⁶ *Daya Singh v State of Haryana* (2001) AIR SC 1188

¹⁷ John T. Wixted and Gary L. Wells, ‘The Relationship Between Eyewitness Confidence and Identification Accuracy: A New Synthesis’ [2017] 18(1) *Association for Psychological Science* 10, 11

¹⁸ *Swaran Singh v State of Punjab* (2000) 5 SCC 668

remembering events differently from the way it happened. Further, the possibility of threatened or bribed phony witnesses make confidence a poor indicator of accuracy. The discrepancy between confidence and accuracy can also be explained by Daniel Kahneman's cognitive "illusion of validity", a form of bias where one tends to be more overconfident in their ability to accurately interpret outcome from a given data set.¹⁹ High confidence can be an indication towards a coherent story in the eyewitness's mind that need not necessarily be true. In the infamous wrongful rape conviction of Ronald Cotton, the rape victim Jennifer Saw exuded to be a terrific witness embodying composure and complete confidence that she had rightly identified Cotton to be the rapist despite being aware of the fact that darkness during the commission of the crime precluded her from getting a wholesome view of the offender.²⁰ Saw's misplaced confidence landed Cotton in prison for eleven years before being vindicated based on DNA testing. The case is a classic example of weak correlation between eyewitness confidence and accuracy making it unfit for administration as evidence in the courtroom.

Interestingly, in the film "12 Angry Men" focused on jury deliberations in the first-degree murder trial of an 18-year-old boy accused of stabbing his father, the "unshakable", "most important" eyewitness testimonies were the most crippling pieces of evidence. The eyewitness testimony of a woman claiming to have onlooked the murder from her bedroom window while laying down in bed to sleep was proven unreliable when a juror noticed marks on her nose from wearing spectacles which she most likely would not have worn while sleeping in bed, interpreting that she would have only witnessed a blur. The testimony of an old man stating to have seen the boy escape down the stairs after threatening to kill his father was questioned and deemed unreliable because of how long it would have taken the limping man to reach to the door of his apartment. The factors debated above to verify the shortcomings of eyewitness testimonies are interior factors arising out of errors in human memory and physiology. External factors of unfair line-up procedures, phony witnesses or stock witnesses also contribute to its undependability.

3. Salvaging unreliability of testimonies through Forensics

Eyewitness identifications involve a high probability of erroneousness but their importance to the criminal justice system cannot be overlooked. The *modus operandi* of criminals has become quite advanced today leaving behind the crime scene with lesser implicating physical evidences. In such instances, where only minimal

¹⁹ Thomas D. Albright, 'Why Eyewitnesses Fail' [2017] 114(30) PNAS 7758, 7760

²⁰ *Wise* (n 14) 437-440

evidence can be gathered to assist the prosecutors, eyewitness testimonies are critical. Increasing its accuracy is consequently paramount for better law enforcement. This can be achieved by expanding the domain of forensic psychology in criminal investigations. Forensic psychology has been defined by the American Psychological Association as “the application of clinical specialties to the legal arena” *i.e.*, clinical psychology being applied to the investigations of crimes.²¹ It is the branch of forensic science that examines the motive, in legal terms the *mens rea* of the criminal. A forensic psychologist helps assess the suspect’s mental state, the driving force behind their unlawful act which aids the judges in establishing guilt. It is primarily used in cases involving unexplained death, however incorporating it alongside eyewitness identification and other evidences can help ascertain, with a higher degree of accuracy, the real culprit. Psychology can be merged with criminology using techniques of narco-analysis and Brain Electrical Oscillation Signature.

In Narco-analysis, a person is put into an unconscious state by administering a serum (Sodium pentothal) to hypnotise and induce the person to speak whatever is present in their mind.²² Under this test as emotions occur, physiological changes happen automatically without choice and deliberation. Literature indicates that a person who is lying tends to have a higher pitched voice because of stress.²³ The famous 2007 narco-analysis of Abu Salem, an Indian gangster and terrorist extradited to India from Portugal in 2002 for involvement in several murder and extortion cases, revealed many disclosed links of various cases he had been involved in.²⁴ Salem was “unstoppable” during the three hour long test giving the investigating officials “all the information they wanted”.²⁵ A top anti-terrorist squad official stated, “the results will give a new direction to our investigation.”²⁶ Besides, since this technology delves into the subconscious mind that harbours suppressed issues of an individual, it aids the psychologist in determining the emotion that urges one to commit crimes. Understanding this assists psychologist in deeper counselling with the accused which can ultimately help them in reducing recidivism.

Another exceptional innovation in the field of forensic psychology is the Brain Electrical Oscillation Signature (BEOS) technique also known as brain fingerprinting. It is a method of interrogation, to investigate into the suspects’ involvement in a crime, with the help of a scientific tool measuring changes in the electric activity

²¹ Jane Tyler Ward, ‘What is forensic psychology’ (*APA* 2013) <<https://www.apa.org/ed/precollege/psn/2013/09/forensic-psychology>> accessed 9 April 2021

²² Shalini Tyagi, ‘Importance of Narco Analysis Test in Investigation and its Admissibility’ [2019] 3(1) *JLSR* 77, 78

²³ *Ibid*

²⁴ TNN, ‘Abu Salem sings under Narco Test’ (*Times of India*, 17 August 2007) <<https://timesofindia.indiatimes.com/india/abu-salem-sings-under-narco-test/articleshow/2286455.cms>> accessed 9 April 2021

²⁵ *Ibid*

²⁶ *Ibid*

of the brain. No questions are asked while conducting the test rather the suspect is presented with scenarios and events after which the results are inspected to check if the brain had responded with experimental knowledge to the events. The test has reported an accuracy rate of 100% in a study conducted in the United States.²⁷ This technology is gaining popularity and is being used by a number of forensic laboratories situated in Mumbai, Chandigarh, and Gandhinagar. BEOS has proved to be of immense use as corroborative testimony in many criminal cases in India. The test was recently practiced in the Gandhinagar-based Forensic Laboratory on four accused in the notorious Hathras rape and murder case of a Dalit girl. The investigations of the case are still underway.²⁸

The Jharkhand High Court has recognised such scientific tests to increase the credibility of witnesses.²⁹ However, as these procedures include powerful drugs and brain scans which can be injurious if used carelessly, their health risks and constitutional validity has been questioned in light of Article 20(3) of the Indian Constitution which conditions that, ‘No person accused of an offence shall be compelled to be a witness against themselves.’ and Right to Life under Article 21 of the Constitution. Commenting on the issue, the Supreme Court in 2010 ruled that tests like Narco-analysis and BEOS could only be performed with informed consent and in presence of certified psychologist. At the same time, essential information obtained through such tests can be admitted in the court of law as a part of the evidences and not as sole evidence.³⁰ Subsequently, Section 45 IEA empowers the court to seek services of skilled persons aka experts in matters that require special assistance.³¹

Forensic psychologists being trained in the field of criminal psychology can assist the courts in deciding the credibility of eyewitnesses and guilt of accused; thus, facilitating in exonerating innocents, identifying guilt and solving crimes. They can also assist the investigators in the manner of questioning the witnesses. This branch of forensic science is still in its nascent stages in India, but its popularity and significance has encouraged the government to upgrade six forensic science labs to augment the domain of forensic psychology in the country with improved equipment and training facilities.³²

²⁷ Dhiraj Ahuja and Bharat Singh, ‘Brain fingerprinting’ [2012] 4(6) JETR 98, 98

²⁸ Anuja Jaiswal, ‘4 Hathras accused taken to Guj for Polygraph Test, Brain Profiling’ (*Times of India*, 23 November 2020) <<https://timesofindia.indiatimes.com/india/4-hathras-accused-taken-to-guj-for-polygraph-test-brain-profiling/articleshow/79360095.cms>> accessed 9 April 2021

²⁹ *State of Jharkhand v Ajay Kumar Pal* 2007 SCC OnLine Jhar 524

³⁰ *Selvi v State of Karnataka* (2010) 7 SCC 263

³¹ Indian Evidence Act 1872, sec 45

³² PTI, ‘Six central forensic labs to be upgraded to help probe Heinous Crimes’ (*The Hindu*, 1 December 2019) <<https://www.thehindu.com/news/national/six-central-forensic-labs-to-be-upgraded-to-help-probe-heinous-crimes/article30129121.ece>> accessed 9 April 2021.

Additionally, investigations should also depend on DNA-profiling, a scientific procedure to identify individuals on the basis of their unique genetic makeup; provided physical evidence has been found from the crime scene. 69% of DNA exonerations which is approximately 252 out of 367 cases in U.S. have involved eyewitness misidentifications, throwing light onto the “hopelessly unreliable” disposition of eyewitness testimonies.³³ The approximate number of DNA profile testing developed from crime scenes in India stand at 20,000 as of year 2019.³⁴ With lakhs of cases pending adjudication, it is the need of the hour to step up DNA technology to corroborate eyewitnesses. While forensic psychology helps increase accuracy of eyewitnesses by narrowing down the list of suspects, as some might not consent to the technology; DNA-profiling helps in identifying the suspect. A person has the legal right to reject forensic psychologic techniques on grounds of self-incrimination however giving DNA impressions cannot be refused for the same grounds as they are not oral or written in nature and thus do not constitute testimonies.³⁵ In instances where both fields of forensics are unable for application during investigations or trials due to lack of consent and physical evidence from crime scene, eyewitness testimonies have to be proceeded with extreme caution by the courts.

In conclusion, the judiciary must be wary of the mouldable and delicate nature of human memory as well as the possible flaws in law enforcement in the form of unfair line-up procedures and harassment of witnesses. Moreover, it is fundamental for courts and law enforcement officials to be acquainted with developments in the field of science and technology in order to strengthen and promote infallibility of eyewitness testimonies.

³³ Innocence Staff, ‘How Eyewitness Misidentification Can Send Innocent People to Prison’ (*Innocent Project*, 15 April 2020) <<https://innocenceproject.org/how-eyewitness-misidentification-can-send-innocent-people-to-prison/#:~:text=Nationally%2C%2069%25%20of%20DNA%20exonerations,based%20exonerations%20involving%20eyewitnes%20misidentification>> accessed 9 April 2021

³⁴ PTI, ‘Need of the hour: Stepping up DNA technology in India to combat surge in rape cases’ (*Economic Times*, 2 June 2020) <<https://economictimes.indiatimes.com/news/science/need-of-the-hour-stepping-up-dna-technology-in-india-to-combat-surge-in-rape-cases/dna-analysis-a-territory-unexplored-in-india/slideshow/76151340.cms>> accessed 9 April 2021

³⁵ *State of Bombay v Kathi Kalu Oghad* 1961 SC 1808