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Assessing the Reliability and Evidentiary Value of Polygraph Tests

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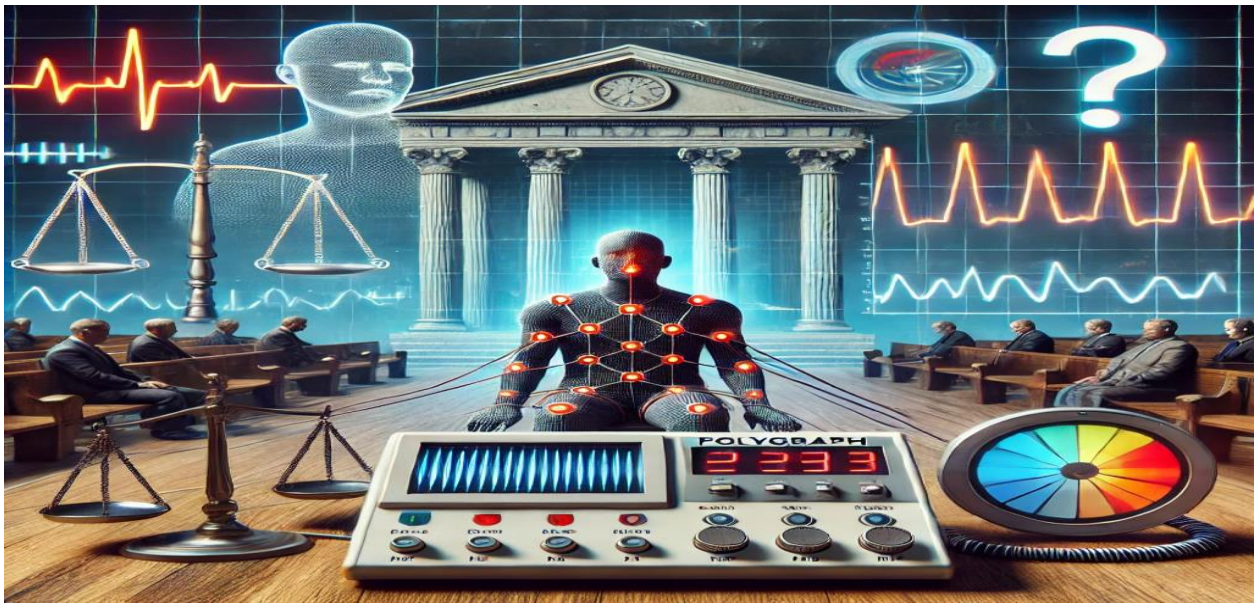
Abstract:
The polygraph test, commonly known as a lie detector test, assesses physiological reactions to evaluate honesty and deception. Despite its extensive usage in criminal investigations and many other fields of application, its reliability and admissibility as evidence have remained contentious issues. Critics argue that it lacks scientific basis as it could yield false positives, false negatives, and that the responses may be susceptible to extraneous influences such as stress and anxiety or even deliberate withholding. Different legal systems around the world portray different levels of acceptance, with the most significant case such as Selvi v. State of Karnataka in 2010 bringing out the constitutional and ethical constraints. Polygraph testing will thus be discussed from history, methodology, legal admissibility, and the future ahead, especially emphasizing the need for strong guidelines and supporting evidence for this article into polygraph testing. While advances in neuroscience and technology offer intriguing options, current polygraph techniques are not reliable enough to be used for absolute legal findings.

Keywords: Polygraph test, Lie detector, Physiological reactions, Reliability, False positives, False negatives, Legal admissibility, Forensic investigations, Selvi v. State of Karnataka, Evidentiary value.

1. Introduction:



Lie detector tests, or polygraph examinations, measure physiological signs including heart rate and blood pressure, as well as breathing patterns, during responses to a series of questions. The principle on which lie detectors are based is that lying causes certain physiological changes. However, this concept

has been the focus of intense criticism, with critics questioning its accuracy. The reliability and admissibility of the results of polygraph testing in legal cases are still contentious issues.

The basic notion behind the polygraph test is that physiological responses elicited during deception are different from those observed during truthful statements. Throughout the examination, devices such as cardio-cuffs and sensitive electrodes are strapped to the individual to monitor a wide range of physiological indicators, including blood pressure, pulse rate, respiration, sweat gland activity, and blood flow while questions are being asked. Each of these responses is measured through numbers to establish whether the individual is either truthful or deceptive or not sure.

In the 2007 Nithari killings serial murder case, Surinder Koli, the accused, underwent polygraph tests. Although Koli later admitted to the murders, these examinations were reportedly considered pivotal in directing the investigation for law enforcement. Nevertheless, the results of the polygraph were not accepted as evidence in court and did not directly influence his conviction.

2. Origin of polygraph Test:

The polygraph test, commonly referred to as the lie detector test, first appeared in the early 20th century. As early as 1906, Italian criminologist Cesare Lombroso created a rudimentary device aimed at monitoring blood pressure variations in suspects during interrogations. In 1915, American psychologist William Moulton Marston advanced this concept by developing a systolic blood pressure test designed to identify deception. By 1921, John Augustus Larson, a medical student and police officer, introduced the modern polygraph, which simultaneously measured several physiological responses, including blood pressure, pulse, and respiration. Larson's contribution marked a significant improvement in lie detection methods, making it a valuable tool for both criminal investigations and psychological studies.

3. Concerns about Reliability:

Polygraph tests can be beneficial for verification purposes. However, there are significant limitations that impact their reliability and acceptance. One major concern is the privacy involved in interpreting the results, which requires considerable judgment from the examiner. This increases the likelihood of bias or inaccuracies. The dependability of polygraph tests is also questionable since they rely on physiological indicators such as heart rate, blood pressure, and perspiration. These responses can either indicate truth or deception, potentially compromising the test's reliability.

Moreover, lie detector tests are susceptible to manipulation. Individuals with expertise may employ countermeasures like regulated breathing or muscle tension to alter the results. Additional factors, including mental health issues or medications, can further skew the physiological responses, limiting the test's effectiveness. Furthermore, legal restrictions stemming from the Supreme Court's ruling in Selvi v. State of Karnataka (2010) prevent the administration of involuntary lie detector tests, underscoring the importance of obtaining consent. Due to these vulnerabilities, polygraph results are not regarded as conclusive evidence in court and are typically used as supplementary tools in investigations.

Polygraph tests are based on the premise that lying causes stress, leading to observable physiological responses. Nonetheless, this theory fails to account for other potential stressors, including anxiety, fear, or existing medical conditions. A truthful individual might display increased stress simply due to the pressure of the testing situation. Accuracy studies of polygraphs have produced reliability estimates that range between 70% and 90%, with these figures very much influenced by factors as diverse as the skill of the examiner and the conditions under which the test is conducted.

4. Help in Police Investigation:

Polygraph tests can assist law enforcement in their investigations by revealing whether a suspect is being deceitful. During an interrogation, a polygraph monitors physiological reactions such as heart rate, blood pressure, and breathing patterns, which typically change if the individual is not truthful. Though these tests are not infallible, their outcome can enable investigators to ascertain whether the suspect is truthful or evasive thus guiding further investigations in the right direction. Polygraphs can also exonerate an innocent person or draw nearer attention to those with deceptive tendencies. However, results thereof should be confirmed by other evidence since they cannot be considered as proof of guilt or innocence.

5. Legal Viewpoints on Polygraph Evidence:

Historically, courts have adopted a skeptical stance toward polygraph evidence. In the 1923 case of Frye v. United States, a precedent was established, ruling that polygraph results were not sufficiently accepted within the scientific community for use as evidence. This ruling has had a significant impact on their application in legal contexts.

Nevertheless, only a limited number of courts have permitted the use of polygraph results under certain conditions. In the case of United States v. Scheffer (1998), the court determined that polygraph results could be deemed beneficial if both parties consented to their use. However, the Supreme Court of the United States, in the pivotal case of Daubert v. Merrell Dow Pharmaceuticals (1993), ruled that polygraph evidence does not meet the standards of scientific reliability necessary for criminal proceedings.

In the significant case of Selvi v. State of Karnataka (2010), the Indian Supreme Court addressed the constitutional legitimacy of polygraph tests. The court examined whether conducting a polygraph test against an individual's will infringed upon the right to remain silent as stipulated in Article 20(3) of the Constitution. It concluded that such practices were unconstitutional because they violated the right against self-incrimination, as polygraph tests, narco-analysis, and brain mapping were performed without the accused's consent.

Additionally, the court stressed that confessions obtained through coercion or involuntarily - even if derived from scientifically advanced techniques like polygraphs - would be deemed inadmissible.

It observed that the results of polygraph tests might be useful in an investigation, but a verdict should not be based only on those results since their reliability has not been proven scientifically to determine truth-telling or lying. Besides, the Court further established that the results of a polygraph test, even if administered voluntarily, cannot be considered as admissible evidence in court.

The consent obtained from the accused should be informed, wherein the accused should be provided access to legal counsel and a detailed explanation of the physical, emotional, as well as legal implications of the test. Additionally, the National Human Rights Commission Guidelines for polygraph tests issued in 2000 should be followed strictly, and consent on the part of the accused should be obtained preferably on a document signed in front of a judicial magistrate. Any information or evidence obtained during a polygraph test voluntarily consented to may be availed as admissible in court.

In the case of D.K. Basu v. State of West Bengal (1997), the Supreme Court ruled that administering polygraph and narcoanalysis tests without the individual's consent constitutes cruel, inhuman, and degrading treatment, which is prohibited by Article 21 of the Constitution that guarantees the Right to Life and Liberty. Additionally, in State of Bombay v. Kathi Kalu Oghad (1961), the Supreme Court determined that Article 20(3) of the Constitution safeguards individuals from self-incrimination;

however, this protection does not extend to physical evidence such as fingerprints, handwriting, blood, and voice samples, nor to identification methods that involve voluntarily provided information, line-ups, and photo arrays.

Courts evaluate polygraph test reports by considering their legal admissibility, emphasizing the subject's voluntary consent and adherence to proper legal procedures. They scrutinize the examiner's qualifications, the reliability of the testing equipment, and the fairness of the testing process, ensuring no coercion occurred. Additionally, polygraph results are not seen as conclusive evidence but rather as supplementary information that can support or challenge other evidence in the case. Ultimately, their significance hinges on how well they correlate with the overall factual context presented.

6. Guidelines for Polygraph Tests Issued by the National Human Rights Commission in 2000:

No lie detector test should be administered without the consent of the accused, who should have the autonomy to choose whether to participate in the test. If the accused opts to take the test, they should also have access to legal counsel. Both the police and the attorney have a responsibility to thoroughly explain the physical, emotional, and legal implications of the test. Consent must be documented in the presence of a Judicial Magistrate, ensuring that the accused is properly legally represented during these proceedings.

During the magistrate hearing, proper communication to the accused must be made that statements made will not be treated as confessions before the magistrate but statements given to the police. Once more, the law stipulates that the magistrate must weigh various elements concerning the detention of the accused, including the duration of the detention and the nature of the interrogation. Consequently, the lie detector test should be conducted in a neutral setting, like a hospital, with a lawyer present, and a detailed medical record along with an accurate account of the information given must be preserved.

7. The Future of Polygraph Test:

The future of polygraph testing will be shaped by technological advancements and improved integration with various detection tools. New technologies, including artificial intelligence and machine learning, have the potential to enhance the accuracy of lie detection by assessing physiological and behavioral cues in real-time. Additionally, these advancements may help mitigate concerns related to privacy violations and reduce the occurrence of false positives. Additionally, incorporating polygraph results with advanced forensic methods like brain mapping or MRI scans can provide a more comprehensive approach to detecting deception, thereby increasing credibility.

Nevertheless, in order for lie detection tests to remain pertinent, it is essential to tackle ethical and legal challenges. The implications of privacy concerns and the potential for misuse underscore the necessity for stringent regulations to ensure testing is conducted ethically and with informed consent. Courts and law enforcement agencies must remain vigilant, as no technology can fully guarantee accurate identification of deception. The emphasis should be on utilizing the polygraph as a supplementary tool while continuously refining and validating its accuracy through ongoing research and development. This balanced strategy will define the role of lie detector tests in criminal investigations and the contemporary legal framework.

8. Literature Review:

The polygraph has commonly been referred to more as a "lie detector," measuring physiological respon-

ses that might indicate honesty. It monitors changes in parameters like blood pressure, pulse, respiration, and skin conductivity. While applied today in criminal investigations and employment assessments, questions about its dependability and the value of its evidentiary weight still linger both among legal and scientific circles. This review discusses the dependability of polygraph exams and their recognition as evidence in diverse jurisdictions.

The idea behind polygraph examinations relies on the assumption that deceitful responses cause physiological changes because of psychologically associated stress. However, critics argue that these physiological signs are not specifically related to deception and may be brought about by anxiety, fear, or other emotional states (Vrij, 2008). Lack of a direct causal relationship between deceit and physiological alteration raises questions about the test's validity.

Numerous studies have examined the validity of polygraph tests, and the findings are diverse. Proponents typically reference an 80-90% accuracy figure under controlled settings (National Research Council, 2003). However, real-world factors, such as the mental state of the subject and the experience of the examiner, can significantly influence results. The frequency of false positives and false negatives can compromise the overall reliability of the test (Lykken, 1998).

A scientific scepticism surrounds the polygraph in that it relies upon indirect manifestations of truthfulness. Analysts argue that the test is by nature skewed, as anxiety or nervousness are commonly mistaken for deception. Also, subjects who have been trained in countermeasures like controlled breathing or mental abstraction can influence the outcome, and this makes it less valid (Honts & Schweinle, 2009).

The acceptance of polygraph results as evidence varies across different jurisdictions. In a significant U.S. case, Frye v. United States in 1923, the "general acceptance" standard was established, greatly limiting the admissibility of polygraph evidence in many courts. This changed somewhat in the 1993 case of Daubert v. Merrell Dow Pharmaceuticals, which adopted a more lenient standard that did not require general acceptance; however, polygraph results are still not universally admissible. A similar situation exists in India, where the Supreme Court ruling in Selvi v. State of Karnataka (2010) mandated that polygraph tests cannot be conducted without consent, thus providing constitutional safeguards against self-incrimination as outlined in Article 20(3).

Other ethical dilemmas surrounding polygraph testing concern the abuse in potential exploitation. Compelling or misleading persons to undergo testing can lead to false conviction or damage to one's character. These concerns speak to the need for due rules and regulation in the administration of polygraph tests (Gudjonsson, 2003).

The international view of polygraph evidence appears to be a mix of scepticism and hesitant acceptance. The Japanese accept polygraph results into investigations but do not regard them as conclusive proof. Conversely, most European countries exclude polygraph evidence on the basis of unproven scientific validity (Vrij, 2008). These differences illuminate the lack of international consensus on its probative value.

Modern developments in neuroscience and technology, such as the utilization of functional magnetic resonance imaging (fMRI) scanners, are being investigated as potential alternatives to the polygraph. These technologies, although with great promise for the detection of lying, likewise face an arduous challenge of expense, accessibility, and ethically controversial issues. Such advances might soon replace polygraph testing in forensic applications (Farah et al., 2014).

Indeed, while flawed, the polygraph can still be useful in certain investigative situations, like pre-employment screenings for sensitive positions. However, the utility of the device is reduced when the results are taken as definitive proof of guilt or innocence. Law enforcement agencies often use polygraphs more as a strategic means of getting confessions than as an independent proof.

Strict guidelines and standardized training of examiners could help in improving the reliability and evidentiary standing of polygraph tests. The risks of undue reliance could be alleviated if polygraph outcomes were combined with corroborating evidence. Forensic truth-detection methods need to be refined through further research on the physiological underpinnings of deception and the exploration of alternative technologies.

The polygraph test has been an instrument of criminal justice and other fields for ages. The problem lies in its reliability and evidentiary value. Where scientific and legal critiques, and also ethical issues, do not let the acceptability rise to the dignity of strong evidence in judicial proceedings, a completely scientific truth-detection instrument will certainly be needed by developing forensic science.

9. Examples of Failures of Polygraph Test:

- During the Watergate scandal, several aides of Richard Nixon underwent polygraph tests in an effort to demonstrate their innocence. While some of these aides initially passed the tests, they were later found to be involved in misconduct, leading to questions about the effectiveness of polygraphs in accurately detecting lies and deceit.
- Gary Ridgway, known as the Green River Killer, managed to evade suspicion in 1984 after successfully passing a polygraph test, despite being a notorious serial killer. However, years later, DNA evidence definitively connected him to numerous murders, demonstrating that the polygraph had incorrectly cleared him of involvement.
- The Aldrich Ames case serves as a notable example of a false negative in polygraph testing. Ames, a CIA officer who turned out to be a Soviet spy, managed to pass several polygraph tests throughout his espionage activities. Even after years of leaking classified information, these tests were unable to uncover his deception, revealing significant flaws in their ability to detect skilled manipulators and deceitful individuals.
- In 1990, a 16-year-old named Jeffrey Deskovic was charged with the rape and murder of a fellow classmate and subsequently did not pass a polygraph test administered by the police. His inability to pass the test was used to pressure him into making a false confession, resulting in his wrongful conviction. Deskovic ultimately spent 16 years incarcerated before being exonerated through DNA evidence.
- In the Amanda Knox case, she was accused of murdering her roommate and endured a distressing interrogation involving questions similar to those used in a polygraph test, although not administered in a formal setting. The combination of stress and coercive tactics produced misleading physiological reactions, which law enforcement interpreted as signs of deception, even though she was ultimately exonerated.
- A previous CIA report highlighted that several applicants were rejected after failing pre-employment polygraph tests, not due to deceit but because of nervousness. As a result, numerous qualified candidates missed out on job opportunities, demonstrating that the polygraph is vulnerable to emotional and physiological influences that are unrelated to truthfulness.

- In 1998, 14-year-old Michael Crowe was accused of murdering his sister, and a polygraph test suggested he was not truthful. He was pressured into giving a false confession but was ultimately exonerated when DNA evidence pointed to a different suspect.
- A notable example illustrating the flaws and unreliability of polygraph tests in India is the 2008 double murder case of Aarushi Talwar and Hemraj Banjade. In that instance, polygraph tests were conducted, but the results were unsatisfactory, leading to skepticism about their reliability in criminal investigations.

False results can occur for several reasons. False positives may arise from stress, fear, or anxiety unrelated to deceit, as well as medical conditions that impact physiological responses, such as heart problems or sweating disorders. Conversely, false negatives can happen when individuals employ countermeasures like controlled breathing or muscle tension, or when psychopaths and highly skilled liars exhibit no physiological reaction while being deceptive. These instances highlight the importance of approaching polygraph test results with caution and ensuring they are supported by additional evidence.

10. Conclusion:

While polygraphs may indicate truths under specific conditions, their inherent limitations and vulnerability to misinterpretation render them unreliable as legal decision-making instruments. Until their accuracy can be guaranteed, widespread acceptance as credible evidence seems improbable. The position taken by the Supreme Court of India, particularly in the Selvi case, highlights the minimal evidentiary significance of polygraph tests. Although these tests can serve as useful investigative tools, their outcomes cannot decisively establish guilt or innocence in criminal matters. Instead, they should be evaluated alongside other pieces of evidence and cannot be deemed conclusive without the individual's voluntary consent. As such, while polygraphs may offer some insights during investigations, they lack the reliability needed to be considered definitive evidence in legal settings.

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