

# Lie Detection in Criminal Justice: The Role and Limitations of Polygraphs with Indian Cases



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## Abstract

Technology has greatly influenced the judicial process, particularly through the integration of polygraph tests, or lie detectors, in criminal investigations. This test is commonly used to assess the credibility of statements made by the suspects or witnesses. However, the use of polygraph is controversial due to concerns about their accuracy, reliability, and ethical implications. This paper explores the role and limitations of polygraph testing in the Indian Criminal Justice system, particularly in high-profile cases. Polygraph tests are typically used as supplementary tools in investigations, offering suggestive insights but also not admissible as evidence in court. The Selvi case judgement clarified that polygraph test must be voluntary and not coerced, in line with constitutional protections against self-incrimination. The paper analyses Indian cases like the Nithari Killings, Jessica Lal, Mumbai Terror Attacks and Aarushi Talwar murder, where polygraph tests were taken to assess suspects' statements. Despite their usefulness, polygraph has limitations, such as false positives, inability to capture context, and potential ethical issues, including coerced confessions. The paper concludes by calling for on-going legal and ethical scrutiny of polygraph use and the development of more advanced lie detection methods to ensure fairness and accuracy in criminal justice proceedings.

**Keywords:** Polygraph; Lie Detection; Criminal Investigations; Forensic Science; Ethical

## Introduction

The detection of lies has been a part of criminal investigations for very long. Methods and technologies have evolved with time to establish whether the answer given by suspects, witnesses, or victims is true or false [1]. There are several technologies used in criminal investigation to solve the case efficiently and quickly. Polygraph is one of them, which is also known as the lie detector. The principle on which the polygraph works assumes that a person's physiological responses, such as heart rate, blood pressure, respiration rate, and sweat production, change when they are experiencing psychological stress or anxiety [2]. Proponents argue that this physiological stress is often linked with deception, as people generally feel anxious while lying or their behavior deviates from societal norms. Although it is widely used in several countries, the polygraph test is far from being universally accepted. It is commonly used in investigation and legal contexts, but the scientific validity of the polygraph has been in issue for years. The critics say that physiological changes measured by it are not specific to lying and are rather a product of a combination

of fear, stress, medical conditions, or nervousness. The accuracy of polygraph results is always a question, as they might raise a false positive or a false negative result. This uncertainty, therefore, raises multiple issues when the results are used as evidence in legal proceedings. In India, the polygraph test has entered the investigative procedure, especially in important criminal cases wherein traditional methods may not be sufficiently fruitful [3]. These tests are typically used to detect the truth about statements made by suspects and in deciding whether an investigator should proceed with further questioning.

However, their application in the Indian criminal justice system remains controversial, since the results of polygraph tests are generally not admissible in court. The Supreme Court, in its landmark judgment *Selvi v. State of Karnataka*, held that a conviction cannot be based solely on the results of a polygraph test because of the potential for forced confessions and violation of the accused's right against self-incrimination. The use of polygraph as an additional tool by an Indian law enforcement agency has grown

in spite of these legal limitations. In cases involving complex criminal activities such as terrorism, serial murder, or political corruption, the polygraph test is often used to verify the credibility of confessions or statements [4]. Problems related to the accuracy of the outcome and ethical issues indeed severely restrict the utility of polygraph testing, as improper testing may infringe upon the rights of an individual. The most important concern related to polygraph tests in India is human rights violations, mainly when an individual is forced or coerced to undergo this test. In the Selvi case, it was pointed out that getting voluntary consent before any polygraph test is important so that a person cannot be forced to undergo it and commit self-incriminating statements, assuming a person is forced to undergo a polygraph test. In effect, this judgment has secured the fundamental rights of individuals while directing attention to the upper echelons of the criminal justice system to provide a crime-free society through ethical questioning procedures at every level [5].

Polygraph results are still inadmissible in courts in India, and the Indian Evidence Act does not indicate what to do with a polygraph test. However, the Courts of India have persistently declared that polygraph results are not enough to establish guilt. This is based on the principle of jurisprudence that polygraph results cannot prove conclusively. Hence, although polygraphs may provide investigative leads, they cannot be considered as prime evidence in criminal cases. The purpose of this paper is to conduct an all-rounded analysis on the role of polygraph testing in the Indian criminal justice system. It analyzes critically the effectiveness and limitations of polygraph tests, particularly on their use in high-profile criminal cases. This paper explores how polygraph results are used in criminal investigations and the challenges and controversies surrounding the use of such results through key case studies such as the Nithari Killings and the Aarushi Talwar Murder case. Through this paper, a review of the existing legal framework and the ethical considerations involved in the process of polygraph testing, it attempts to provide some insights into its practical and theoretical implications in India and contributes toward the on-going debate about its role in the criminal justice system. It would be crucial to understand both the advantages and disadvantages of polygraph testing, particularly as they pertain to justice and human rights, given its on-going growth in India. The suggestion for additional changes in the technology of detection is discussed in conclusion along with the need to strike a balance between investigative tools and respect for the rights of the individual in the legal system [6].

### Background and Concept of Polygraph Testing

Polygraph testing, also known as a “lie detector” test, is one of the most well-known and controversial methods used to detect deception. The basic principle of polygraph testing is that physiological changes occur when a person is under stress or anxious, which is usually caused by lying [7]. Polygraphs measure physiological responses such as heart rate, blood pressure, respiration rate, and skin conductivity to detect signs

of deception. These physiological indicators are said to change when a person is under emotional stress, which may be due to the attempt to hide the truth [8]. The idea of using physiological responses as a marker for deception dates back to the early 20th century. Since its initial invention by John Augustus Larson in 1921, polygraph technology has become an important tool for the law enforcement body [9]. The polygraph test is based on the fundamental premise that dishonest behaviour results in physiological reactions that can be measured objectively, which makes them a useful tool for identifying lies [10]. For example, if any subject is lying during the test, the reaction of the body would be measured like heartbeat, higher blood pressure or more rapid breathing, all of which are indicators that can be recorded by the polygraph. However, the reliability and validity of polygraph tests have been widely debated. Critics of polygraph testing content that the physiological reactions it measures are not always exclusive to lying, while proponents of the test maintain that it can offer valuable insights into whether an individual is telling the truth [11]. Numerous factors, such as fear, anxiety, and even medical conditions, can cause physiological reactions that are similar to those seen during deception. Indeed, studies have demonstrated that even when people are telling the truth, they may feel more stressed or anxious during a polygraph test Gass & Lykken, 1997. The major concerns of tests are the reliability of results, which casts doubt on their ability to be a reliable indicator of dishonesty.

### Polygraph procedure

During a polygraph test, several crucial procedures are used to record physiological reactions to a series of questions. Usually, the procedures start with the subject cable being connected to polygraph machine-using sensors that track their blood pressures, respiration, skin conductivity, and heartbeat. Throughout the test, these sensors are applied to the body to continuously collect data. Once the equipment is set up, the examiner explains the procedure to the subject and asks a series of questions. The questions usually are divided into two categories, relevant questions and control questions. Relevant questions pertain directly to the investigation under scrutiny, that is, questioning the subject on their possible involvement in the crime [12]. Control questions are those that would set a baseline physiological response to be compared to that elicited by the relevant questions. Such questions are expected to be answered truthfully by the subject. These control questions serve as a comparison to help the examiner identify any significant physiological changes that may indicate deception when the subject answers relevant questions. During the test, the polygraph records physiological data upon the subject answering each question. The examiner then analyzes the physiological responses to detect abnormalities or patterns that might confirm the subject to be lying. For instance, an increase in heart rate or a sudden fall in skin conductivity while answering a relevant question might point toward stress and, therefore, possible deception. However, of course, such responses could be attributed to the client’s nervousness or discomfort over several other reasons not related

to deception [13]. After the examination, a polygraph examiner usually studies the information and makes deductions about the results. According to different polygraph examiners and their experience, deception, truth, or a non-conclusive result is shown. However, the results of a polygraph examination are never clear-cut, and several other lines of evidence must be taken together to help us to understand the situation properly.

### Scientific and legal controversies

The scientific basis of polygraph testing has remained one of the most highly controversial issues in use, even though polygraph tests are very widespread. While some argue that a polygraph could offer an indication of deception, others doubt the validity and reliability of this technique [14]. This is so because physiological responses, such as an increased heart rate or changed breathing, do not occur uniquely to a person when lying. Anxiety, fear, stress, or even medical conditions such as hypertension or panic disorders can cause physiological responses that may be similar. It is for this reason that many critics argue that polygraph tests are prone to false positives in which truthful persons are misdiagnosed as deceptive and false negatives in which deceptive persons are classified as truthful. It added more complexity to the polygraph, which wasn't very reliable since the results tended to be subjective [15]. What one examiner determined from the data might be determined differently by another, which produced inconsistent results, and this sort of subjectivity tends to degenerate the validity of polygraph testing as an instrument for lying detection based on science [16]. Research studies have shown that polygraph tests can achieve accuracy rates ranging from 70% to 90%, but the margin of error remains high enough to raise concerns about its effectiveness in high-stakes situations, such as criminal investigations and legal proceedings Kothari, 2007.

Apart from scientific issues, the legal challenges that polygraph tests face are also enormous. Many courts around the globe, including courts in India, have declared polygraph test results invalid in court, because they rely more on emotion and less on science. Additionally, the truth is not scientifically proved through it, so most of the evidence collected from the test is only for the gathering of information but is not reliable to be termed as conclusive [17]. In India, legal framework governing the use of polygraph is strict. In the case of *Selvi v. State of Karnataka*, the Indian Supreme Court's decision over the limitations of polygraph testing during criminal investigations [18]. The Supreme Court established that results from polygraph tests cannot be considered court evidence unless the individual agrees to take the test voluntarily [19]. This move further strengthened the idea that a polygraph test should not be the sole criterion for criminal convictions. Another legal issue is that coerced confessions may come about as a result of polygraph testing because physiological responses measured are mainly associated with stress or anxiety.

Some will confess to committing crimes even if they are not involved, due to feelings of coercion. The involuntary confessions raise serious concerns on ethics and human rights on jurisdictions where there is less legal safeguarding against coerced statements while investigating crime cases [20].

### The Role of Polygraph Tests in Indian Criminal Justice

Polygraph tests, commonly called lie detector tests, have increasingly been used by investigators in Indian investigations, mostly in complex criminal cases and big-time crimes. Even though they do not confirm whether a suspect is guilty or not, it provides leads in cases that give way to follow-up investigations of the law enforcing agencies [21]. Indian criminal justice system imposes overly restrictive use of polygraph tests, and their results are generally not considered as conclusive evidence by court proceedings. The inclusion of polygraph results is supplementary, ultimately helping investigators to narrow down the suspect list or obtain information about the accuracy of statements made by individuals involved in investigation procedure [22].

### Legal framework for polygraph testing in india

The Indian legal framework regarding polygraph tests is mainly based on the Indian Evidence Act of 1872. This act does not mention the use of polygraph tests or the usage thereof during criminal investigations. However, the landmark judgment of *Selvi v. State of Karnataka* in the year 2010 brought into light the legal issues regarding the usage of polygraph tests in criminal investigations by the Supreme Court of India. This case is a landmark in understanding the legal limits of polygraph testing in India [23]. The court interpreted that polygraph tests could only be administered with explicit, voluntary consent from the tested individual. Under Article 20(3) of the Indian Constitution, individuals cannot be made to testify against themselves, reaffirming a constitutional protection under this judgment [24]. It clearly stated that any polygraph test conducted without the consent of the person would be illegal, and any information derived from such tests could not be used as evidence in a court of law [25]. Further, the *Selvi* case established that though polygraph tests can be used during criminal investigations to help police officers, the outcome of the test could not be taken as the proof of conviction. Polygraph results should instead be used as part of the overall evidence piecing together to form a case, and therefore it should be cross-checked by other evidence types. This constraint proves legal acceptance of the limitation and, in some cases, unreliability of polygraph testing. The *Selvi* judgment also enunciated the critical principle of informed consent: that the investigating agency should sufficiently explain the nature of the polygraph test to the person under test, ensuring they are fully aware of the consequences of the process. This judgment reiterates respect for the rights of the individual during the criminal justice process and ensures that the testing techniques used are not inconsistent with human rights [26].

### Application of polygraph tests in criminal cases

In practice, polygraph tests are commonly employed in India in criminal investigations, particularly when there is a need for additional information or when investigators are dealing with suspects who may be withholding critical details. Polygraphs have been used in cases ranging from terrorism and murder to political corruption and financial fraud. However, their main role is usually to provide some leads for an investigation rather than providing conclusive proof. One of the very famous applications in India is at the time when the 2008 Mumbai Terror Attacks took place. The deadly attacks prompted investigation agencies to get several suspects and give them polygraph tests to know who was involved with the planning or execution of this attack. Despite the deceptive response, some of the polygraph test results were found to be insufficient evidence to support the suspicion of involvement in the parts of the case's suspects. Instead, the polygraph tests were used as part of a broader investigative strategy to gather more evidence and determine the suspects' level of involvement in the terror network. Polygraph tests have also been used in high-profile political corruption cases. For instance, investigators in corruption cases have used polygraph testing to verify the truthfulness of confessions made by individuals accused of bribery, embezzlement, or other forms of corruption. The polygraph test can help determine whether a suspect is being truthful about their involvement in corrupt activities, although it is typically not used as the sole determinant in making a case.

The polygraph test conducted in relation to the Nithari Killings case in 2006 are arguably among the most controversial and extensively discussed instances of polygraph test in India [27]. There, a polygraph was used to determine whether the main suspect, Surrender Koli, a young man implicated in the killings of multiple young children in Noida, was telling the truth when he made his confession. The polygraph outcome showed deceptive reactions during his examination, which compelled the investigators to doubt the accuracy of his claim. Still, the results did not form an independent basis of conviction, with Koli confessing before courts, too; his confessions were subject to scrutiny, due to doubts in the conditions within which he presented those confessions, possibly from coercion. The results of the polygraph test were finally interpreted as inconclusive, and thus the case still required further, more substantial evidence [28]. This is one of the major limitations of polygraph testing. The test can be useful for investigators in assessing the truthfulness of the statements of the suspect, but it cannot be used to ascertain guilt or innocence. Polygraph results may show that a person is being deceptive, but it cannot be the basis for criminal conviction without corroboration evidence [29]. For example, when someone is proven to have confessed, it presents challenges because the confession may be contested, or physiological stress or fear of punishment may influence the test examiner's physiological reactions [30]. Ethical concerns are yet another important problem with the use of polygraph tests in criminal investigations. The Selvi case affirms

the stringent ethical and legal restrictions placed on administering a polygraph test. It requires informed consent at the very least, and its findings cannot be used to establish beyond a reasonable doubt that someone has committed a crime. Even though all these legal safeguards guard against mistreatment and coercion, it is still possible that subjects could be persuaded to provide a sample or that test results were misunderstood [31].

### Limitations of Polygraph Testing

Although polygraph tests are now frequently used in criminal investigations, a number of drawbacks limit their usefulness. Reliability, ethical considerations, legal admissibility, and societal factors are the four primary categories into which these limitations are frequently divided [32]. The use of polygraph tests in criminal justice are severally hampered by each of these factors, especially when it comes to determining how truthful witnesses and suspects are.

### Reliability and accuracy

The biggest weakness of polygraph testing is that it lacks reliability. Polygraphs measure physiological responses, including heart rate, blood pressure, respiration rate, and skin conductivity, all of which are assumed to be affected when a person is under stress, typically related to lying [33]. However, these physiological responses are not specific to lying and can be the result of various factors. For instance, anxiety, fear, or nervousness can produce similar physiological changes even in the most innocent person who is not lying. Again, medical conditions such as hypertension or respiratory issues can affect the test's accuracy [34]. Polygraph results can therefore lead to false positives (where innocent individuals are incorrectly flagged as deceptive) and false negatives (where guilty individuals are mistakenly cleared). Studies on the precision of polygraphs have revealed some variability in such results. A polygraph has been shown to have an accuracy rate as low as 70%, which means it cannot always identify whether someone is telling truth or not. A serious issue that is particularly brought up in connection with high-level investigations where, for example, people's lives and reputation are at stake is this inherent ineffectiveness. The utility of polygraph test as a means of assessing truthfulness is significantly diminished when their accuracy is in doubt [35].

### Legal and ethical concerns

Polygraph test raises serious concerns regarding ethical issues as well. One of the primary ethical concerns is the potential for coercion. During criminal investigations, people may feel pressured to take a polygraph test, especially if they believe that refusing to do so could have negative consequences [36]. Because the subject may not have freely and voluntarily consented to take the test in such circumstances, the validity of test results is called into question. The Selvi case in India highlighted the importance of informed and voluntary consent in the use of polygraph tests. The Supreme Court ruled that a polygraph

test could only be administered if the individual's consent was freely given and that the results could not be used against the individual if they had been coerced into taking the test [37]. This is to highlight the fact that a decision not to respect constitutional protection against self-incrimination and forcing people to confess under duress would not be very fair. Though these are present, some investigation methods do tend to raise unethical concerns about forcing a suspect to undergo a polygraph test [38]. Again, polygraphs cannot identify a truthful or a liar person accurately. Such determinations on polygraph tests, especially inconclusive ones, could lead to injustice. In turn, this creates an ethical impairment of the criminal justice system with too much dependency on polygraph tests, though they might help generate leads in investigations [39].

### Legal admissibility

Polygraph results are only very scarcely admitted in the court of law in India. As defined by the Indian Evidence Act of 1872, and in the Selvi case, it is made clear that the polygraph test result cannot be accepted as primary evidence in court. The Supreme Court held that the polygraph result can be taken only as an auxiliary in investigation, but not as the only basis for a conviction. This limitation severely restricts the value of polygraph testing in the judicial process [40]. However, the test can provide the relevant information regarding the offence but still it can't be the conclusive proof of guilt or innocence. The outcome of the polygraph test can be used to guide the investigation, but the data must be supported by other forms of evidence before a conclusion is made about a suspect's involvement in a crime. This limits the use of polygraphs as a legal tool since they cannot be used to directly influence court decisions or contribute significantly to the evidence needed for a conviction [41].

### Societal and cultural factors

The appropriate use of a polygraph also depends on social and cultural factors. Multiple levels of trust exist in polygraphs as lie detectors in India, particularly in rural areas where there is a lack of development regarding the device's scientific underpinnings. Many individuals will view the polygraph as some kind of mystical device that never makes mistakes. But conversely, perhaps there are people in society that are skeptical regarding polygraph testing, perhaps through lack of exposure to its scientific basis or to the perceived intrusive or unreliable process. Cultural factors and power dynamics will also determine how individuals respond to polygraph questioning. For instance, members of communities often experience anxiety or fear when they are exposed to law enforcement or other authority figures that can elicit strong physiological reactions during a polygraph test. Especially if the test-taker is nervous or intimidated, this could lead to inaccurate readings that imply dishonesty [42]. Furthermore, even if the polygraph was administered in dubious circumstances, people may be reluctant to contest the results in societies that place a high value on deference to authority [43]. Moreover, in areas where

individuals have limited exposure to modern forensic science, the use of polygraphs may be met with distrust or resistance. This can affect the willingness of individuals to undergo polygraph testing voluntarily, further complicating the issue of obtaining accurate and ethical results [44].

### Case Studies in India: Polygraph Testing in Practice

Polygraph testing has been employed in various of India's famous criminal cases. The results depend on case to case as individual ability and controversy of the case vary. Generally, tests form supplementary tools of any investigation but still have the drawback of producing convincing evidence or acceptance in judicial processes. Some case studies depict the practical applicability and limitations of polygraph testing in India's criminal justice system.

#### The Nithari killings case

One of the worst crimes for which polygraph tests were most rampant was the case of Nithari Killings in 2006 [45]. Surinder Koli, a house servant, had allegedly murdered minors brutally and hushed up all their bodies through the drain running behind his hut at Noida's suburb, Nithari. This became one of the most heinous crimes, so the nation kept its attention to the involvement of Koli with the crime. During the course of the investigation, Koli was made to undergo a polygraph test to verify the authenticity of his confessions. The results of the polygraph indicated deception and thus threw a question mark on the validity of his statements. However, the results were not conclusive enough to form evidence reliable enough for conviction. The polygraph results showed that Koli may have been deceptive when providing details about the murders, but investigators could not use the polygraph data alone to prove his guilt beyond a reasonable doubt [46]. The polygraph results in the Nithari Killings case were ultimately deemed insufficient to establish Koli's involvement in the murder. Koli's confession was also contended because it was made while in police custody, raising doubts about its veracity. Although polygraph testing helped to narrow down the involvement, it was not sufficient to determine Koli's guilt because the courts required more convincing evidence.

#### The Aarushi Talwar murder case

Another very debated case in India is the Aarushi Talwar murder case. This case too had undergone polygraph testing. Aarushi Talwar was a 14-year-old girl who was murdered in her bedroom in May 2008, and suspicion immediately arose regarding her family members in the murder case [47]. Many theories emerged on motives and identities of the murderers in the case; however, misunderstandings and contradictions also were numerous. Aarushi's parents, Rajesh and Nupur Talwar, as well as the domestic worker Hemraj, whose body was discovered soon after Aarushi was murdered, were among the people who underwent polygraph tests during the investigation. Although the polygraph test revealed possible indications of dishonesty among

the suspects, the findings were inconclusive enough to prove guilt beyond a reasonable doubt. While some suspected the Talwar family members, others pointed to a possible involvement of outsiders. Although the polygraph tests indicate inconsistencies in the statements of the suspects, results cannot be relied upon as conclusive evidence. The case remains unsolved, and the role of polygraph evidence remains a topic of debate. The Aarushi Talwar case reminds every one of the limitations of polygraph testing in the case of circumstantial evidence where the results can be inconclusive or open to interpretation.

### The 2008 Mumbai terror attacks

One of the most destructive and lethal terrorist attacks on Indian hotel involved coordinated armed militants assaulting several targets within the city in the 2008 Mumbai terror attacks [48]. The investigators utilized polygraph tests in interrogations to question the suspects after the attack in the hopes of discovering further information related to the planning and its execution. Several suspects, including members of the terror group behind the attacks, were put through polygraph test [49]. To establish a case against the accused, the outcomes of these tests were examined in conjunction with additional evidence, including confessions and intelligence reports. Even though polygraph results sometimes suggested possible deceit, they weren't enough to prove that particular people were involved in the attacks. The test results were used as an investigative tool to help corroborate other evidence but were not relied upon as a source of truth [50].

### The Jessica Lal murder case

The case of the Jessica Lal murder is another example where polygraph testing has been applied in criminal investigations. This was the 1999 shooting death of a model at a night club in Delhi [51]. At first, the police were unable to identify the murderer because there was insufficient evidence in the given case. Polygraph tests were administered to several witnesses and even suspects during the investigation in an attempt to confirm specific statements. However, the case later became a national issue because the new forensic evidence brought by the prosecution attracted a strong case leading to the conviction of Manu Sharma (accused), son of a prominent politician who has been charged in this murder. Despite being used, polygraph tests had no bearing on how the case was resolved [52,53]. The conviction ultimately resulted from the new witness testimony and the forensic evidence, demonstrating that polygraph result can't be trusted in cases where the evidence is circumstantial or vague.

### Conclusion

Polygraph tests have found a place in the Indian criminal justice system as valuable tools for investigation, providing leads and aiding in the assessment of suspects' truthfulness. However, their drawbacks-such as reliability, admissibility, ethical concerns and issue regarding the consent highlight their inability to be used as conclusive proof in the trial. Though it does provide

some insight into deception, the accuracy of polygraphs is often debated, as physiological responses are not always unique to lying and are often influenced by anxiety or other medical conditions. In addition, ethical considerations, especially on the issue of voluntary consent and potential coercion, mean that caution is needed in their use. The legal provisions regarding the polygraph test are prior consent of the person. In addition, in various landmark judgements the court clearly held that the decision of the test could not be conclusive proof for any investigation. So, the court must scrutiny all the documents carefully. In that regard, polygraph tests are secondary tools, often used as a guide for conducting investigations but not as a determining tool for establishing guilt or innocence. The Indian criminal justice system, therefore, needs to continuously look for alternatives in lie detection and forensic investigation that are better and more morally sound. More importantly, the polygraph testing needs to be regulated carefully to preserve the rights of individuals and ensure proper dispensation of justice. All these measures must be in place before the real potential of the polygraph test could be tapped for criminal investigations.

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