

## SCIENTIFIC METHODS OF INTERROGATION AND THEIR ADMISSIBILITY

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### Abstract

*The integration of scientific methods into interrogation practices represents a significant advancement in the pursuit of justice and the accuracy of investigative outcomes. This paper examines the application and admissibility of scientific techniques in the interrogation process, focusing on methods such as polygraph testing, cognitive interviewing, and neuroimaging. Polygraph testing, which measures physiological responses to assess truthfulness, has been widely used but remains controversial due to its variable accuracy and legal challenges regarding its admissibility in court. Cognitive interviewing techniques, designed to enhance the retrieval of accurate information from witnesses and suspects, are grounded in psychological research and have shown promise in improving the reliability of testimonies. By analyzing the current state of scientific interrogation methods and their judicial acceptance, this paper aims to provide a comprehensive overview of how these advancements intersect with legal practices and the implications for future developments in forensic science and criminal justice. The goal is to contribute to an informed dialogue on the appropriate integration of scientific tools into interrogation procedures while safeguarding the principles of justice and fairness.*

**Key Words:** Persecution, Resilience, Human Rights, Minority Rights, Discrimination, Bangladeshi Hindus, Ethno-Religious Conflict.

### INTRODUCTION

Regardless of the severity of the case, the concepts of forensic science are invaluable to crime investigators in conducting thorough investigations. The outcomes of such forensic investigations can determine whether a person is found not guilty or guilty in a court of law. Forensic science has emerged significantly to aid criminal investigation. Interrogating suspects, victims, and witnesses is essential for obtaining the truth. Neurological examinations such as hypnosis, psychological detection of deceit (lie detection), narco-analysis, and brain mapping have significantly transformed police investigations by saving time, money, and effort, while also yielding highly superior findings. The implementation of these scientific interrogation techniques has resulted in more compassionate and legally compliant interrogations, thus eliminating the renowned and sometimes disastrous third degree procedures.

The scientific interrogation techniques include -Brain mapping, Narcoanalysis, and Lie detector tests (often referred to as "Polygraph tests"), all of which have proven to be

extremely beneficial in police investigations. While these techniques are viewed as cruel and dehumanising methods of investigation, they are also thought to be beneficial in cases of severe or violent crime. They have broad moral, scientific, and legal importance in society and are also referred to as Deception Detection tests. And occasionally a candidate for government employment with the FBI or CIA must also pass a polygraph or lie detector test<sup>1</sup>.

The decision to submit to these interrogation techniques or tests is up to each individual. The investigating authorities do not have the right to administer this test if the suspect, the accused, or the witness does not voluntarily consent. It has been argued that lie detector tests violate several human rights provisions. According to Article 1 of the *United Nations Convention Against Torture*, this test qualifies as "torture." Additionally prohibited by the Human Rights Committee is the collection of evidence from individuals by torture, assault, or pressure.

The former additional solicitor general of India, Mr. KN Bhat, stated in a February 2016 Deccan Chronicle article that "when police use lie detector tests in criminal cases, it should be concluded that the investigation has reached a dead end and other methods of discovering evidence or eliciting information, including procuring a confession, have failed."

Along with Mr. Bhat, a number of other professionals, including scientists and lawyers, have debated the accuracy and error rates. Furthermore, a number of NGOs, right-wing activists, and organisations have fiercely opposed the best, mostly on the grounds that it infringes the subject's fundamental rights. The three primary forms of deception detection techniques, or DDTs, are brain mapping, polygraphs, and narcoanalysis. There are significant therapeutic, scientific, ethical, and legal ramifications for each of these three methods. Even though the results cannot be used as evidence in court, they can be quite helpful in uncovering hidden information related to crimes and can be very important in investigations. Supporters of the scientific method testify that it is superior to "third degree" methods. However, some persons have contended that they infringe upon the fundamental rights of individuals. The Supreme Court of India ruled in a landmark decision that DDTs cannot be administered without consent<sup>2</sup>.

## STATEMENT OF PROBLEM

The use of scientific tools of interrogation, such as narcoanalysis, polygraph (lie detector), and brain mapping, has become increasingly prevalent in legal investigations and judicial proceedings. However, the admissibility of evidence obtained through these tools raises significant ethical, legal, and scientific challenges. The statement of the problem revolves

<sup>1</sup> Suresh Bada Math, "Supreme Court judgment on polygraph, narco-analysis & brain-mapping: A boon or a bane", *Indian Journal of Medical Research*, Volume 134, Issue 1, July 2011, p 5.

<sup>2</sup> KedarNagarajan, "Why are Lie Detector Tests Still being used in Criminal Investigations", *The Caravan a journal of Politics and Culture*, July, 2017 (Sep. 5, 2024, 10:05 AM), <https://caravanmagazine.in/vantage/lie-detector-test-criminal-investigation>.

around the effectiveness, reliability, validity, and ethical considerations of using these scientific interrogation techniques in legal contexts, and the criteria for their admissibility as evidence in court proceedings.

### **RESEARCH QUESTION**

- What are the scientific tools of interrogation, including narcoanalysis, polygraph, and brain mapping, and how do they function in extracting information from individuals?
- What are the legal and ethical considerations regarding the admissibility of evidence obtained through these scientific interrogation techniques in judicial proceedings?
- What criteria and standards should be applied to assess the reliability, validity, and accuracy of evidence obtained through narcoanalysis, polygraph, and brain mapping in legal contexts?

### **RESEARCH OBJECTIVE**

The primary objective of this research is to critically examine the scientific tools of interrogation, including narcoanalysis, polygraph, and brain mapping, and evaluate their effectiveness, reliability, validity, and ethical implications in legal settings. Specific research objectives include:

1. To review the literature on narcoanalysis, polygraph, and brain mapping techniques, including their historical development, scientific principles, and applications in forensic investigations.
2. To analyze the legal frameworks, guidelines, and standards governing the admissibility of evidence obtained through these scientific interrogation techniques in different legal jurisdictions.
3. To assess the ethical considerations, human rights implications, and potential risks associated with the use of narcoanalysis, polygraph, and brain mapping in obtaining evidence from individuals.
4. To identify the key debates, controversies, and challenges related to the admissibility of evidence obtained through scientific tools of interrogation and propose recommendations for addressing these issues.

### **RESEARCH METHODOLOGY**

The research methodology will involve a comprehensive literature review of scholarly articles, books, legal documents, case studies, and policy reports related to narcoanalysis, polygraph, brain mapping, and their admissibility in legal contexts. Qualitative research methods, such as content analysis, thematic analysis, and comparative analysis, will be utilized to examine and synthesize the findings from the literature review.

## BRIEF HISTORY OF SCIENTIFIC METHODS OF INTERROGATION

The history of these techniques goes back thousands of years, when different cultures used primitive techniques to determine who was telling the truth. For example, in ancient Chinese courts, the suspect's pulse rate was considered important, and in ancient Indian literature, regulated breathing was described as a sign of deceit. However, the development of contemporary lie detection techniques did not start until the early 20th century. John Augustus Larson created the polygraph in 1921, and it quickly became popular as a tool for monitoring physiological reactions to interrogation, including blood pressure, heart rate, and sweating. The use of this tool in criminal investigations and interrogations spread rapidly. Other approaches developed throughout time, such as neuroimaging techniques or functional magnetic resonance imaging, which monitors patterns of brain activity. The scientific and legal communities continue to argue the validity and reliability of lie detection techniques, despite their lengthy history. This has led to further study and technical developments aimed at improving accuracy and resolving ethical issues<sup>3</sup>.

## DIFFERENT METHODS OF SCIENTIFIC INTERROGATION

Three forms of scientific interrogation tests are employed in criminal investigations: brain mapping, narcoanalysis, and polygraph. In order to elicit the truth from a subject, each of these three tests uses a different set of strategies.

### 1. NARCOANALYSIS

In the narcoanalysis test, a medication is given to the subject, causing them to experience various degrees of anaesthesia. The subject becomes significantly less conscious during the hypnotic stage and might divulge things that he would not normally knowingly reveal. This method has been around since World War II<sup>4</sup>. The main disadvantage of this method is that a lot of people can continue to deceive during the hypnotic stage, which implies that they can lie while under hypnosis.

This test is linked to the intravenous injection of a medication or drug (such as sodium pentothal, scopolamine and sodium amytal) that induces anaesthesia in the test subject. Investigators can benefit from this stage of hypnotic trance since it increases the subject's likelihood of disclosing hidden knowledge that they would never reveal when conscious. The findings can help the investigators identify the crucial pieces of evidence or support prosecution arguments and earlier witness testimony.

Sometimes, the accused can use this test to establish his innocence, which can be beneficial. While the results are undoubtedly not acceptable in court, they do lend a larger degree of credence to the accused's argument. This test might be helpful for things like verifying a witness's mental state to stand trial and helping witnesses recollect their experiences.

<sup>3</sup> Marsh, A., A Brief History of the Lie Detector, IEEE Spectrum (2021) (Sep. 6, 2024, 5:10 PM), <https://spectrum.ieee.org/a-brief-history-of-the-lie-detector>.

<sup>4</sup>Dhamendra Kumar Singh, "Constitutionality and Evidentiary Value of Narcoanalysis, Polygraph and BEAP Tests", International Journal of Law, Volume 3, Issue 4, 2016, p.84-89.

Two major concerns are brought up by the narcoanalysis test without consent<sup>5</sup>:

1. The person is physically assaulted by injections, which may have further negative effects. The application of several painful stimuli, such as pushing, hitting, pinching, shaking the body, is added to that.
2. The reason mental assault happens is that the test allows the investigators to access the subject's thoughts while he is hypnotised, raising numerous privacy concerns.

## 2. POLYGRAPH

A polygraph test measures a person's physiological reactions and is frequently mistakenly believed to be the only method of lie detection. These consist of:

- Heart rate
- Blood pressure
- Respiratory rate etc<sup>6</sup>

A person who is guilty and plans to lie to get out of a test would become hyper-arousal while questioning, which would lead to increased or abnormal physiological responses. This is the premise for the test. During the test, those individuals who are qualified to interpret polygraphs notice the anomalies. Numerous variables, including skin conductance, heart rate, blood pressure, respiration rate, and electromyography, affect the measurement of hyper-arousal. Additionally, a lot depends on the questions the investigator poses. The primary disadvantage of this strategy is that lying and deception are not the only ways in which hyper-arousal can be induced. It may also be brought on by psychosis, despair, worry, agitation, perplexity, stress, etc.

## 3. BRAIN MAPPING

Through the use of electrodes placed on the face and neck, the brain mapping test records brainwaves in order to assess an individual's neurological activity. The test is based on the notion that the brain will generate distinct, distinct brainwaves in response to a known input, such as an image or sound. The Brain Electrical Activation Profile Test (P300 Waves Test) is the name of the brain mapping technique that is utilised in India. In this test, the participant is exposed to several stimuli—visual or auditory—that are pertinent to the problem under investigation in addition to other unrelated words and images. The basic hypothesis is that, should a guilty suspect be exposed to specific “probes” related to the inquiry, the lie detector will capture the P300 wave that is emitted. In the event that the test indicates that the witness was aware of the relevant details, for example, a bystander who saw a murder may be charged as an accused.

It's a technique for determining if someone is amenable to receiving certain information by measuring the amount of brain activity that occurs in response to exposure to specific stimuli

<sup>5</sup> All you need to know about Lie Detectors, (Sep. 7, 2024, 2:15 PM), <https://blog.ipleaders.in/lie-detector-test/>.

<sup>6</sup> How a Polygraph Works? (Sep. 7, 2024, 4:05 PM) <https://science.howstuffworks.com/question123.html>.

also. In this test, electrical waveforms that the brain emits after absorbing an external event are examined and measured to determine "event-related potentials" (ERP).

The entire test is predicated on the idea that the examiner will be able to record how the subject's brain functions when exposed to familiar stimuli such as pictures, videos, and words that contain both relevant and irrelevant stimuli, such as those related to a crime scene or any other aspect of a case. It is imperative that the test be conducted in a well-insulated and air-conditioned environment to prevent weather-related differences<sup>7</sup>.

### ADMISSIBILITY OF SCIENTIFIC INTERROGATION TECHNIQUES

Since the polygraph's invention, police have mostly in the United States and Japan utilised it as a means of aid in criminal investigations. But recently, it has also been utilised for other things, like hiring cops and other staff members<sup>8</sup>.

In addition to law enforcement agencies, banks and other companies, the Federal Bureau of Investigation, and the Department of Defence also employ these tools for their own investigations. The lie detector is used by large American corporations and industrial organisations to verify that their workers are telling the truth.

- **MEDICO-LEGAL ADMISSIBILITY OF THESE TESTS**

The usage of lie detecting techniques has a significant negative impact on a person's health. These techniques have the following negative effects:

A medication (such as sodium pentothal, scopolamine, or sodium amytal) that causes the individual to experience varying degrees of anaesthesia is administered intravenously during a narcoanalysis test. The patient becomes less guarded and more likely to share facts during the hypnotic phase that they would typically withhold while conscious.

Nervousness, anxiety, dread, disorientation, hypoglycemia, psychosis, depression, substance-induced (nicotine, stimulants), substance withdrawal state (alcohol withdrawal), and other emotions are all triggered and created by the polygraph test. Brain mapping exacerbates mental and neurological problems, including substance abuse or dependency, schizophrenia, mood disorders, anxiety disorders, and stroke. It also causes delirium, head injuries, stroke, and amnesic syndromes.

- **Physiological Indicators**

These tests quantify arousal and stress-related physiological reactions. These reactions are a reflection of autonomic nervous system changes rather than particular medical disorders.

- **Health Issues**

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<sup>7</sup> National Academies of Sciences, Engineering, and Medicine, *The Polygraph and Lie Detection*, National Academies Press, (2003) (Sep. 8, 2024, 2:50 PM) <<https://doi.org/10.17226/10420>>.

<sup>8</sup> Suresh, *supra* note 1.

During these tests, people with specific medical diseases or health concerns, like anxiety disorders or cardiovascular problems, may show physiological reactions that could be misunderstood. This calls into question the precision and dependability of the test findings.

- Educated Consent

People taking these tests ought to be well informed about the purpose of the test, the physiological measurements that are required, and any possible health risks. People have the right to decline the test, and informed consent is essential.

- Health Issues and Exclusions

Owing to the possibility that their medical issues could affect their physiological reactions, some people may not be allowed to take a polygraph test. The person's safety and wellbeing ought to come first.

- Proficiency of Examiners

An important factor is these test examiner's training and experience. Examiners with training should use professional judgment when interpreting test findings and be aware of any possible medical influences.

- Acceptability of Court cases

Although these test results are not usually regarded as medical evidence, they can be used in court for specific objectives. Legal criteria must be met for these results to be admissible, and courts may take voluntariness, dependability, and relevancy into account.

- **LEGAL ADMISSIBILITY OF THESE TESTS IN INDIA**

As precedent dictates that a suspect cannot be forced to be a witness against himself or the right against self incrimination, the legal maxim “nemo tenetur se ipsum prodere” indicates that no one is bound to accuse oneself.

Suspects are protected against self-incrimination by Section 161(2) of the Code of Criminal Procedure and Article 20(3) of the Indian Constitution. The legal maxim “nemo tenetur prodere accusare se ipsum”, which asserts that the burden of proof rests with the prosecution and that no accused may be coerced into testifying against himself, forms the basis of Article 20(3) of the Indian Constitution. Additionally, it states that unless a man is proven guilty, he is assumed innocent. Thus, it can be concluded that applying these tests is against the Indian Constitution's Article 20(3) principle.

Section 45 of *The Indian Evidence Act, 1872* states- Opinion of experts: When the Court is asked to make a decision regarding a matter pertaining to foreign law, science, or the arts, or concerning the identity of handwriting or finger impressions, the opinions of those who are particularly knowledgeable about those subjects, as well as those matters involving handwriting or finger impressions, are relevant facts. We refer to these people as experts.

This section stipulates that when determining a course of action involving the identity of handwriting or finger impressions, or other similar scientific matters including these tests, specialists must be consulted.

The admissibility of data from a narcoanalysis test is not addressed under the Law of Evidence. The next concern is whether or not DDT's (Deception detection tests) effects qualify as evidence. A combined reading of Sections 24 to 27 of the Act states that if there was even the remotest possibility of force, intimidation, or any other type of influence, such comments would be deemed useless and inadmissible as evidence.

The Supreme Court of Karnataka ruled in *Selvi v. State of Karnataka*<sup>9</sup> that no person should be subjected to any of the procedures in question by force, whether or not it is part of an investigation for a criminal case. To do otherwise would be to infringe upon someone's right to personal freedom. In the realm of criminal justice, the Court did permit the voluntary administration of the contested techniques—as long as appropriate safeguards were in place<sup>10</sup>.

The test results alone cannot be admissible as evidence, even in cases where the subject has given permission to take any of these tests, since the subject does not have conscious control over their responses while the test is being administered. However, in line with Section 27 of the Evidence Act, 1872, any information or material that is later found with the aid of voluntarily administered test results might be admitted.

The Supreme Court of India did not provide a definitive ruling in the *Ram Singh v. Sonia*<sup>11</sup> case concerning the admissibility and credibility of the narcoanalysis test report, despite considering these issues.

The criminal justice system continues to face a complex and contentious issue regarding the admissibility of lie detector tests in court. Although polygraphs and other lie detector tests have been used for many years to help verify the truth, their admissibility as evidence differs greatly amongst legal countries. The intricate relationship among scientific validity, legal requirements, and moral concerns emphasises the necessity for a thoughtful strategy when incorporating them into court proceedings. The difficulty in navigating the legal system amid the proliferation of lie detecting technology is striking a careful balance that preserves individual rights, promotes equity, and recognises the limitations of these assessments. A reasonable and strict legal system that pursues the truth must be fostered, and this requires striking a balance.

## ANALYSIS OF CASES IN THIS REGARD

- **SELVI V. STATE OF KARNATAKA**

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<sup>9</sup>Selvi v. State of Karnataka, A.I.R 2010 S.C.1974 (India).

<sup>10</sup> Polygraph Test and its Legal Implication in the Indian Criminal Justice System, (Sep 7, 2024, 2:30 PM) <https://shodhganga.inflibnet.ac.in/bitstream/10603/70232/10/chapter6>.

<sup>11</sup>Ram Singh v. Sonia, A.I.R 2007 S.C. 1218 (India).

A 2010 bench of the Hon'ble Supreme Court, presided over by the Indian Chief Justice at the time, rendered a decision on polygraphs and other novel applications of forensic psychology in the case of *Selvi v. State of Karnataka*<sup>12</sup>. The Court was asked a question in this instance on the applicability of the polygraph examination. In this instance, the court must determine whether or not it is constitutionally permissible to administer the Polygraph test to the subject without that person's agreement. The Honourable Court noted that regardless of whether the ensuing testimony turns out to be exculpatory or incriminating, Article 20(3) safeguards a person's right to remain silent. Preventing the forced transfer of personal knowledge that is pertinent to the circumstances at hand is the primary goal of Article 20(3). The outcomes of all the contested tests are testimonial in nature and cannot be classified as substantial evidence<sup>13</sup>. The salient aspects of this ruling regarding polygraph interrogation are as follows:

- The polygraph test can only be administered with the subject's consent before a magistrate.
  - Nobody is forced to undergo the test involuntarily.
  - The material and other evidence derived from the polygraph interrogation can be used as evidence under Section 27 of the Indian Evidence Act.
  - One's right against being forced to testify against oneself cannot be ignored due to a strong public interest.
- **SANTOKBEN SHARMA BHAI LADEJA V. STATE OF GUJARAT**

The Gujarat High Court ruled in *Santokben Sharma Bhai Ladeja v. State of Gujarat*<sup>14</sup> that because the Narco analysis test is carried out under the guidance of medical professionals, with due care, consent, and observation of the accused's condition, there is very little risk involved. Since risk is a natural component of life and is present in the majority of human endeavours, the contested test cannot be invalidated on this basis alone.

• **JITUBHAI V. STATE OF GUJARAT**

Since the state of Gujarat filed an affidavit stating that it will not test the accused without his consent in the *Jitubhai Patel v. State of Gujarat*<sup>15</sup> case, the question of whether scientific evidence can be admitted becomes academic in nature alone. It might be decided upon at a later time. In this instance, it was decided that scientific examinations like polygraphs and narco-analysis tests cannot be carried out without the accused's agreement.

• **VIRENDRA KHANNA V. STATE OF KARNATAKA**

*Virendra Khanna v. the State of Karnataka*<sup>16</sup> is a recent case. The High Court has ruled that polygraph tests, frequently referred to as "lie-detector tests," can only be conducted with the accused's consent. The accused's silence, according to the court, did not signify consent. No

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<sup>12</sup>Selvi, *supra* note 9.

<sup>13</sup>Suresh *supra* note 1.

<sup>14</sup>Santokben Sharma Bhai Ladeja v. State of Gujarat, 2008 CriLLJ 68 (India).

<sup>15</sup>Jitubhai Patel v. State of Gujarat, 2005(10) S.C.C. 545 (India).

<sup>16</sup>Virendra Khanna v. the State of Karnataka, Case No.11759/2020 (India).

polygraph test may be administered to someone who refuses to participate in it, and even if it is, the test's results are null and invalid and cannot be used as evidence in court.

## CONCLUSION AND SUGGESTIONS

The parliament should pass new law that simplifies the use of these techniques in India's modern criminal justice system, based on recommendations from the NHRC and the rulings of various cases. Also, the application of lie detection techniques in the criminal justice system requires consideration of both ethical and scientific aspects. Here are a few recommendations:

- **Standardization of Protocols:** Promote the creation of uniform guidelines for the use and interpretation of these tests. This can support maintaining dependability and consistency across various testing contexts and legal frameworks.
- **Investment in Research and Development:** Promote greater financing for studies aimed at refining current lie detection technology and creating new, more precise techniques. Collaboration between criminal justice experts, software developers, and scientific researchers may be necessary for this.
- **Examiner Certification and Training:** Establish stringent training courses for examiners who will be giving these tests. To guarantee that examiners are knowledgeable about the newest lie detection techniques, ethical considerations, and any biases, certification procedures should be created.
- **Regular Evaluation and Recertification:** Establish a procedure for the examination and recertification of examiners for these tests on a regular basis. Over time, this continuous assessment can support the preservation of the calibre and dependability of lie detection techniques.
- **Technology and Artificial Intelligence Integration:** Investigate how cutting-edge technologies, such machine learning and artificial intelligence, may be integrated to improve the accuracy. These tools could help analyze physiological data and spot trends that human examiners might find difficult to see.
- **Transparent Communication of Test findings:** Create policies to ensure that test findings are communicated in a transparent manner to all pertinent parties, such as the people being tested, law enforcement, and legal experts. An impartial and transparent reporting process can help ensure that justice is administered fairly.
- **Public Education on these Tests:** To raise knowledge about the potential and constraints of these tests, implement educational initiatives targeted at the general public, legal professionals, and law enforcement. This can help control expectations and debunk the notion that they are infallible<sup>17</sup>.

To build a more ethical, and successful framework for these tests within the criminal justice system, putting these recommendations into practice would involve cooperation between legislators, law enforcement agencies, scientific groups, and legal professionals.

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<sup>17</sup>Polygraph Test, *supra* note 10.