



SCIENTIFIC TESTS AND THEIR APPLICATION IN CRIMINAL JUSTICE ADMINISTRATION: AN INDIAN PERSPECTIVE

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ABSTRACT

Criminals and crimes leave traces at crime scenes and it is the duty of the investigator and investigation agency to find out the leads and solve the mystery behind every crime. Investigation is the bedrock for any criminal prosecution and hence the success of criminal prosecutions always depends on the facts revealed through such investigations. In most cases, there may be eyewitnesses or direct physical evidence that may lead to identifying the culprits. However, there are occasions in which there are no eyewitnesses or eyewitnesses may turn hostile and physical evidence may be insufficient to identify the culprit. The developments in science and technology have introduced different tests which offer various advantages to the investigation officers and agencies. The DNA test; Lie Detector Test; Narco-Analysis; Polygraph Test; Ballistic Tests; etc. are some of the important tests which make the investigation easier and more accurate. The inherent advantages of these tests have made them, an indispensable part of modern criminal investigations. On one hand, these tests are considered useful in criminal investigation and on the other hand, they raise several concerns including human rights violations and admissibility of evidence collected through such tests, etc. Hence, this paper examines the beneficial use of scientific tests in criminal investigation and its important legal concerns.



1.1. SCIENTIFIC TESTS AND CRIMINAL INVESTIGATION

In criminal investigations, scientific tests are tests that are used for collecting evidence to prove or disprove the story of the investigation agency and the prosecutor. In a country like India which follows an adversarial system of criminal justice administration, the judiciary has set a high threshold of proof, i.e. 'beyond reasonable doubt' and 'beyond the shadow of a doubt' (Mishra, 2021; Sivanandan, 2019). The scientific tests are treated as an effective tool to prove the facts beyond any reasonable doubt before the court. The use of different scientific tests for the collection of evidence in criminal cases is not new in India (Shali, 2018). However, the emergence of various modern techniques and the development of forensic science have made the use of scientific techniques in criminal investigations a complex one. Even though the scientific tests and their processes are complex, the absence of eyewitnesses and direct evidence compelled the use of different scientific tests to ascertain the veracity of the facts. These scientific tests help the investigation agencies to identify the following questions:

a) Whether there is a commission of a crime? In certain cases without conducting adequate scientific analysis and tests, it may be difficult to identify the commission of crimes. For example, if a dead body is found otherwise than in an abnormal circumstance, to identify whether the death is natural or homicidal, the investigating agency will depend on scientific tests.



b) If there is a crime, how and when it is committed? Normally through an examination of the crime scene and from the evidence of eye witnesses the investigating agency can reach a conclusion that how and when the crime is committed. However, in certain cases, the investigation agency may find it difficult to reach a probable conclusion about the mode of commission and the time of commission, then they take recourse to the scientific tests.

c) Who has committed the crime? In certain cases identifying the real culprit may be a herculean task in the absence of sufficient evidence. With the use of scientific tests, the investigation agency can get clues and it will enable to identify the real culprit. Moreover, scientific tests can be used to verify the culprit and to establish his links with the crime (Math, 2011).

In India, the use of scientific tests in criminal investigation is statutorily recognised (Jaga Arjan Dangar, 2018). Sections 154 to 176 of the Indian Code of Criminal Procedure, 1973 deal with the powers and procedure of criminal investigation in general. Among these, Sections 156 to 159 specifically recognise the power of investigating agencies to use scientific tests as a part of the investigation process. Moreover, Section 161 of the Code of Criminal Procedure empowers the investigating officer to examine the accused during the investigation (Cr. PC, 1973). It is to be noted that, it is the duty of every citizen in the country to assist the investigation agencies to detect and prevent crimes. In fact, everyone owes a duty to help the State to bring the criminals in front of the law. Therefore, everyone is expected to disclose the information vested with them about the crime and thereby facilitate the investigation agency to reveal the mystery. In cases where it is required the investigation agency is empowered to use appropriate scientific tests to collect evidence and also to verify the pieces



of evidence already collected. In these modern times, where the criminals use technologies and modern methods, in order to get a clue and to ascertain the innocence and guilt of suspects, the use of scientific tests is a compulsion.

1.2. DIFFERENT TYPES OF SCIENTIFIC TESTS:

Various scientific tests are being used for criminal investigation including the detection of crime, the mode of commission, the culprits, etc. These tests include P300 Test or Brain Mapping Test; Lie Detector Test; DNA Profiling; Fingerprint Test; Palm Test; Foot Test; Narco Analysis; Ossification Test; Voice Analysis Test; Handwriting Test; and Ballistic & Explosives Tests; etc. These tests mainly involve chemical analysis and the use of different types of equipment. However, in certain tests, there is direct contact and invasion of the body of the accused and witnesses. Moreover, the accused is compelled to make a statement either directly or indirectly. Therefore, the use of such scientific tests for criminal investigation is being challenged on the ground of its interference with the rights of the accused and witnesses. The most contentious such scientific tests are:

1.2.1. BRAIN MAPPING TEST OR P300 TEST:

It is an established fact that, whenever the test subject is faced with a familiar event, situation, words, etc., the brain emits a particular kind of wave, which is termed as P300. Hence this test is also known as P3 or P300 test. Whenever a person commits a crime the details regarding such crime will be stored in his brain. Hence, when a similar situation, name or word is



being made aware the brain will respond to it. Thus, the subject will be interviewed using certain keywords including neutral words, and words directly connected with the crime as well as certain words, and names that investigating agency found out through their investigation. During this interview session, several sensors will be attached to the body of the subject and using such sensors, the experts will identify the generation of P300. It is generally understood that P300 waves will be generated only if the subject have some connection with the crime. In the P300 test, the subject is not making any oral response. It is only through the P300 waves the conclusions are drawn by the experts and which gives leads to the investigation and helps the collection of evidence (Patowary & Bairagi, 2010; Malini, S. & Chandrakanth, B.K, 2020).

1.2.2. NARCO ANALYSIS TEST OR TRUTH SERUM TEST:

A person is able to lie only if he can imagine. In the Narco-analysis test, the expert will administer a chemical drug which will lower the inhibitions of the subject and he will share the information freely. In this state, a person won't be able to imagine and lie or manipulate. Most commonly Sodium Pentothal drug is being used in this test. Some other types of drugs are also being used for the conduct of Narco analysis and these drugs are generally referred to as truth serums. Therefore, the Narco analysis test is also known as the truth serum test. The concerned experts administer this drug intravenously and as a result, the subject will enter into a hypnotic trance. In this stage, the subject is not in a position to speak up on his own but is able to answer the questions. Such answers to the questions are considered spontaneous and free from manipulations. The entire process of question-answer sessions will be recorded and the same is being used by the investigation agency (Pillai, 2010).



1.2.3. LIE DETECTOR TEST OR POLYGRAPH EXAMINATION:

When a person lies in response to a question, his body will produce certain physiological responses which are different from those he produces during the normal course. Using the instruments attached to the body of the person, such responses will be recorded. In the beginning, the experts will ask a few normal questions to identify the normal physiological responses of the subject and record them. Then the questions relating to the crime begin, and the physiological responses while answering the said questions are also recorded. Based on the deviations in the physiological responses produced during answering the questions relating to the crime, the experts will interpret the result (Meijer & Verschuere, 2010; Tarase *et al*, 2013).

1.3. SCIENTIFIC TESTS AND LEGAL CONCERNS:

In cases where the investigating agency reasonably suspects the involvement of the person with the crime and in the absence of other means to extract information from such person, the investigating agency will prefer the scientific tests. However, the way in which the tests such as brain mapping, narco analysis and polygraph test is being conducted, there arises a question about their legal validity. The major concerns of these scientific tests are as follows:

a) INTERFERENCE WITH RIGHT AGAINST SELF INCRIMINATION:

The extraction of information from an uncooperative person is the most laborious part of any criminal investigation. Scientific tests have emerged as an alternative to extracting information without resorting to illegal third degree and other physical violence. However, it is argued that the extraction of information using the scientific test from a person is violative of his fundamental rights guaranteed in the Constitution of India. The basis



of this argument is the right against self –incrimination guaranteed under Article 20 (3) of the Constitution. It is one of the cardinal principles of any criminal justice system is that an accused cannot be compelled to give evidence against himself. It is well recognised under international human rights law as well as various countries’ national legal systems. The major objective behind this rule is to avoid the possibility of physical coercion to extract the information and thereby prevent custodial torture and involuntary confessions.

Article 20(3) says that “No person accused of any offence shall be compelled to be a witness against himself”. The scope of this right has been discussed by the Indian judiciary through various decisions. One of the first cases in this regard is *M. P. Sharma v. Satish Chandra* (SC, 1954), wherein the Hon’ble Supreme Court held that, “A person can ‘be a witness’ not merely by giving oral evidence but also by producing documents or making intelligible gestures as in the case of a dumb witness or the like. ‘To be a witness’ is nothing more than ‘to furnish evidence’, and such evidence can be furnished through the lips or by the production of a thing or of a document or in other modes”. Further the Court stated, “the protection afforded to an accused in so far as it is related to the phrase ‘to be a witness’ is not merely in respect of testimonial compulsion in the courtroom but may well extend to compelled testimony previously obtained from him”.

In the *State of Bombay v. Kathi Kalu Oghad and Others* (SC, 1961), the Hon’ble Apex Court observed that, “Self-incrimination must mean conveying information based upon the personal knowledge of the person giving the information and cannot include merely the mechanical process



of producing documents in court which may throw a light on any of the points in controversy, but which do not contain any statement of the accused based on his personal knowledge". Hence the Court said, 'the production of a document, with a view to comparing the writing or the signature or the impression, is not the statement in nature of a personal testimony'. Thus, if an accused is compelled by the Court or investigation agency to give a specimen writing or signature or finger expression, he is not eligible for the protection of right against self-incrimination under Article 20(3). The scope of right against self-incrimination was further widened by the judiciary in the case of *Nandini Satpathy v. P.L. Dani* (SC, 1978). The Hon'ble Apex Court observed, "Compelled testimony' must be read as evidence procured not merely by physical threats or violence but by psychic torture, atmospheric pressure, environmental coercion tiring interrogative prolixity, overbearing and intimidatory methods and the like not legal penalty for violation". The Court highlighted that every accused person has a right to silence during interrogation as a part of his right under Article 20(3). Further in *Ramchandra Ram Reddy v. The State of Maharashtra* (BHC, 2004), the Bombay High Court declared that, "in order to invoke Article 20(3) the following things must happen:

1. There should be formal accusation of commission of any offence.
2. The accused of such formal accusation should be compelled to make a statement.
3. The statement so compulsorily made or evoked or provoked is incriminating to the accused or maker thereof.
4. Result of such statement must be a testimony with these ingredients as even though Article 20(3) are established, the protection under testimonial compulsion will come into operation".



From these cases and other similar decisions, it can be seen that the right against self-incrimination is available against oral and written statements/documents as well as any other things which are having the character of evidence. However, the compulsion to produce a document, specimen signature, thumb impression etc. for the comparison is not covered under this right. The use of scientific tests such as brain mapping, narco-analysis and polygraph test and its interference with right against self-incrimination was discussed at length by the judiciary in different cases.

In the case of *Ramchandra Ram Reddy v. The State of Maharashtra* (BHC, 2004), the Hon'ble Bombay High Court expressly dealt with two issues relating to scientific tests such as brain mapping, polygraph and narco analysis. Firstly, the Court discussed the question of whether the results of these tests can be considered as a statement made by the accused for the purpose of Article 20(3) of the Constitution of India. Secondly, whether compulsory administration of these scientific tests violates the rights guaranteed under Article 20(3). The Court pointed out that in brain mapping test and polygraph test, there are no statements or testimony rather the experts will form a conclusion based on the responses of the accused with the help of certain machines. Hence, there is no statements are generated at the instance of the accused and hence, both these tests would not violate the right guaranteed under Article 20(3).

Therefore, the Court held that the Brain Mapping/P- 300 or Lie Detector/polygraph tests can be administered to any accused or a witness even without his consent. With respect to the Narco analysis test, the Court came to the conclusion that there is a statement or testimony generated at



the instance of the accused. Hence, such statements can be considered for the purpose of statements under Article 20(3). The Court further observed that, "The question which falls for consideration, therefore, is whether such statement can be forcibly taken from the accused by requiring him to undergo the Truth Serum Test against his will. It will be seen that such a statement will attract the bar of Article 20(3) only if it is inculcating or incriminates the person making it. Whether it is so or not can be ascertained only after the test is administered and not before. Therefore, there is no reason to prevent the administration of narco analysis because there are enough protections available under the Indian Evidence Act, under Criminal Procedure Code and under the Constitution (Article 20(3), to prevent the inclusion of any incriminating statement if one comes out after administration of the test".

In *Dinesh Dalmia v. State* (MHC, 2006), the Hon'ble Madras High Court observed that, "unless such scientific tests are conducted, the investigating agency may not be in a position to come out with clinching testimony as against the petitioner. Subjecting an accused to undergo such scientific tests will not amount to breaking his silence by force. He may be taken to the laboratory for such tests against his will, but the revelation during such tests is quite voluntary. Therefore, such process does not amount to compelling a witness to give evidence as against him".

In *Rojo George v. Deputy Superintendent of Police* (KHC, 2006), the Hon'ble Kerala High Court held that, "in present days the technics used by the criminals for commission of crime are very sophisticated and modern. The



conventional method of questioning may not yield any result at all. That is why the scientific tests like polygraph, brain mapping, narco analysis, etc. are now used in the investigation of a case. When such tests are conducted under the strict supervision of the expert, it cannot be said that there is any violation of the fundamental rights guaranteed to a citizen of India”.

In *Smt. Selvi and Ors. v. State by Koramangala Police* (Kr HC, 2004), the Hon’ble Karnataka High Court observed that, “It is true in Narco-analysis Test, nothing is extracted from the body of accused nor anything is compared nor tallied since what is obtained is statement or information given by the accused. Such statement made or information given by an accused will be either exculpatory or inculpatory and it is only inculpatory statement which is hit by Article 20(3) of the Constitution”. The Hon’ble Gujarat High Court in *Santokben Sharmanbhai Jadeja v. State of Gujarat* (GHC, 2008), also held that, “by conducting/performing the Narco Analysis Test itself would not tantamount to compulsive testimony or testimonial compulsion and the same would not amount to violation of Article 20(3) of the Constitution of India. If the statement recorded during the course of the aforesaid test is used against the accused, enough protection exists in the Criminal Procedure Code and/or Indian Evidence Act and recourse to which can be taken as and when the Investigating Agency seeks to produce such statement as evidence. Merely on apprehension and/or presumption that the said statement could be used by the Investigating Agency against the person making it that by itself is no ground not to permit the Investigating Agency to conduct/perform the Narco Analysis Test upon the accused”.



Further, the Court observed that, “What is received at the conclusion of brain mapping and P300 test is indication of the fact that the accused or the suspect does have or is in possession of knowledge about the subject on which he was questioned. There is no verbal response from the witness. There is no statement coming out of this voluntarily test and the consequences which come out of such test is not a statement and therefore, there would not be bar of Article 20(3) of the Constitution of India so far as Brain Mapping Test is concerned”. So also, the Court held that, “the question of consent of the accused at the stage of conducting/performing the aforesaid two tests is not required to be considered”.

Finally, the Hon’ble Supreme Court in *Smt. Selvi & Ors. v. State of Karnataka* (SC, 2010), rejected the contention that, at the time of conduct of test, it is not known whether the results will eventually prove to be inculpatory or exculpatory and hence Narco analysis can be administered even without consent. The Court categorically observed that, “it is quite evident that the narcoanalysis technique involves a testimonial act. A subject is encouraged to speak in a drug-induced state, and there is no reason why such an act should be treated any differently from verbal answers during an ordinary interrogation. Therefore, the compulsory administration of the narcoanalysis test amounts to ‘testimonial compulsion’ and thereby interferes with the protection of Article 20(3)”.

Further the Hon’ble Apex Court observed that “the results obtained from tests such as polygraph examination and the BEAP test should also be treated as ‘personal testimony’, since they are a means for ‘imparting personal knowledge about relevant facts. Therefore, the results obtained through the involuntary administration of either of the impugned tests



come within the scope of 'testimonial compulsion', thereby attracting the protective shield of Article 20(3)". The Selvi case is the landmark case in this regard which settled the questions relating to the use of narco analysis, polygraph test and brain mapping tests and their interference with the right to self-incrimination. It is now settled that, involuntary administration of these three tests are violative of Article 20 (3) as it generates a statement in the nature of a testimonial compulsion. Generally, the investigating agency may go for narcoanalysis only after obtaining the necessary consent from the concerned persons.

However, in cases where the accused is unwilling to undergo the narco analysis test, the use of such a test is violative of Article 20(3). The reasoning of the Court is based on the fact that the narco analysis test generates a statement. It is to be noted that, once the truth serum is injected into the person he will speak voluntarily to the questions which are asked during the test. Hence, the element of compulsion can be ruled out. However, it can be argued that the information which is collected in such a way from the person when he is in dazed and half-conscious state, is invalid. However, this argument is not sound because under Section 29 of the Indian Evidence Act a confession obtained under the similar circumstance is valid.

Where the confession is the outcome of a fraud being played with the accused, it is nevertheless relevant (Singh, 2004). Thus, in a case where the two accused persons who were left in a room thought they were all alone, but secret tape recorders were recording their conversation, the confessions thus recorded were held to be relevant (R., 1966). Similarly, where an accused was persuaded to submit to a medical examination for



an innocent purpose which was in fact conducted for criminal purpose, his statements to the doctor and doctor's report were held to be relevant at the discretion of the court (R., 1963). If under Section 29 of the Indian Evidence Act, the above-mentioned methods of collection of evidence is accepted, narcoanalysis can also be treated as a technique which comes under this section. Thus, it is submitted that the investigating agency can use the information extracted through narcoanalysis as a base for further investigation and for collecting other valuable evidence (Pillai, 2010).

The compulsory administration of polygraph test and barin mapping test is prohibited due to the fact that, the results obtained through these tests would amount to a statement. It is to be noted that the results of such tests would not be considered as a basis for conviction. It is only after establishing facts based on other evidence, the Courts will take into account the results of such tests. Hence, prohibiting the use of such scientific tests in this modern era is not in tune with the need of criminal justice delivery in the country.

b) ENCROACHMENT WITH RIGHT TO PERSONAL LIBERTY:

Liberty is one of the most important fundamental rights of an individual. The compulsory administration of scientific tests against the consent of the accused is argued as a violation of the personal liberty of an individual. This is because, for the conduct of such tests, the concerned persons are required to be confined under the control of investigating agency. Such confinement would amount to a violation of the personal liberty of an individual which is guaranteed under Article 21, in the absence of a valid procedure established by law. It is to be noted that the Code of Criminal Procedure statutorily recognises the power of the investigating agency and



the Courts to detain and restrict the liberty of individuals for the purpose of an effective investigation and prosecution of the accused. It is to be noted that, based on the provisions of the Code of Criminal Procedure and other criminal statutes, which empower the investigating agency to detain a person, will act as a valid procedure established by the law for the purpose of restricting the right to personal liberty. Hence, the compulsory administration of scientific tests after obtaining permission from the concerned Courts should not be considered as a violation of personal liberty.

c) INTERFERENCE WITH RIGHT TO PRIVACY:

The use of scientific tests is opposed on the ground that it interferes with the right to privacy of an individual. Though the right to privacy is not expressly guaranteed in the Constitution of India, but through judicial interpretations, the judiciary has included the right to privacy and its various dimensions under Article 21 of the Indian Constitution (SC, 1995; SC, 1999; SC, 2017). The scientific tests are objected to on the ground that, it interferes with the body and mind of the accused. These tests directly intrude on the mental processes of the subject, who lacks control over his mind during the questioning due to the effect of drugs. There is a risk that the unconscious mind may reveal personal information that is irrelevant to the investigation. However, there is no official guidelines available to ensure the confidentiality of personal information and to safeguard the privacy of test subjects.

In *Smt. Selvi & Ors. v. State of Karnataka* (SC, 2010), the Hon'ble Supreme Court observed that, "an individual's decision to make a statement is the product of a private choice and there should be no scope for any other



individual to interfere with such autonomy, especially in circumstances where the person faces exposure to criminal charges or penalties. Therefore, it is our considered opinion that subjecting a person to the impugned techniques in an involuntary manner violates the prescribed boundaries of privacy". It is to be noted that the right to privacy is subject to compelling public interests. Hence, in cases where there is no other alternative is available, as a last resort the investigating agency should be allowed to use the scientific tests even without the consent of the accused.

d) VIOLATION OF RIGHT TO FAIR TRIAL:

In *Selvi case* (SC, 2010) the Supreme Court held that, "in the light of a conjunctive reading of Article 20(3) of the Constitution and Section 27 of the Evidence Act, if the fact of compulsion is proved, the results of the scientific tests will not be admissible as evidence. If the compulsory administration of scientific tests are allowed, it would also affect some of the key components of the 'right to fair trial". The major component which was identified by the Court in those cases are the access to legal advice at the time of custody. The Court observed that, if the investigating officer uses the scientific tests, then the objective of providing access to legal advice is frustrated. Further, the Court held that, at the stage of trial, the prosecution is obliged to supply copies of all incriminating materials to the accused but reliance on the impugned tests could curtail the opportunity of presenting a meaningful and wholesome defence. If the contents of the revelations or inferences are communicated much later to the accused, there may not be sufficient time to prepare an adequate defence. The right to a fair trial is an important element of criminal justice administration in every country. In India, this right is guaranteed as a part of Article 21 of the Constitution. It is to be noted that, the right to a fair trial like any other



right is not an absolute right. Hence, any right which is conferred under Article 21 can be restricted by an appropriate procedure established by law.

The collection of evidence and prosecution of the accused is a compelling public interest. When the investigating agency is in darkness, then in order to get a lead, the scientific tests can be allowed. The need for using scientific tests and their importance in criminal investigation and trials are well-acknowledged in most of the legal systems in the world. In India, though the scientific test using blood samples, DNA etc. were recognised but the involuntary administration of important scientific tests like 'brain mapping, polygraph and narcoanalysis is not yet acknowledged. Along with the arguments based on the violation of fundamental rights such as the right against self-incrimination, privacy, etc., it is argued that these tests are not fool-proof and the results may mislead. It is to be noted that, the results of these tests are not expressly admissible before the Court, it is only acting as a source of information to the investigating agency and based on such information, the investigating agencies collect the relevant admissible evidence. Hence, the reliability of the test results will not adversely affect the accused. Moreover, the accused is entitled to seek the protection of rights against self-incrimination in cases of direct use of test results as evidence. It is relevant to note here that, in different cases, the judiciary has made clear that an accused can request the conduct of such scientific tests in order to prove his innocence. This right is recognised as a part of Articles 14, 21 of the Indian Constitution and other provisions in the Code of Criminal Procedure (GHC, 2022).



2.0. CONCLUSION

Scientific tests such as brain mapping, polygraph and narco analysis have emerged as significant tools for criminal investigation. Generally, these tests are preferred by the investigating agency only as a last resort to get a lead when they are in darkness. However, the Hon'ble Apex Court has made a qualification for the use of such tests i.e. only with the consent of the accused. In this modern scientific world, the investigating agencies should be permitted to use these scientific tests as a part of investigation. This is because as these tests does not involve any element of torture or physical violence, these tests can avoid the use of traditional physical torture. Though physical violence is not accepted in the Indian legal system, in order to extract the information from the suspected persons, the investigating agencies may resort to physical violence. Hence, if the scientific tests are allowed, they can prevent the use of such physical violence and they can act as an effective tool for the investigation of crimes. At present, there exist Guidelines for the Administration of Polygraph Test (Lie Detector Test) on an Accused, 2000 formulated by the National Human Rights Commission of India. The judiciary has extended the application of this guideline for the conduct of tests such as narcoanalysis and brain mapping also. This guideline offers safeguards to the accused against any possible violation of fundamental rights. In order to ensure the effective use of scientific tests and to prevent any possible violation of the rights of the accused, there is a need to develop a legislative framework clearly explaining the modus operandi of the conduct of these tests and the rules relating to the admissibility of results.



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