ISSN 2277-8330 *(Electronic)*

J.Bio.Innov2(1),pp:05-16,2013

www.jbino.com

SCIENTIFIC AND LEGAL PROCEDURE OF POLYGRAPH TEST

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(Received on Date: 1st December 2012 Date of Acceptance: 1st January 2013)

ABSTRACT

A polygraph (popularly referred to as a lie detector) measures and records several physiological indices such as blood pressure, pulse, respiration and skin conductivity while the subject is asked and answers a series of questions. The belief is that deceptive answers will produce physiological responses that can be differentiated from those associated with non-deceptive answers. The polygraph was invented in 1921 by John Augustus Larson, a medical student at the University of California at Berkeley and a police officer of the Berkeley Police Department in Berkeley, California. According to Encyclopedia of Britannica, the polygraph was on its 2003 list of greatest inventions, described by the company as inventions that "have had profound effects on human life for better or worse." Many members of the scientific community consider polygraphy to be pseudoscience. Nonetheless, in some countries polygraphs are used as an interrogation tool with criminal suspects or candidates for sensitive public or private sector employment. US federal government agencies such as the FBI and the CIA and many police departments such as the LAPD use polygraph examinations to interrogate suspects and screen new employees. Within the US federal government, a polygraph examination is also referred to as a psychophysiological detection of deception (PDD) examination. In this paper authors have discussed about brief history, method of operation, use and utility, legal procedure and National Human Rights Commission's Guidelines for Administration of Polygraph Test.

Number of Tables : 1 **Number of References : 12**

Introduction

Polygraphy is the process which is used in medical practice for comprehensive study of functioning of different body systems with particular reference to circulation, respiration and peripheral nervous response. This technology has been attempted in forensic investigation process. The basis of its application is the fact that mental excitation or stimulation there is alteration of these body functions due to autonomic, particularly sympathetic excitation.

Basing on this principle, polygraph, which indicates the functioning levels of the above noted systems, has been used to know whether a suspect or an accused of a case is deceptive while facing interrogations during the investigation, so that subsequent investigation process can be channeled through right way. For this purpose, the persons to be so examined with the help of a polygraph should be so done in his complete physical and mental relaxation stage, without any factor acting on him to influence the responses, except which should naturally occur while giving a deceiving or false reply.

Brief History

Earlier societies utilized elaborate methods of lie detection which mainly involved torture ; for instance, the middle Ages used boiling water to detect liars as it was believed honest men would withstand it better than liars. Early devices for lie detection include an 1895 invention of Cesare Lombroso used to measure changes in blood pressure for police cases, a 1904 device by Vittorio Benussi used to measure breathing, and an abandoned project by American William Marston which used blood pressure to examine German prisoners of war (POWs). Marston's machine indicated a strong positive correlation between systolic blood pressure and lying.

Marston wrote a second paper on the concept in 1915, when finishing his undergraduate studies. He entered Harvard Law School and graduated in 1918, re-publishing his earlier work in 1917. Marston's main inspiration for the device was his wife, Elizabeth Holloway Marston. According to their son, Marston's wife, Elizabeth Holloway Marston, was also involved in the development of the systolic blood pressure test: "According to Marston's son, it was his mother Elizabeth, Marston's wife, who suggested to him that 'When she got mad or excited, her blood pressure seemed to climb' (Lamb, 2001). Although Elizabeth is not listed as Marston's collaborator in his early work, Lamb, Matte (1996), and others refer directly and indirectly to Elizabeth's work on her husband's deception research. She also appears in a picture taken in his polygraph laboratory in the 1920s (reproduced in Marston, 1938)."The comic book character, Wonder Woman, by William Marston (and influenced by Elizabeth Marston carries a magic lasso modeled upon the pneumograph (breathing monitor) test.

Despite his predecessor's contributions, Marston styled himself the "father of the polygraph". Marston remained the device's primary advocate, lobbying for its use in the

courts. In 1938 he published a book, *The Lie Detector Test*, wherein he documented the theory and use of the device. In 1938 he appeared in advertising by the Gillette Company claiming that the polygraph showed Gillette razors were better than the competition.

A device recording both blood pressure and galvanic skin response was invented in 1921 by Dr. John Augustus Larson of the University of California and first applied in law enforcement work by the Berkeley Police Department under its nationally renowned police chief August Vollmer. Further work on this device was done by Leonarde Keeler. As Larson's protege, Keeler updated the device by making it portable and added the galvanic skin response to it in 1939. His device was then purchased by the FBI, and served as the prototype of the modern polygraph.

Several devices similar to Keeler's polygraph version included the Berkeley Psychograph, a blood pressure-pulse-respiration recorder developed by C. D. Lee in 1936 and the Darrow Behavior Research Photopolygraph, which was developed and intended solely for behavior research experiments.

A device which recorded muscular activity accompanying changes in blood pressure was developed in 1945 by John E. Reid, who claimed that greater accuracy could be obtained by making these recordings simultaneously with standard blood pressure-pulse-respiration recordings.

Materials & Methods

The person is made to sit on a chair and the accessories of the instrument are properly attached on different parts of the body. An arm cuff is placed around the arm for recording blood pressure and pulse rate and pulse features. An elastic belt is placed around the chest to measure the rate and amplitude of respiration with deviations and an electrode connection is placed, one on the tip of one side index finger for recording galvanic skin reaction (Galvanic current is used for the purpose). The response is recorded graphically on a single paper from where different adverse responses, the intensity of responses, and the time and extent of exciting reaction, can be studied.

In the following table shows that the name of the instruments attached to the different parts of the body for the purpose of various graphical measurements.

Table 01

S.No	Name of the instrument	Part of the body	Purpose of attach
O1	The pneumograph	Chest	To measure the respiratory changes
02	The sphygmograph	Upper arm	To measure the cardiovascular changes
03	An electrode	Palm or fingers	To measure the electro dermal response (GSR)
04	Transducer (the plethysmograph)	Thumb	To measure blood volume reflecting the pulse rate

All these measurements are recorded simultaneously in the form of traces on a graph paper individually. These recordings on a graph paper, collectively, are known as PolyGram. It is evaluated to find out whether during the lie detection test the subject experienced emotional stress from any of the questions asked, or showed no reaction

Application and utility:

Since the development of polygraph, it has been widely applied in criminal investigation by the police, especially in USA and Japan. However, of late, the polygraph has also been used elsewhere and for other purposes:

Recruitment of police and other personal.

Apart from the police department the federal bureau of investigation and the department of defence, banks and other organizations are also utilizing the lie detector as an aid for investigation undertaken by them.

The big business and industrial concerns in USA use the lie detector for checking the honesty of their employees.

Specific quality of polygraph and allied deception tests can briefly be summarized as follows:

1. It can detect deception.
2. The guilty can be induced to confess to his crime.
3. It can discriminate between the innocent and the guilty.
4. It can replace the third degree methods used in interrogations.
5. It can narrow down the field of inquiry for the police.
6. It can check the veracity of the statement of a witness.
7. It is an effective tool to ascertain and check the honesty of candidates or employees.

Procedure of interrogation and questioning to the subject:

The subject to be examined is to be prepared without any premedication. The preparation is more a mental preparation than otherwise. Certain subjects are naturally unsuitable for this test, for instance, subjects with psychotic personality, over reactive personality, drug addicts; persons suffering from gross abnormality of any of these three conditions and persons who are by nature deceptive, restless and non co-operative. These subjects require special preparation and need time to be fit for the test. They are not suitable for ready examination.

Preparation of the subject (who is suitable for ready examination): the person is subjected to pre-examination interview during which its purpose, aim, the process of polygraph examination to be followed, should be explained to him to his optimum understanding. For satisfactory result of the test, the tester should have the knowledge of the incident. The subject should be informed that, he would be asked certain questions, and he is to answer the questions as 'yes' or 'no'. For this questions will be of suggestive in nature. The subject has nothing to be apprehensive about any wrong study and interpretation of the polygraphic test. But if he deceives then, that will be reflected in the test. In the second stage he should be made acquainted with the questions and he has to understand the questions well so as to give 'yes' or 'no' answers. Ideally, not more than 10 questions should be asked to him in the same sitting. Initially three categories of questions are asked.

Irrelevant questions: These are the questions which have no bearing with the incidence of offence in any way. For example – Is your name Mr. 'X'? Are you 28 years in age? Are you a usual inhabitant of 'Y' area? Do you work in 'Z' firm?

Relevant questions: These are the mostly directly implicating him with commission of the offence or suggestive of having knowledge about some aspects of the offence. For example, 'on 11-10-2012 at 5-00 p.m, you stabbed Mr. 'A' at his home or saw Mr. 'B' stabbing Mr. 'A', on 11-10-2012 at 5-00 p.m'. 'You have robed SBI bank of Rs.5 lac'. The answers for the relevant questions should be "yes" or "no".

Control questions: for proper understanding and interpretation of the graphic curves imprinted with answers and mental reaction of the subject to different relevant questions, control question are asked, which are mostly generalized in nature, related to some minor bad acts which the person might have committed some time in his early life and should have not forgotten. E.g., 'Have you at any time during your childhood, stolen some money from your mother's purse for purchasing some playing materials'? 'Did you ever think to make money by way of bank robbery or some such way'?

In case of deceptive answers, adverse reactions are reflected in different ways in the graphic presentation of the body functions. Irrelevant questions are asked to facilitate comparison between the reactions to a correct answer and that to a deceptive

answer. Interpretation of reaction to answers to controlled questions helps further to assess whether the person is generally reactive to any of the questions which he feels may indirectly implicate him to the present offence in question, that has not been committed by him. Thus, a negative answer for both relevant as well as control questions with similarity in abnormal response will rather be taken as the person's adverse nervous and other systemic reaction to any incriminating question or affair.

The questions should be so arranged that the graphic response can be easily compared and becomes conspicuous. Thus, an irrelevant question should be followed by a relevant question, to be followed by an irrelevant question again and then should be followed by a control question. All these should be so done to allow the person to come back to normal receptive stage, after giving a deceptive answer to a relevant question, so as to make him ready for another relevant question. The purpose the control questions have been narrated above.

Proper examination: the person to be examined is made to sit on a polygraph chair in such a way that he faces the instrument and the operator faces him so that during questions and answers he can observe the facial reactions of the subject.

The different settings of test constitutes: (i) first test (ii) card test (iii) 3rd test (iv) mixed question test (v) yes test (vi) guilt complex test (vii) repeat test (re-examination test) (viii) peak of tension test.

The first test is carried on after the subject settles and the appliances and instruments are attached to his different body parts. Next he is explained about the types of questions and the type of reactions which will be obtained, if he lies.

Card Test: in case interpretation becomes difficult on the findings of the first test, the card test may be performed to know whether he has lied during the first test. The person is subjected to this test when the findings of the first remain ambiguous or if no conclusion can be drawn from the findings. Seven playing cards of different numbers are used for this test. The person is asked to pick up one out of them without looking at the number. Then he will see the number of the card he has picked up. The card is taken back from him and mixed with the other six cards. Then all the seven cards are handed over to him with instruction that, he should take up each one individually when asked the question. 'Is that the card you picked up earlier?' he should answer 'No' in all cases, including the question relating to the card he actually picked up earlier. Thus, one of the 'No' answer must be wrong, and graphic change due to such wrong answer becomes helpful to make a comparative study with graphic pattern related to his answer for relevant questions asked during the first test. If the responses are similar, then it becomes strongly suggestive that, he lied during the relevant question during the first test.

A "Third Test": is necessary, when no conclusion can be drawn after the card test, i.e., when no change in the response is noticed during answering "No" in

connection with questions related to the card test. During the third test, the same questions are repeated after informing the person that, the polygraph showed that, he was not always truthful while answering the questions.

Mixed Question Test: To know whether the answers given for relevant questions during the first test, which have shown some changes in recorded response, are correct or not, the person may be subjected to another test with just some rearrangement of the same questions. If the responses to the individual questions are same as during the first test, then it indicates that, the answers given are genuine.

"Yes" Test: In some persons, another test in a changed form may be necessary. Here, among the irrelevant questions some false incriminating questions are also asked. Before setting him for the test, he is narrated the questions and asked to replay in "Yes" in all questions. It is expected that there will be change in the response when he says "Yes" for a false incriminating question. If there is no change in response for the incriminating question, then absence of change in response against relevant questions in the previous test becomes meaningless.

"Guilt Complex Test": In the guilt complex test, offence for which a person is interrogated is not the matter of questions directly. But questions which will create a guilt complex in him are asked. For example, if he had hit a person, then he may be asked question like, "You carried danger with you when you met him that day" or "You have knowledge that the person was stabbed on that day at that time".

"Re-examination Test": Re-examination is carried in case of erratic response or with unresponsive persons or in persons with inconsistent behaviour. The examination is done by specific stimulation by general suggestive questions which does not bear an element to unnecessary excite the person. The question should be like, "You know that such and such person has been stabbed" or "You also can say who might have stabbed him".

Peak of Tension Test: these questions contain the fact of offence without directly linking the person with the offence in a specific manner. For example, when it is a case of theft of some ornaments, the interrogator may name several ornaments out of which one has been allegedly stolen by the person. The excitement period will be at the time of naming the exact ornament, which was stolen and that peak of excitement will be represented in the graphic records. It is suitable for persons who remain to some extent excited and alert all along the period of interrogation.

Of all the responses, the responses in the change of respiratory function and in the GSR (Galvanic Skin Reaction) are more dependable. The circulatory response represented by pulse rate and blood pressure may be helpful but often are less so. Further, variation in circulatory response may occur due to various reasons like over consciousness, contraction of muscles, body movements, etc.

Legal status of polygraph:

By and large, lie detector evidence has limited judicial recognition. In a few courts of America polygraph test results have been recognized for their value as an aid to investigation and in some cases the expert evidence relating to polygraph has been accepted. The experts in areas like finger prints, firearms, identification of questioned documents etc. have been widely acclaimed. But the polygraph experts have not received acceptance and recognition from the court. It is unfortunate when the polygraphists have established 95 to 98% accuracy of the lie-detector in detecting deception or the truthfulness of the subjects in criminal investigations. On the basis of relevant scientific data on the lie-detector, it is strongly felt the courts should accepts deception test results because it can furnish a fairly effective method and technique for the exposure of deception in a subject. Since polygraph interrogation is the best available method to detect deception, the time has come for the courts to admit this type of evidence.

The Chicago Bar Association Committee of Criminal Law undertook a study on the polygraph and its role in the administration of criminal justice. The committee concluded as follows:

Polygraph has a place in the detection of crime because of psychological effect on persons, who are in fact guilty of crime.;There may be 5-30% errors in the test results, depending upon the ability of the examiner and other factors.; Unqualified operators could cause unnecessary injury to innocent persons.;Refusal to take a polygraph test should have no bearing on the presumption of innocence.;The polygraph is not a substitute for the competent detection and investigation of crime. ;Due to the fallibility of the results of polygraph examination should not be admitted as evidence in court cases.

The present position regarding the acceptability of lie detection test results is that in some of the courts of USA it has been accepted as legal evidence. There are instance where the courts have recognized and utilized the polygraph test to be decisions. In USA, out of 23 states, 11 have enacted legislation to create a licensing authority for polygraphists to conduct certain specific type of polygraph examination, like cases of disputed paternity. In remaining states, no such legislation has yet been enacted. The only other countries where polygraph has been put no extensive use in criminal justice system are Japan and Israel. The legal status here is no different from that in USA. In Japan some of the courts have accepted the polygraph test results.

The use if polygraph in Canada or in European countries, e.g., U.K., France, Germany, etc. is not extensive. But it is on the increase.In India, a beginning was made by the Central Forensic Science Laboratory, Central Bureau of Investigation, New Delhi, by providing the facility of polygraph for the purpose crime investigation. A number of other institutions have since introduced the

facility. The polygraph test results do not appear to have been utilized in the courts. However, there is no law, which forbids the use of polygraph in criminal investigations. In fact section 45 of the Indian Evidence Act is wide enough to accept the polygraph evidence. The lie-detectors are in providing useful assistance in criminal investigations in thousands of cases.

Corroboration of circumstantial evidence is not legally required. Theoretically also, it is not necessary. But in practice most of the courts are hesitant to base their convictions, as a matter of abundant caution, on the sole testimony of experts. However, there are reported cases where convictions were based upon the expert evidence alone. There can be no hard and fast role in this regard. The circumstances of each case determine the weight of expert evidence.

Rights of the subject:

The critics of the polygraph technique emphasize that the technique involves an intrusion in to the privacy of the subject. In order to counter such criticism, certain rights of the subject have been formulated. These rights are respected. There are;

Only a qualified examiner is to examine the subject.;The subject must be declared fit for polygraph examination.;He must be informed of the reasons for the polygraph test.;He should know how the polygraph functions.;He must consent to take the polygraph test.;He can refuse to submit to polygraph test.;He must not be exposed to mental and physical abuse.;He must not be subjected to prolonged questioning.

NHRC'S Guidelines on Administration of Lie Detector or Polygraph Test:

The Commission, in 16 May 1997, had received a petition dated 12 May 1997 from Shri Inder P. Choudhrie, a resident of New Delhi, while he was lodged in the Shimla Sub-jail. The petitioner had alleged that while visiting Shimla to attend the hearing of a civil suit, he had been arrested by the Shimla Police in connection with a murder and thereafter had been subjected to various kinds of custodial torture for a period of 13 days of police custody. He had been illegally detained and tortured both physically and mentally and subjected to `Lie Detector Test' without his consent and after he had been administered certain intravenous drug. He had prayed that the Commission might look into his case and get the matter inquired by the CBI independently.

The case was originally considered by a Member of the Commission on more than once occasion. The Learned Member did not find it a fit case for intervention by the Commission. The petitioner had sought review of the order of the commission. The review petition was placed before the same Bench in terms of Regulation 32 (b) of the National Human Rights Commission Procedure (Regulation), 1994. The Bench disposed of the review petition by an order dated 8 September 1998. Later the petitioner filed another petition dated 14 September 1998 for review. The case was later listed before the Chairperson. The petitioner along with his Counsel was heard this matter and he had admitted that almost every allegation

made in the petition before the Commission formed part of the Writ Petition filed before the High Court of Himachal Pradesh which had since been dismissed. A special leaf petition also been filed before the Supreme Court which had also been dismissed.

As the complainant had also approached the High Court of Himachal Pradesh with a writ petition and later the Supreme Court of Himachal Pradesh with a writ petition and later the Supreme Court of India with a special Leave Petition but without success, the Commission declined to intervene in the matter. Subsequently, the review petitions filed by Shri I.P.Choudhrie were also dismissed. While dismissing his last review petition vide an order dated October 1999, the commission had observed, "as the lie Detector Test to be administered to an accused is not regulated by Law, it is appropriate that guidelines for the test should be formulated." It also observed, however, apart from and as not applicable to the present case, the commission may have to consider formulating appropriate guidelines for the conduct of 'polygraph test'.

Accordingly, a set of guidelines relating to administration of Polygraph Test was formulated and approved by the commission. The commission considering this aspect felt that as the polygraph test was not regulated by Law it was appropriate that guidelines the test should be formulated.

The National Human Rights Commission on 12 November 1999 adopted a set of guidelines relating to administration of the Polygraph Test or the Lie Detector Test. The Commission had been receiving a number of complaints pertaining to the conduct of this test said to be administered under coercion and without informed consent. The test is allegedly conducted after a certain drug is administered to the accused. As the existing police practice in invoking Lie Detector Test is not regulated by any 'Law' or subjected to any guidelines, the Commission felt that it could tend to become an instrument to compel the accused to be a witness against himself, violating the constitutional immunity from testimonial compulsion.

These matters concerning invasion of privacy have received anxious consideration from the Courts too. A suggestion for legislative intervention was made, in so far as matrimonial disputes were concerned. American Courts had taken the view that such steps are routinely a part of everyday life and had upheld their consistory with due process. To hold that because the privilege against testimonial compulsion protects only against extracting from the persons own lips and the life and liberty provisions are not attracted may not be wholly satisfactory. In India's context, the immunity from invasiveness (as an aspect of Article 21) and from self-incrimination (Article 20(3)) must be read together. The general executive power cannot intrude on either constitutional rights and liberty or, for that matter any rights of a person. In absence of a specific 'law', any intrusion into fundamental rights must be struck down as constitutionally invidious.

The Lie Detector Test is much too invasive to admit of the argument that the authority for this test comes from the general power to

interrogate and answer questions or make statements. However in India, we must proceed on the assumption of constitutional invasiveness and evidentiary impermissiveness to take the view that such holding of tests is a prerogative of the individual not an empowerment of the police. In as much as this invasive test is not authorized by law, it must perforce be regarded as illegal and unconstitutional unless it is voluntarily undertaken under non-coercive circumstances. If the police action of conducting a Lie Detector Test is not authorized by law and impermissible, the only basis on which it could be justified is, if it is volunteered.

However, there is distinction between 'volunteering' and 'being asked to volunteer.' This distinction is some significance in the light of statutory and constitutional protections available to any person. There is a vast difference between a person saying, 'I wish to take a Lie Detector Test because I clear my name"; and the person told by the police, "If you want to clear your name, take a Lie Detector Test". A still worse situation would be by the police say "Take a Lie Detector Test and we will let you go". In the first situation the person voluntarily wants to take the test. It will still have to be examined whether such volunteering was under coercive circumstances or not. In the second and third situations the police implicitly/explicitly link up the taking of the test to allowing the accused to go free.

The extent and nature of 'self-incrimination' is wide enough to cover the kinds of statements that were sought to be induced. The test retains the requirement of personal volition and states that self-incrimination must mean conveying information based upon the personal knowledge of the person giving information. The information, sought to be elicited in a polygraph test, is always information in the personal knowledge of the accused.

The Commission, after bestowing its careful consideration of this matter of great importance laid down, the following guidelines relating to the administration of Lie Detector Test:

No Lie Detector Test should be administered without the consent of the accused. Option should be given to the accused as to whether he wishes to avail the test. If the accused volunteers for the tests, he should be given access to a lawyer. The police and the lawyer should explain the physical, emotional and legal implication of such a test to him. The consent should be recorded before a Judicial Magistrate. During the hearing before the Magistrate, the accused should be duly represented by a lawyer. At the hearing, the person should also be told in clear terms that the statement that is made shall not be a 'confessional' statement to the Magistrate but will have the status of a statement made to the police. The Magistrate shall consider all factors relating to the detention including the length of detention and the nature of interrogation. The actual recording of the Lie Detector Test shall be done in an independent agency (such as a hospital) and conducted in the presence of a lawyer. A full medical and factual narration of the manner of information received must be taken on

record.

These guidelines of the Commission were circulated to the Chief Secretaries and DGPs of States as well as Administrators and IGPs of UTs by a letter dated 11 January 2000.

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