



# Psychological Evaluations: An Indoor Game of Criminal Minds **13**

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## Abstract

Forensic psychology is the application of psychological practices and principles under the court of law. The chapter explores the principles and techniques that are used in forensic psychology to aid the legal system along with other contributing factors such as mental disorders or other factors involved in commission of crime. Combining the discussion of theory, this chapter also addresses the different roles of the forensic psychologist. Investigative techniques such as polygraph, narcoanalysis/truth serum, and Brain Electrical Oscillation Signature Profiling (BEOS), and forensic hypnosis play a very important role in helping the legal system by providing a corroborative evidence. By exploring the crime scene, the modus operandi used, and place and time of the crime and interviewing witnesses (if present), a lot can be known which can be further used to narrow down the suspect list which is really helpful for the police. This chapter will further address the ways in which forensic psychology is really helpful in both civil and criminal proceedings. The importance of forensic psychology in the court of law is further explained.

## 13.1 Introduction

This chapter permits a brief understanding on the field of forensic psychology which includes understanding and analyzing investigative techniques used, the kind of psychological evidences, and the behavior of the suspect or criminal which can be

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really helpful in understanding the crime scene. Forensic psychology contributes a very important role in helping the legal framework. Forensic psychology can be basically defined as practicing psychology within the court of law.

Even though “forensic psychology” is a relatively young field, the practice of intertwining law and psychology dates back to the 1800s. There is absolutely no doubt of contribution of forensic psychology to the execution of justice.

The father of forensic psychology is “Wilhelm Wundt.” In Germany (1879), he established his first lab, and since then, forensic psychology has grown with immeasurable contribution by other professionals. Another expert, “James Mckeen Cattell,” has performed a number of analyses on psychological evidences.

“Alfred Binet” inspired by the Cattell’s work studied the conclusions of other experiments of psychology applied to legal and system of criminal justice. His testing of intelligence was conjointly vital in the discipline of forensic psychology as several future tools of assessment were formed based on the work done by him. “Hugo Munsterberg” (1908) published *On the Witness Stand: Essays on Psychology and Crime* where he discussed the flaws of eyewitness memory, the role of hypnosis within a legal context, and detection of false memories.

Another important contribution in this field in 1917 was made by “William Marston” who is known as the “father of the polygraph” despite the contributions made by other experts before him. Marston remained the primary advocate for the use of polygraph lobbying in the courts. He published a book in the year 1938 called *The Lie Detector Test* where he explained the theoretical part and use of the polygraph. There was an advertisement produced by Gillette company where Marston was also casted who claimed that the usage of the polygraph has shown that razors produced by the company are better than other razors in the market.<sup>[1]</sup>

### 13.1.1 Forensic Psychology and Criminal Investigations

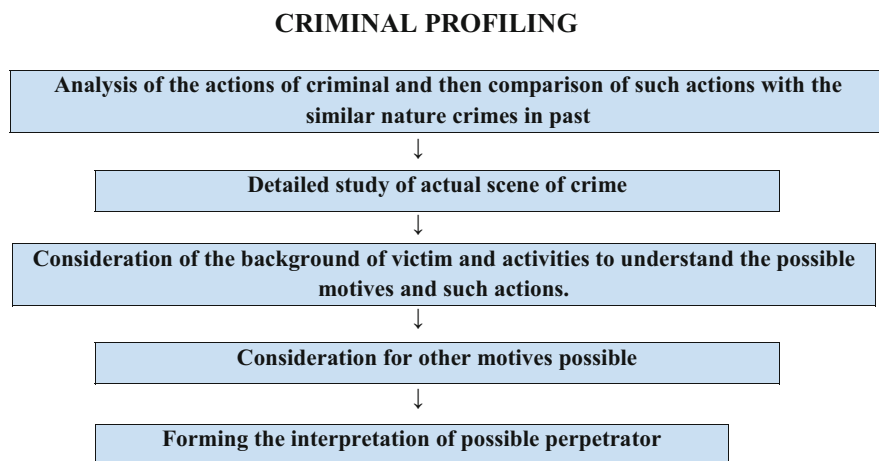
When there are few or no physical evidences left on the crime scene, then investigators generally give their attention in discipline of forensic psychology to understand and find what and how it occurred. The very known techniques of forensics that are used for investigation include fingerprint analysis, shoe print casting, or analyzing evidences such as hair and fiber. Recently, analysis of DNA as a forensic technique has greatly improved in solving crimes, but investigators turn to forensic psychological techniques when these evidences are very few or not present. Forensic psychology techniques such as polygraph, Brain Electrical Oscillation Signature Profiling (BEOS), and narcoanalysis/truth serum have been playing very important roles in criminal investigations. Some famous cases where one or more forensic psychological techniques have been used are the Veerappan case (2001), Nithari killings (2006), Abdul Karim Telgi case (2007), Aarushi Talwar case (2011), and the infamous narcoanalysis of Kasab and his confession about Mumbai terror attack on the Taj Hotel.

### 13.1.2 Criminal Profiling

Profiling of criminal or criminal profiling also goes by another name as offender profiling. It is the procedure of making deduction about characteristics of perpetrator from their actions during a crime. It helps in identifying the offender or perpetrator based on the analysis and mode in which the crime was committed. It is done on the basis of crime scene characteristics. Criminal profilers rely on psychological and behavioral evidences to find the offender's likely characteristics. Criminal profiling is largely prepared by the police with the help of forensic psychological experts. Because of psychological/criminal profiling, police or investigators are able to link the crimes and even narrow down the suspect list which thereby helps in solving the case more efficiently.

Criminal profiling has gotten people's attention from various famous movies like "Silence of the Lambs," "Hannibal," or "Red Dragon" or web series like "Criminal Minds" or "CSI" where offender profiling has been associated with the prediction of expert in understanding the offender's mind. However, the important thing to be kept in mind is that criminal profiling aids forensic investigation and is not a forensic technique because:

- It helps in giving a bigger picture on the likely characteristics of the offender and not the indication of the offender.
- Presently no particular scientific evidences are present that can support and provide the validity of the criminal/offender profiling in solving criminal cases (Fig. 13.1).



**Fig. 13.1** Five steps of criminal profiling

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## 13.2 Behavior Analyzed in the Crime Scene

Many things contribute to the success or failure in generating the profile or investigation of criminal, and there is need of an approach that is more empirical and systematic in nature which plays an important role for the decision-making process. Opposite to the approaches which are deductive in nature where generalizations guide the conclusions, the inductive approach is an empirical approach where scientific analysis derives conclusions.

For instance, general principles are derived by the methods that are inductive for understanding the behavior of serial killers by examining the facts empirically from an outsized number of cases that are solved in order to understand the behavior that has shifted with the time.

Opposite to the processes that are deductive in nature, which commence with assumption of the behavior, inductive profiling depends on the data collected from the scene of crime, reports of the police records, psychological assessments, reports given by the examiner, and victim reports which are empirically analyzed to check an assumption.<sup>[2]</sup>

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## 13.3 Theories of Criminal Behavior

Many scholars have attempted to create various theories in order to explain crime systematically. Some of these scholars have even tried to modify the existing theories so that various parts of theory could fit together and exempt out the inconsistencies and contradictions of the positions.

This is done in order to formularize a theory which could provide explanation for crime of different types and categorize different types of offenders.

For example, occupational crime such as white-collar crime is different when compared to common thief's petty crime. Similarly, many theories have been formulated to explain the difference between female crime and male crime. Crimes committed by juvenile delinquents are also explained differently from the crimes committed by adults.

### 13.3.1 Classical Theory

The classicists defined crime as a behavior which breaches social contract, which is destructive not to the state as such but to the safety and property of those people in the community whose commitment to "contract in" established the state authority. Classicists not only focus on the conditions and influences but on the unlawful act itself. A renowned Italian thinker named "Beccaria" who was influenced by intellectuals like John Howard propounded this theory in 1764.

**The main assumptions of Beccaria's classical explanation are as follows:**

1. The behavior of a man is rational and purposive. This behavior is based on hedonism or on the principle of pleasure-pain, which means he constantly avoids pain and chooses pleasure over it.
2. Each crime should be assigned a punishment, and the measure of this punishment should be damage done by a crime to the public welfare. Any pleasure derived from the commission of crime should always be outweighed by the pain.
3. Extreme and deterrent punishment should not be given, and this punishment should be crime proportioned, pre-determined, prompt, and communal. Instead of corporal punishment, more use of imprisonment should be there while insuring the use of fair trial. Along with this, there should be total abolishment of any kind of torture.
4. Legislation must be equally applied to all citizens.
5. Legislatures should clearly authorize the law and determine particular punishment for its violation. Judges should only determine whether or not an individual has committed a crime or has done any breach of law and never interpret the laws according to the ideas they have. In other words, whether an individual is innocent or guilty, deciding the punishment of a guilty person should be decided by the courts.<sup>[3]</sup>

**Criticisms against this theory are as follows:** Assumption of classicists is based on the point that all men are free, rational, and equal and not one of them has any kind of rank priority and no earlier disabilities or any kind of superiority, but this ideal model does not resemble in any way in the real world, and even this fact has been accepted by classicists. If men are equally rational as given in this classical theory, then why do individuals violate the law at all? Criminals are to be treated equally, and no differentiation should be made on the basis of age, sex, or intelligence. The nature of crime has been given no importance in this classical theory, that is, whether the crime is felony or misdemeanor. Similarly, no importance is given to the type of criminal, for example, whether the criminal is a first-time offender or habitual or a professional offender. Explanation of the person's behavior is simply done according to the doctrine of "free will," and the principle of "utilitarianism" helps in suggesting the punishment which fundamentally studies crime in the abstract and lacks the scientific perspective in empirical and objective approach. Lastly, there is not a single provision for criminal acts that are justifiable.

### 13.3.2 Theory of Evolutionary Atavism

Cesare Lombroso, an Italian physician and professor of clinical psychiatry and criminal anthropology, propounded the theory of evolutionary atavism in 1876. He is also known as the "father of criminology." This theory is also called as the "theory of physical criminal type" or "theory of born criminals."

According to him:

1. Criminals represent a definite “born” type.
2. Identification of this type of criminal can be made by specific physical abnormalities or peculiarities such as presence of asymmetrical face, ears which are mainly larger than average, excessively lengthy arms, compressed nose, a pulled back forehead, feathery and crispy hair, apathy toward pain, defects of the eye, and other physical anomalies.
3. The stigmata are the symptom of atavism and not the cause of crime.
4. An individual who is the criminal type cannot abstain from commission of criminal acts unless he lives under exceptionally favored conditions.
5. Criminals differ from non-criminals not only in physical anomalies, but they can also be differentiated according to the type of crime they commit.

At first, Lombroso came out only with one type of criminals which were “the born criminals” given by Ferri, but later he classified the other two types of criminals which are:

- *Criminaloid or occasional criminals*: These types of criminals differ from born criminals solely in degree and who coddled in crime due to precipitating aspects in the environment, that is, if they have or got an opportunity for the commission of crime.
- *Criminals by passion*: These are criminals who are in complete dissimilarity when compared with born criminals in points of anxious and emotional perceptiveness and also in the criminal motives such as love or passion.

The main criticisms against this theory are:

1. Collection of facts by Lombroso was narrowed to organic factors, and he ignored the factors such as psychic and social.
2. The above method for describing the criminals was mainly descriptive.
3. The research samples taken by Lombroso were generally very small and were not representative as it was only taken from the population of prisons.
4. There is no use of sophisticated statistical analysis.
5. Operational definition of their terms was not always clear and concise.
6. Presence of logic science errors because of the assumption that institutionalized populations represented criminals.
7. The approach that was used while formulating this theory has no anticipating value because many who have the anomalies attribute to criminals, but that doesn't mean that they become criminals, and many of them who do not have these anomalies do become criminals.<sup>[4]</sup>

### 13.3.3 Differential Association Theory

Differential association theory was proposed by Edwin Sutherland in 1939 and elaborated in 1947. He believed that delinquency is a learned behavior just like

any other behavior. The theory indicates that individuals become predisposed toward criminality because of an excess of contacts that advocate criminal behavior. Due to these contacts, a person will tend to learn and accept values and attitudes that look more favorably on criminality.

His main thesis is that individuals encounter many inharmonious and inconsistent social influences in their lifetime, and many individuals become involved in contacts with the carriers of criminalistic norms and a consequence become criminals. He called this process “differential association.”

**Sutherland proposed nine propositions for the differential association theory:**

1. Criminal behavior is learned.
2. Learning of the criminal behavior occurs from interaction with other people through communication.
3. Within the intimate personal groups, learning of the criminal behavior occurs.
4. The learning of the criminal behavior includes:
  - Approaches of committing the crime, which are very easy
  - The particular cause of motives, drives, rationalizations, and perspective
5. The particular direction of motives is learned from definition of the legitimate code as favorable or unfavorable.
6. An individual turns into delinquent because of the presence of excess number of definitions favorable to breach of law over definitions unfavorable to breach of law.
7. Differential association may differ in frequency, period, priority, and severity.
8. The learning of criminal behavior by indulging with criminal and anti-criminal patterns includes all of the mechanisms that are present in any other learning.
9. Even though criminal behavior is a description of general needs and values, it is however not explained by those general needs and values since non-criminal behavior is an expression of the same needs and values.<sup>[5]</sup>

**The criticisms against differential association theory are:**

1. The theory was criticized, questioned, and claimed to be not testable by Sheldon Glueck.
2. There seemed to be a lack of reasons in theory proposed by Sutherland to explain acts of deviance that are not learned.
3. The ideas proposed by Sutherland seemed to be difficult to be put into action and evaluate quantitatively. Therefore, Akers and Burgess revised Sutherland’s theory in their theory of social learning theory.

### **13.3.4 Social Learning Theory**

Ronald Akers is an American criminologist known for social learning theory. According to him, in order to commit crime and gain the skills for commission,

individuals should develop motivation and associate with such people. Aker's social learning theory states that individuals, by observing and learning from the social factors present in their day-to-day lives, are able to learn the deviant behavior.

Robert Burgess and Ronald Akers in 1966 collaborated to revise Edwin H. Sutherland's differential association theory of criminal behavior. To show that discriminative cues activate the criminal behavior, Burgess and Akers cut down the nine propositions of Sutherland's theory to seven propositions which are as follows:

1. Learning of the criminal behavior occurs according to the principles of operant conditioning.
2. Learning of the criminal behavior occurs both in nonsocial and social situations.
3. The principal parts of learning happen in groups.
4. Criminal behavior is learned by including peculiar techniques and attitudes which is a purpose of the active and existing reinforcers and the existing reinforcement contingencies.
5. Behavior is reliant on the application of reinforcers which is based on norms.
6. Criminal behavior is a function of rules which are discriminatory for criminal behavior.

The forte of criminal behavior is dependent on the rate of recurrence and likelihood of its reinforcement.<sup>[6]</sup>

Social learning theory is also based on operant conditioning. Operant is a behavior that results in some consequences which have effect on future behavior. The theory is built on the postulation that the "primary learning mechanism is social behavior is operant (instrumental) conditioning in which behavior is shaped by the stimuli which follow, or are consequences of the behavior."

Direct conditioning and imitations of other are important in determining this behavior. Rewards or positive reinforcement as well as avoidance of punishment, or negative reinforcement, strengthens it. The determination of whether the behavior is deviant conforming depends on differential reinforcement, defined as "past and present rewards or punishments for the behavior and the rewards and punishment attached to alternative behavior."

These explanations help in reinforcing the behavior and serve as prompts for behavior. The more positive the explanations society have of a given action, the more expected they are to participate in it. These definitions are learned from peer groups and from family but also may come from schools and other groups.

### **13.3.5 Tarde's Imitation Theory**

This theory is formulated by Gabriel Tarde (1843–1904). He presented significant interest in social problems and countered Cesare Lombroso and the positivist school.

According to him, individuals are not "born criminal"; instead, they become criminal. He saw criminal conduct as the outcome mainly of social influences, a belief that establishes one of his greatest contributions in the field of criminology.



Social-process theory of criminal behavior given by “Tarde” is reflected in his belief that altogether, the “important aspects of social life are carried out under domination of example.” Upon this belief, he framed the “Theory of Imitation.” He described the method of attaining criminal and non-criminal behavior.

### 13.3.5.1 Developing Theory

Tarde distinguished between fashion and custom. Fashion is representative of imitation that occurs in crowds or cities where the interaction is close and regular. Custom can be described as the phenomenon that happens in small towns and rural areas where interaction is less close or frequent and variations are fewer. Fashion may uproot and create new custom.

Tarde also gave three laws of imitation which are:

- **First law of imitation:** *Men imitate one another in proportion as they are in close contact.*
- **Second law of imitation:** *Inferior imitates the superior.*  
Peasants replicate royalty; small-town and rural population imitate the acts of residents living in city. Tarde penned: “Infectious epidemics spread with air or the wind; epidemics of misconduct trail the line of telegraph.”
- **Third law of imitation:** *The law of insertion.*  
When two equally exclusive fashions come together, then one of the fashions can be replaced by the other. When this take place, then there is deterioration in the older method, and the newer method increases.<sup>[7]</sup>

### 13.3.6 Labelling Theory

This theory was propounded by Howard Becker in the year 1963 and is also known as “social reaction theory.” This theory does not explain or deal as to why a person became a criminal, but instead it throws a light on why a society labels some people as deviants or criminals. It also tries to explain criminal professions in relations of the damaging social communication and social interaction produced by stigma.

“Crime” and “Deviance” are always defined by social audiences, and Becker described those who make these social rules as moral entrepreneurs. Labelling a particular group as “outsiders” by social groups creates deviance. Individuals are given various kinds of social labels that define the individual as a whole. A person’s self-image is reduced by stigmatizing him or her by negative labels, and it is the social groups that create definition of negative and positive labels. Criminal behavior may actually be maintained and amplified by these labels.

So, this theory emphasized that labelling actually causes deviant behavior, and when an individual is labelled as “deviant,” he or she might conclude that this is the behavior that others might expect from them, and they end up becoming the same.<sup>[8]</sup>

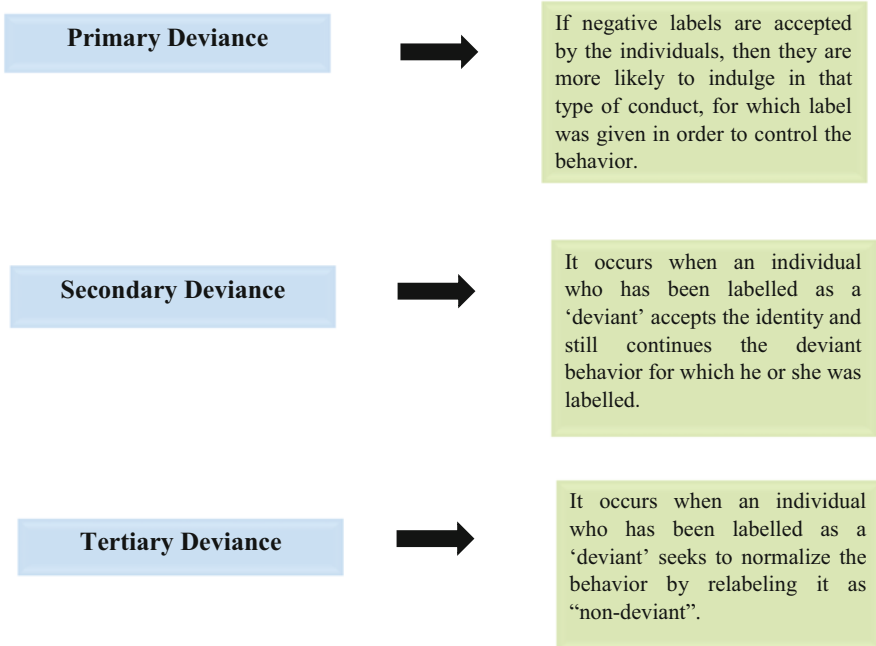
### 13.4 Stages of Labelling (Fig. 13.2)

There can be many consequences of labelling such as:

- Stigma is produced by labelling.
- Condemnation or degradation starts getting carried out in ceremonies like trials and media.
- The individual starts self-labelling which involves capitulating those defiance and characters which basically reflect upon how an individual is viewing himself or herself which is based upon how others see them.
- Few of the labelled individuals may also connect with cliques such as deviant cliques or other outcast peers.
- Labelling may also cause retrospective reading which means reassessing the past of a person in order to find the suitable or the current generalized label, and these labels often become a person's personal identity.

Research suggests that evidence supports the target of labelling specially for the poor and powerless people, and these people are victimized by law and system of

#### STAGES OF LABELLING



**Fig. 13.2** Three stages of labelling

justice. It has been seen that there is presence of contextual discriminations in the justice system. Empirical evidence supports those labels which are negative and which affect the self-perception of the person and often provide cumulative disadvantage thus provoking repeated behaviors.

Criticisms that are made against this theory are that it disregards the beginning of deviant behavior and is not even able to stipulate the condition which must occur previously to an act or if a person is labelled and that too negatively labelled. Along with this, it has been seen that this theory fails to explain the differences in rates of crime.<sup>[9]</sup>

### 13.4.1 Rational Choice Theory

The theory of rational choice states that a person makes a rational choice by using rational calculations and thus are able to achieve outcomes that are affiliated with their own particular objectives. An individual's best, self-interests are also related to such results. With the help of using the theory of rational choice, one can also predict what will be the end outcomes which can help in providing individuals with the finest benefits and satisfaction given the available alternative needs. Many economic assumptions that are mainstream and theories have supported the theory of rational choice. Rational choice theory is generally discussed and is mainly related to the notions of rational actors, the rationality postulation, and self-interest.

The theory of rational choice is based on the idea of participation from rational actors who are the people in an economy making rational choices or supportive of rational calculations and available rational information. Rational actors formulate the idea of rational choice theory and are what makes an effective rational choice theory. The theory of rational choice assumes that people are rational actors' information which is rational in order to actively take full advantage in any situation and therefore constantly try to minimize their losses.

Much of these ideas can be traced back to the economist Adam Smith. Smith, who wrote in the 1700s, tried to make sense out of how people come to make choices, especially economic ones. Rational choice theory has found its modern home in an article written by the Nobel Prize-winning economist Gary Becker (1968). As a part of broader studies to understand certain behaviors existing in society, economists may use the rationality assumption. The rationality assumption assumes that every person is likely to be rational actors making choices that are rational based on the theory of rational choice in order to understand what best results are there for themselves and their self-interests.

For instance, a good illustration of rational choice theory is white-collar crime. An investment banker chooses to skim money from the account of his clients and then skins the loss, and then the banker uses that cash to fund his/her lavish lifestyle. The criminal of white-collar crime premeditated and then weighs that choice of himself or herself. He then decides the personal advantage of stealing the money which overshadows any chance of theft being discovered by him or her.<sup>[10]</sup>

**Criticisms against the rational choice theory:** Several economists do not believe in the theory of rational choice. Dissidents have pointed out that people do not make rational utility-maximizing decision every time. For instance, the discipline of behavioral economics is built on the idea that people often make decisions which are irrational and explores why they do so. Nobel laureate Herbert Simon proposed the bounded rationality theory, which says that individuals are not always able to gain all the information they would need in order to make the best decision. Christopher Simms of Dalhousie University in Halifax, Canada, showed that when individuals are anxious, they mostly fail to make rational decisions. According to him, the theory has no scope of explanation for decision made by mentally challenged individuals.

For instance, political parties in favor of the Brexit vote was held on June 24, 2016. Promotional campaigns which were constructed on emotion rather than rational analysis were used.<sup>[11]</sup> These campaigns were semi-shocking, and the result of the vote was unexpected, when the European Union was officially left by the United Kingdom. The financial markets then responded with shock, which increased short-term volatility, as calculated by the CBOE Volatility Index (VIX).

### 13.4.2 Social Control Theory

This theory was propounded by Hirschi (1969) and is also known as the social bond theory. According to this theory, the delinquents fail to form or maintain a societal bond consisting of attachments, commitments, involvement, and belief. Everyone has the potential to violate the law. Sociologists apply the term “social control” to those mechanisms by which a normative social system is maintained by society. So social control basically means a control of society over individuals.

“Self-control” refers to a strong moral sense that prevents a person from hurting others and violating social norms. “Walter Reckless” argued that a strong self-image insulates an individual from criminogenic influences of the environment. Similarly, even “Howard Kaplan” suggested that young individuals or youths who have poor self-concept are likely to engage in criminal behavior.

There are many factors which suggest why a social control is necessary or needed to maintain an order which is a must for every society. A social control is also necessary in order to regulate an individual’s behavior and therefore establish social unity. This control also helps provide a social sanction and check cultural maladjustment. “Hirschi” also linked the onset of criminality to the weakening of the ties than to bind people to society thus establishing a social bond. His concept of social bond comprises four elements which are:

1. **Attachment:** It refers to the sensitivity and interest in others. Factors such as development and attachment with family, friends, co-workers, and the community make an individual sensitive, therefore increasing and strengthening the companionship.

2. **Commitment:** It basically refers to investing time, energy, and effort into the conventional activities. It is only rational for a person to be concerned with his or her self-respect. A person commits toward family, career, success, and future goals.
3. **Involvement:** When an individual is involved in activities like sports, school, and other recreational pursuits, he is less likely to be indulged in criminal actions. This happens because when a person devotes energy to a productive task, he or she reduces chance to offend.
4. **Belief:** It is moral respect for the law and social values. It is seen that people with strong and high moral values or belief in law are less expected to indulge in any sort of criminal activity. These beliefs are based on the constant social reinforcement. A fundamental understanding of right and wrong is very important in reducing such criminal activities. These beliefs include honesty, morality, fairness, patriotism, responsibility, etc.<sup>[3, 12]</sup>

Some of the arguments that have been made against this theory are that this theory was not able to explain all the modes of criminality and is therefore restricted in scope. Bonds do change over time, and not all elements of bonds are equal as well, that is, some of the individuals are much involved and still not attached. The major criticism that Hirschi's theory faced was the notion that delinquents are detached loners, but it is also seen that people with lots of connections also commit crimes (e.g., corporate crimes). Some individuals are very much attached to deviant groups, and therefore wrong direction of association might be calculated (Fig. 13.3).

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## 13.5 Personality Disorders and Criminal Behavior

Research suggests that rates of personality disorder are higher especially antisocial personality disorder which is found among individuals in correctional and forensic mental health settings when compared to the general community.

A deep-rooted relationship between personality disorder and violent reoffending that an occurrence of personality disorder has been included as a risk factor in tools calculating risk assessment.

The Hare Psychopathy Checklist-Revised (PCL-R) which is often used to check psychopathy which is a specific subtype of antisocial personality has become a well-established tool to predict danger of violent reoffending. It is very important to comprehend the relationship between personality disorder and offending in order to provide the correct treatment and to prevent future reoffending.

### Symptoms of Anti-social Personality Disorder

1. Indifference of right and wrongdoing
2. Persistent lying or trickery to exploit other people
3. Being callous, skeptical, and disrespectful to others
4. Using charisma or wit to deploy others for personal advantage or pleasure
5. Egotism, a sense of dominance and being awfully opinionated

<b>Theory</b>	<b>Propounder</b>	<b>Year</b>	<b>Main thesis the crime is result of</b>
<b>Classicist</b>	Beccaria	1764	Man's rational motivation Pleasure-pain principle
<b>Atavism theory</b>	Lombroso	1876	Physical stigmat
<b>Differential association theory</b>	Sutherland	1939	Association with & social influences of criminalistic norms.
<b>Social Learning Theory</b>	Ronald Akers	1966	Learning and observing through the presence of social factors.
<b>Tarde's imitation theory</b>	Gabriel Tarde	1843-1904	Criminal behavior is learned, people are not born criminals. They become criminals
<b>Labelling theory</b>	Howard Becker	1963	Labelling certain groups as 'deviants' or 'outsiders' by society may cause deviance.
<b>Rational choice theory</b>	Gary Becker	1968	People use rational objectives that are aligned with their personal benefit.
<b>Social control theory</b>	Hirschi	1969	Delinquents fail to maintain any form of societal bond.

**Fig. 13.3** Different theories and the cause of crime

6. Repeated problems with the law, as well as criminal behavior
7. Frequently violating the rights of others through pressure and deceitfulness
8. Impulsiveness or failure to plan ahead
9. Resentment, significant irritability, distress, aggression, or violence
10. Absence of empathy and lack of guilt about harming others
11. Taking unnecessary risk or risky behavior with no respect for the safety of self or others
12. Relationships that are abusive or poor
13. Failure to ponder on the negative consequences of behavior or to learn from them
14. Being constantly careless and frequently failing to accomplish work or financial commitments

Adults with antisocial personality disorder primarily show symptoms of conduct disorder before the age of 15.

Signs and symptoms of conduct disorder include serious behavioral problems such as:

1. Being aggressive toward people and animals
2. Causing damage or destruction to property
3. Deceitfulness
4. Theft
5. Serious violation of rules

People with antisocial personality disorder repeatedly violates the law and become criminals. Such individuals lie, conduct themselves abruptly or aggressively, and have problems with drug usage and alcohol. Due to the presence of these traits, such individuals are unable to fulfil responsibilities associated with family, work, or school.

Risk factors that are likely to increase the risk of antisocial personality disorder are:

1. Diagnosis of conduct disorder in childhood
2. Presence of antisocial personality disorder or other personality disorders or mental health disorders in family history
3. Being exposed to abuse or neglect during childhood
4. Not being stable or violent or chaotic family life in childhood <sup>[13]</sup>

Ways to avoid antisocial personality disorder from developing in individuals who are at risk are still not present, and it is assumed that this personality disorder has its roots in childhood. Early warning signs may be spot by parents, teachers, caregivers, and pediatricians. Early diagnosis may help children who show symptoms of conduct disorder be given early intervention to prevent them from becoming future offenders.

Many researches have proved that offending is related with personality disorder. It has been found out that rates of personality disorder are altogether high in serious criminals, but the part played by personality disorder could also be greater in some crimes than others, for instance, rapists compared with child molesters, men who murder their fathers instead of their mothers, men who murder their children with mothers who murder their children, and in less severe stalking behavior with those who get convictions.

The important point to be remembered here is that such researches are able to show a link between personality disorder and offending but show us nothing of the casual link. Any act of criminal behavior usually arises from interaction of various factors such as predisposing characteristics of individual, circumstantial factors, for instance, a physical and social context. <sup>[14]</sup>

Section 84 of the Indian Penal code deals with the act of a person of unsound mind: “Nothing is an offence which is done by a person who, at the time of doing it, by reason of unsoundness of mind, is incapable of knowing the nature of the act, or that he is doing what is either wrong or contrary to law.” <sup>[15]</sup>

This is a modification of the Mc Naghten’s rule. The burden of proof lies upon the suspect. He must prove in a court of law that he was of unsound mind at the time of doing the act. The degree of unsoundness must be such that he did not know the nature of his act, or he did not know that his actions were either wrong or contrary to law.

### 13.6 Intelligence and Offending

Intelligence has been found to predict wider range of antisocial and criminal behaviors including violent and chronic offending. Lesser people with profound intellectual disabilities commit many criminal acts since arts of crime assume mens rea; if they go into the justice system, they are probably diverted to mental health, intellectual disability, or forensic psychological state service system through the courts.

Many previous researches investigating the role of cognitive and affective empathy to behavior of offending found that the connection between low empathy and offending vanished after controlling intelligence and social economic rank (Jolliffe and Farrington 2004). It is done not to neglect the notion of empathy but relatively to understand the emotions of other people which could also be chief function of intelligence, which eventually links with criminal activities (Jolliffe and Farrington 2004). Roughly the research that has been done with the intention to look or point at the roots of offending behavior, predominantly juvenile delinquency which continues to spot at the origins of offending behavior, and more particularly juvenile delinquency that remains to spot the low IQ as a interpreter of the offending behavior (Diaz et al. 1994).<sup>[16]</sup>

Such people are protected under the Right of Persons with Disabilities Act, 2016. The Act substitutes the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995. It fulfils the requirements to the United Convention on the Rights of Persons with Disabilities (UNCRPD), to which India is a signatory. This Act came into power during December 2016. Disability has been well defined based on developing and dynamic concept. The types of disabilities have been increased from existing 7 to 21, and the Central Government will have the power to add more types of disabilities. The 21 disabilities are given below:

1. Blindness
2. Low vision
3. Leprosy-cured persons
4. Hearing impairment (deaf and hard of hearing)
5. Locomotor disability
6. Dwarfism
7. Intellectual disability
8. Mental illness
9. Autism spectrum disorder
10. Cerebral palsy
11. Muscular dystrophy
12. Chronic neurological conditions
13. Specific learning disabilities
14. Multiple sclerosis
15. Speech and language disability
16. Thalassemia
17. Hemophilia



18. Sickle cell disease
19. Multiple disabilities including deaf-blindness
20. Acid attack victim
21. Parkinson's disease

People with “benchmark disabilities” are defined as those certified to have at least 40 percent of the disabilities specified above.<sup>[17]</sup>

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### 13.7 Socioeconomic Factors and Crime

Crime accompanies social life from the very beginning and occurs in every society, in every stage of its development irrespective of its structure, system, or even period. Undoubtedly, crime may be a consequence or a result of many social and economic problems which constantly change.

Crime and changes within the structure of crime both suffer from such elements as the degree of economic development, socio-form of government that functions in a given country, the progress of industrialization and urbanization, transformations in social organization which are age related to members of the society, and eventually migrations. Transformations could also be administered during a revolutionary way or throughout an extended period of time. These changes can also happen rapidly because of some raging changeovers and sudden changes which can take place in a community.

Changes within the number related to the factors such as, sex, age, structure, migration (demographic changes), and even their shared impact associated with the economy, system of power, education, health protection, religion, and crime. Economic situations such as poverty may transform into criminal activities with the rise in unemployment. A very important point to be remembered is that unemployment is naturally associated with economy which may have a different dimension.

Unemployment can be further classified into structural, cyclical, long-term, and frictional unemployment. When individuals suffer from unemployment, due to the social and demographic factors like gender, age, or educational level, this could have various links and impact on offending activity.

Many analyses have been done on police statistics which depicts that the very best intensity of the criminal activity occurs among individuals of less than 30 years of age and unemployed. If a person is suffering from long-term unemployment, he then starts to suffer from results of such circumstances, namely, a way of segregation, prejudice, and eventually the lack of hope to find a source of income that is legitimate.<sup>[18]</sup>

Such study has shown that unemployment brings on crime against property instead of violence. Nevertheless, an important point to be noted here is that the rise in job loss in different ways may affect specific social groups by the increase or decrease in their criminal activity.

So, four specific relationships between unemployment and crime can be outlined which are:

1. Some perpetrators associate their legitimate work with their criminal activity. Legal occupation is then used as a cover-up for illegal activity or occupation. During this event, the case of unemployment may lessen the “gray zone” business, because the legitimate work during this situation gives a way of cover-up or security for carrying out the illegal or criminal activity.
2. There are variety of misconducts, probable to be conducted only during activities being employed legally, for instance, “Bribes are handed over to officials or higher authority, “employee theft.” In those cases, the number of crimes of abovementioned type will be inhibited by unemployment, instead of increasing them.
3. Children, especially differentiate between two choices which are either being employed legally or being involved in an unlawful activity. If there is shortage of job or work, then the will to require a revenue from the sources that are illegal could also be conclusive. Being unemployed, during this viewpoint, may cause a rise in illegal activity or a crime.
4. There are many individuals for whom unemployment is firmly associated with their style of living. This group of individuals treat with their style of living. This group of individuals treat legitimate occupation as a situation that is abnormal to those people who are not a part of the market. For such people circumstances such as shortage of employment is a component of their cultural individuality, and the illegitimate activity in their case is accepted socially as their source of income. When such situation happens, a rise in joblessness or unemployment will not have any effect on the development of criminal behavior.

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### **13.8 Investigative Techniques Used in Forensic Psychology**

The discipline of forensic psychology remains an early branch of industrial psychology within the early twenty-first century. It has been documented by the APA in 2001 and recertified in 2008. In 1991, Specialty Guidelines for Forensic Psychologists were accepted by the American Psychology of Law Society, APA Division 41. It makes use of different investigative techniques to detect deception. An important point to be kept in mind is that these techniques provide an aid to investigation but are not a substitute for the investigation. The forensic psychological evidences are used as corroborative evidences in the court of law.

The different forensic psychological techniques that will be discussed below are:

1. Polygraph
2. Narcoanalysis or narcosynthesis
3. Brain Electrical Oscillation Signature Profiling
4. Forensic hypnosis

### 13.8.1 Polygraph

Polygraph can be defined as a device that is used for recording of changes in blood pressure, pulse, respiration, and skin resistance as indication of emotional disturbances specially of lying when an individual is subjected under questioning. The word “polygraph” was derived from the word *poly* meaning “many” and *graphs* meaning “writing chart.” Therefore, polygraphy can be described as the scientific method of detecting deception, using a polygraph instrument. The polygraph is employed to check or question a person with the aim of detecting deception or verifying truth of statements through a visible, perpetual, and instantaneous recording of an individual’s cardiovascular and respiratory pattern as a minimum instrumentation obligation.

A polygraph (mentioned commonly as a lie detector) is a device which measures and records various physiological responses such as:

- Blood pressure
- Pulse
- Respiration
- Skin conductivity

These physiological measures are checked while the subject is asked and responds to a series of queries, on the idea that untruthful answers will produce distinguishing measurements.

The polygraph records physiological changes which are produced by the sympathetic nervous system while an individual is under questioning. Within the US federal government, a polygraph examination is also known as a psychophysiological detection of deception (PDD) examination. Other different technologies also are utilized in the sector of lie detection, but the polygraph machine is the one that is the most famous.

#### 13.8.1.1 History of the Polygraph

The notion that deceitfulness produces physical side effects has long been appealed. In West Africa, people who were accused of a criminal offense were compelled to pass an egg of a bird to at least one another. If an individual broke the egg, then the person was considered to be guilty, and this was supported by their thought that a person’s nervousness was responsible. In ancient China, the suspect was asked to hold a couple of rice in his or her mouth during a speech of prosecutor. Since it was believed that salivation ceases sometimes of emotional anxiety, the individual was considered guilty if the rice was dry by the end of the speech.

Cesare Lombroso (1895) employed the very first scientific instrument for detecting deception known as “hydrosphymograph,” which recorded the changes in pulse and blood pressure when accused were questioned about their participation of a specific offense.

“Pneumograph,” an instrument that graphically records the subject’s inhalation and exhalation to detect deception, was successfully developed by Vittorio Benussi.

He therefore demonstrated changes in breathing patterns that accompanied deception.

There was a research conducted by William Marston in 1917 which addressed the “sphygmomanometer,” which was accustomed to find periodic intermittent vital sign interpretations during the period of an examination. An instrument recording both blood pressure and galvanic skin response, it was invented by Dr. John A. Larson (1920) of the University of California, and it was first used by the Berkeley Police Department for the law enforcement work under its nationally well-known police chief August Vollmer. Additional work on this device was done by Leonarde Keeler.

The term “polygraph” for the first time was used by James Mackenzie in 1906 in his invention of the “ink polygraph,” which was used for medicinal reasons. A second paper was written by Mackenzie in 1915 on this topic in 1915, while he was finishing his undergraduate studies. He got admitted into Harvard School of Law and graduated in 1918, re-publishing his earlier done work in 1917.

According to their son, Marston’s wife, Elizabeth Holloway Marston, was also involved within the development of the systolic blood pressure test: “According to Marston’s son, it had been 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 isn’t listed as Marston’s collaborator in his early work, Lamb, Matte (1996), et al. refer directly and indirectly to Elizabeth’s work on her husband’s deception research. She also appears during a picture taken in his polygraph laboratory during 1920s (reproduced in Marston, 1938).”

A famous character of magazines which is “Wonder Woman” inspired by Elizabeth Marston was created by William Marston. Wonder Woman carries a magical rope which was modelled upon the test of systolic blood pressure. Although Elizabeth isn’t listed as Marston’s collaborator in his early work, Lamb, Matte (1996), et al. refer directly and indirectly to Elizabeth’s work on the research done on the deception by Marston. She also appeared during a photo taken in his polygraph laboratory during the 1920s (reproduced in Marston, 1938).

Despite the contributions made by predecessors, Marston was the self-proclaimed “father of the polygraph.” Marston remained a primary advocate of the instrument, petitioning for its use within the system of courts. He also published a book in 1938 entitled *The Lie Detector Test*, wherein he documented the knowledge and use of the polygraph. In the year 1938, he appeared in an advertisement produced by the Gillette company claiming that Gillette razors were better than the competition as shown by polygraph.<sup>[19]</sup>

There are two types of polygraphs – analog and computerized polygraph. Analog polygraphs are polygraphs shown in movies, which contained a single strip of scrolling paper scribbled by little needles, while computerized polygraphs have sophisticated algorithms and computer monitor replacing the scrolling paper.

### 13.8.1.2 Components of the Polygraph

**Cardio-sphygmograph:** It measures the blood pressure and heart rate of the subject. This is measured with the blood pressure cuff that is wrapped around the arm of subject. This cuff remains inflated when the subject is under questioning.

**Pneumograph:** It records the respiratory rate of the subject. This component of polygraph has two tubes, one of which is wrapped around the chest, and other tube is wrapped around the abdomen of the subject.

**Galvanograph:** The amount of perspiration produced is measured by this component of the polygraph. Galvanometers are electrical sensors which are attached to the fingertips of the subject. Galvanometers are attached to the fingertips because these are the areas which contain high density of sweat glands, which makes them a best location to measure the perspiration.

### 13.8.1.3 Principle Behind the Use of the Polygraph

The nervous system of the human body contains:

1. *Central nervous system (CNS)*
2. *Peripheral nervous system (PNS)*

The central nervous system contains the brain and spinal cord. It is referred to as central because it is involved in combining the information received from the entire body of an organism and then coordinating the activity. The peripheral nervous system contains all those nerves that lie outside the CNS. Its role is to basically connect the CNS to organs, limbs, and the skin.

The peripheral nervous system is further divided into:

1. **Somatic nervous system:** The primary role of this nervous system is to carry out the sensory and motor information to and from the central nervous system.
2. **Autonomic nervous system:** The autonomic nervous system is in control of regulating a variety of bodily processes that take place without conscious effort. It maintains blood pressure, controls breathing rate, influences digestion and urination, and modulates sexual arousal. The autonomic nervous system can be further divided into **sympathetic nervous system** and **parasympathetic nervous system**.

**Sympathetic Nervous System:** The neurons of this nervous system emerge from the thoracic and lumbar regions of the spine. The nervous system is typically activated when there's need for response to emergencies. The sympathetic division of the autonomic nervous system regulates the fight or flight responses by releasing neurotransmitters like epinephrine or norepinephrine. It basically controls the body's response to the perceived threat, and the body accelerates, tenses up, and becomes more alert. Contraction increases in the circulatory system, and thus heart rate increases. Bronchial tubes dilate in the pulmonary system. Muscles contract and pupils dilate. There is a decrease in stomach movement and secretions in the gastrointestinal system. Saliva production is also decreased in the salivary glands,

and the adrenal gland releases adrenaline. Glycogen to glucose conversion increases, and there's decrease in urinary output.

**Parasympathetic Nervous System:** The parasympathetic neurons are related to cranial and sacral regions. It helps in maintaining normal body functions and conserves physical resources. This branch of nervous system monitors the body's response while at rest and activates the response of rest and digest and neuron pathways are longer and slower. The parasympathetic nervous system basically counterbalances the general body response. Bronchial tubes constrict, and there is decrease in heart rate. The musculoskeletal system relaxes, and pupils constrict. Stomach movements increase, and there is increase in secretions of GIS; there is also increase in urinary output. The neurotransmitters released here are acetylcholine. The parasympathetic response is associated with enhancing growth and reproduction.<sup>[20]</sup>

#### 13.8.1.4 What Happens when We Are in Stress?

Stress is a response which can be either biological or psychological which is experienced on encountering a danger that we feel we do not have the resources to deal with. A stressor is a stimulus (or threat) that causes stress. Our body judges a circumstance and then decides whether or not the circumstance is stressful. This decision is formed supporting sensory input and processing of the information (i.e., the items we see and hear within the case) and also in stored memories (i.e., what happened the last time we were during a similar case). This stressor also can be physical within the sort of exertion and may even be emotional which may include fear, lie, anger, excitement, detection, etc.

If the case is referred to as being stressful, then the activation of hypothalamus is seen. The hypothalamus within the brain is responsible for the strain response. When a stress response is activated, it sends signals to two other structures: the pituitary and also the medulla.

The medulla is also activated by the hypothalamus. The medulla is a component of the ANS. The ANS is the region of the peripheral nervous system that acts as an effect system, maintaining homeostasis within the body. These activities are generally performed without conscious control. The hormone adrenaline is secreted by the medulla, and this hormone makes the body ready for a fight or flight response reflex including the increase in pulse rate.

Adrenaline causes stimulation of the sympathetic nervous system and decreased activity within the parasympathetic nervous system. It also causes bodily changes like decrease in digestion and increase in sweating, pulse rate, and blood pressure. Once the "danger" or "threat" is over, the parasympathetic branch takes control and brings the body back to a balanced state.<sup>[21]</sup>

### 13.9 Psychological and Physiological Symptoms of Guilt

**Sweating and change of color:** Anger is indicated by sweating along with the flushed face, embarrassment, or extreme nervousness. Shock of fear is indicated by sweating along with the facial pallor. Sweating of hands indicate tension. A pale face may be a more common guilt sign. Nervous tension causes reflex inhibition of secretion of saliva which causes dryness of the mouth, and because of this there is continuous swallowing and licking of the lips. On the account of the dryness of the throat apart from the mouth, the person will continuously swallow saliva from the mouth which causes frequent upward and downward movement of the Adam's apple.

**Fidgeting:** It is when the person is consistently moving within the chair, pulling his ears, rubbing his face, picking and tweaking of the nose, crossing or uncrossing the legs, touching the hair or eyebrows, rubbing his or her eyes, biting, or snapping of fingernails. These indicate that there is nervousness.

It has also be seen that a subject who is guilty frequently utters such expression—"I will die if I am lying," etc. Such statements are made to form powerful and substantial proclamation of innocence. Sometimes, the subject may very strongly proclaim that it is not possible for him to do anything like that since he is a religious man, and this is something that cannot be done by him.

The guilty subject doesn't wish to look right at the investigator or have a face-to-face interaction for distress that his guilt may see in his eyes. He will rather consider staring the ground or ceiling. The guilty subject sometimes will use the expression of "I don't remember anything like that" expression when responding to be elusive or to evade committing something prejudicial to him.

**Examination room:** Important points that should be kept in mind while conducting the test is that the examination room should be private and free from any sort of external noises or distractions. It should not contain any sort of decors like paintings or showpieces. The room should have good ventilation and should be properly lit. Only the polygraph desk and the subject's arm chair should be present, and there is no need of any sort of furniture. It is preferred to have a presence of one-way mirror along with the sound system so that the test can be monitored properly and precisely to the authorized audience.

**Test subject:** Before conducting the polygraph test on the subject, the examiner needs to examine whether the subject is fit for the test. If there is presence of any temporary illness or any sort of condition, for instance, sickness, pain, infection, any sort of physical discomfort, or mental exhaustion, or if the subject is under the effect of alcohol or any sedatives, then the test should not be conducted till the subject recovers his normal physical or mental condition.

A subject is considered unfit for the polygraph if there is presence of any permanent physical illnesses like certain conditions of the heart, respiratory problems, or addiction to any narcotic drugs. It should also be checked whether the subject has undergone any treatment before he or she was asked to undergo a polygraph test, as this may affect the results of the polygraph test. It is also seen that the subject may react falsely to the polygraph test or may even have a flat

emotionless chart if he or she has been under prolonged interrogation, and this is the reason why a person's daily habit should not be upset more than necessary.

### 13.9.1 Three Phases of the Examination or Polygraph Test

Before conducting the examination of the subject, the examiner also has an initial interview with the investigator to obtain the detailed and accurate information regarding the case and the subject, for instance, the details that only the investigator and the subject know, information regarding the crime scene, any past police records, result of any lab test, etc.

- (a) **Pre-test interview:** This is the initial and informal interview between the subject and the examiner which lasts for 20–30 min. The main purpose of this interview is to condition the subject psychologically for the test and to explain the purpose of it. It is necessary to tell the subject of his or her constitutional rights, and a free, voluntary consent is given by the subject for the conduction of test.
- (b) **Actual interview and recording of the test:** There are four approaches that are used while conducting the test. For all the approaches, some common things should be kept in mind: there should only be 12–15 number of questions that should be asked to the subject; three charts are at least taken; and each test should last not more than 4 min.
  - **Control question test:** Control Question test is also known as comparison question test. It was initially developed by Reid in 1947, and Backster further conceptualized it. This is the most common approach that is used in polygraph. CQT consists of five phases:
    - Pre-interview phase:** It is premeditated to obtain info about the accused and the crime scene. The examiner asks the subject some basic biographical information including information about physical and mental problems and discusses the accusations against the examinee.
    - Stimulation test:** Here it is proposed to persuade the examinee that the polygraph is able to detect the lie. The notion that polygraphs are 100% precise may supplement concern in a guilty suspect when answering questions related to the crime relevance. The card game is often used here. The subject is asked to pick up a playing card from a deck of cards to make note of it and then return it to deck. The polygrapher then shows the subject several cards and asks every time whether this is the card that the examinee has seen or not while the examiner examines the polygraph charts.
    - Formulating question phase:** Here, the examiner frames the questions that will be asked during the polygraph test and discusses with the subject. Here, three types of questions are asked. *Irrelevant or neutral questions* are general questions: Is your name Patrick? Do you live in the UK? Sequence typically contains three relevant and three probable



lie or control questions. *Control questions* deal with acts that are related to the crime under investigation but don't refer to the crime in question. For example: Have you ever stole anything in 10 years? *Relevant questions* are specific questions about the crime. For example: Did you take that watch?

**Test proper:** It is vital that subjects are not preoccupied during the polygraph test. Every and any distraction causes a change of physiological response that will be perceived by the polygraph and may influence results.

**Scoring phase:** It is the reading of charts of the polygraph, which can be done through approach that is global or numerical. The numerical method is an effort to score the charts systematically while reducing the effects of sources other than the polygraph charts in making of the decision. Comparisons are made between the reactions to the control and relevant questions. There are four possibilities. If there is no difference in physiological response, then a score of "0" will be given; if there is noticeable difference, a score of "1" will be aligned, and strong and dramatic differences are allocated with "2" and "3," respectively. If the reaction detected is stronger to the relevant question than the control question, a negative score (-1, -2, -3, -4) is given. If the observed reaction is weaker in comparison to the relevant question than the control question, a positive score (+1, +2, +3, +4) is assigned.

- **Directed lie test (DLT):** In this approach, directed lie questions substitute control questions that are standardized and can be questioned in any case. For example: In the early 15 years of life, have you ever lied? And before age 24, have you ever broken even one regulation? The examiner presents these directed lie questions by informing the subject that they are designed to see how the subject physiologically responds when he or she lies.

Subjects will be told to answer "NO" to the directed lie questions and to reason about such examples in which they did they tell a lie. The principle behind this is that Guilty Subjects are thought to be mostly concerned with relevant questions and are anticipated to show the strongest responses to these questions. Innocent subjects are believed to be most concerned about the directed lie test.

DLT is more standardized than CQT test and is believed to be 80% correct. This test is scored by the conventional 7-position scoring system used in the tests, with the total score being the sum across the three-examination parameter for each question on all charts which will finally tell us whether that person is hiding something or not.

- **Guilty knowledge test or concealed information test:** This test compares responses which are physiological on the multiple-choice-type questionnaire given about the scene of crime, one option of which contains knowledge only the investigator and the guilty subject would know about. The fundamental postulation of the GKT is that the right choice has a special meaning for the

knowledgeable subject only; thus, this subject will show more physiological response to the relevant answer. So, if a suspect's physiological responses to the relevant options are consistently greater than to the control options across a number of questions, information about the event is inferred. Here two types of items are taken:

*Critical items:* These are present one for each test. These items are options or choices that only guilty subject will notice, and the innocent subject will not have any idea regarding it.

*Irrelevant items:* These are present in five for each test and should be similar to the critical item but in plausibility.

The important and relevant pieces of information is known only to the investigators and persons involved in the crime, for instance, modus operandi used, specific actions that took place, or entry and exit point. Minimum number of keys that should be present are three, but four or more keys are preferred. There is decrease in false positive and increase in accuracy by adding a greater number of keys. Keys are randomly placed in the list of buffers except on the first slot. The first slot is like a neutral or sacrifice relevant. Questions are reviewed with the subject in random fashion and not the order they will be given on the test. First item is not scored as it is considered neutral. If the highest reaction is seen on the critical item, it gets a 2. If there is second highest reaction on the critical item, it gets score of 1. All others scores are 0. The number of tests is the recommended cutting score.

- **Relevant-irrelevant test:** The relevant-irrelevant test equivalences the examinee's responses to the questions that are relevant and irrelevant. A relevant question is one that deals with the issue under the investigation. These questions include asking whether the subject committed the target act or has any knowledge about the culprit and perhaps questions about actual pieces of evidence that would convict the guilty subject.

An irrelevant question is one that is fashioned to aggravate no emotion (e.g., "Is today Thursday?). Questions that are irrelevant are placed in the first position of list of questions because the responses that are physiological that trail the demonstration of the first question are assumed to have no diagnostic value. Guilty subjects are anticipated to show stronger reactions to relevant than to irrelevant questions; innocent subjects are expected to react similarly to both types of questions. So, if arousal (relevant) > arousal (irrelevant) = Lying [22, 23]

- (c) **Post-test interview:** This interview is taken after the polygraph test has been performed on the subject and is done to clarify the findings of the test and to know whether there is presence of any other explanations for the examinee to respond to relevant questions other than the information about the scene of the crime. This interview is also taken to obtain other information for the law administration purposes if the outcome of test suggests deception.

**Limitations of the polygraph test:** Even though it is a helpful investigation aid, it is never a substitute for any investigation. It is a lie detector, and not a

scientific diagnostic device. It does not determine facts, but only records answers to that which the subject knows to be true and is only as precise as the examiner is competent [24].

### 13.9.2 Narcoanalysis/Narcosynthesis

Narcoanalysis is derivative of a Greek word meaning “anesthesia.” “Horsley” coined this term. It is an analytical and cathartic method that uses drugs which are psychotropic in nature. This technique is used in forensic psychology for investigation purposes. Narcoanalysis is also sometimes known as truth serum or drug hypnosis or narco interview technique. The hypnosis is induced with barbiturates or other psychotropic drugs as a means of liberating repressed feelings. This method is effective in two ways, either as therapeutic or rehabilitative. Narcoanalysis cannot be performed on the subject below.

The history of narcoanalysis can be traced back in the 1990s where it first reached mainstream in 1922, when Robert House, a Texas obstetrician, used the drug scopolamine on two prisoners. Later in time, American Armed Forces and Intelligence Agencies sustained to research with Truth Drug mostly Barbiturate during and afterwar. It was then widely used in the 1940s. Marijuana was used as a truth serum by the Office of Strategic Service (OSS), a US government intelligence agency shaped during World War II.

**Objective behind the use of narcoanalysis:** The objective of the test is to excerpt information from the suspect when she/he is in hypnotic state, and the entire responsibility lies on the doctor along with the forensic psychologist. This test therefore helps extract masked information relevant to crime and helps in eradicating the innocent person.

The principle used in this test is that the imagination of subject is neutralized by making him semi-conscious. In the semi-conscious state, it becomes hard for the person to lie, and answers would be limited to facts she or he is already aware of. The answers are supposed to be unprompted as a semi-conscious individual is incapable to deploy the answers, and further efforts are made to obtain probative truth about the scene of crime. The test is conducted in the presence of a forensic psychologist, psychiatrist, physician, anesthetist, audio-videographer, and writer.<sup>[25]</sup>

#### Procedure of the Narcoanalysis Test

1. **Pre-test interview:** This interview is the same as the pre-test interview of the polygraph test where the subject is informed about the purpose and procedure of test and is appraised about his or her constitutional rights. The informed consent from the subject is taken.
2. **Pre-narcotic state:** In this stage of the interview, the anesthetist induces narco and maintains the pre-narcotic state through the interview. A drug with 5% or 10% solution of sodium pentothal is injected gradually in the antecubital vein NMT 1gm/grain per minute till the person appears relaxed and in a state of good contact. When the individual’s speech starts overrunning, the interview begins.

3. **Semi-narcotic state:** In this phase, the subject appears to be flushed and decelerating and with slurred speech. The interview is then facilitated by the forensic psychologist and psychiatrist. The subject is allowed to sleep and then awakened. Once the subject wakes up, the anesthetist checks the subject, and he or she is then allowed to drink tea or coffee. The entire narco-interview is audio- and video-recorded.
4. **Post-test interview:** It is done to clarify any additional findings, and the subject is told about what he or she has spoken during the interview [26].

On the 5th of May 2010, the Supreme Court of India decided the following point with respect to narcoanalysis which was Article 20(3) of the Indian Constitution: *No person accused of any offence shall be compelled to be a witness against himself.* The result of the test cannot be acknowledged as an evidence if they have been attained through the use of compulsion.<sup>[27]</sup>

### 13.9.3 Brain Electrical Oscillation Signature Profiling

It is a new technique used in the area of forensic psychology which provides information on the action committed by the subject rather than detecting deception in the statements of the subject. It is basically an EEG technique by which a subject's participation on the scene of the crime is detected by eliciting electrophysiological responses.

BEOS is a forensic investigatory tool for signature extraction of electrical oscillation from the background of electrical activity of the brain of an individual by presenting probes. This electrical signature contains reference to "Experiential knowledge" in individual to an act executed by the individual which is stated in form of "probe." It is a noninvasive, memory-based test with a high degree of sensitivity which makes it a reliable technique.

The methodology was developed by C. R. Mukund, a [neuroscientist](#), former professor, and head of the Department of Clinical Psychology at the National Institute of Mental Health and Neurosciences (NHIMAS) in Bangalore (India). He worked on the project "Normative Data for Brain Electrical Activation Profiling" granted to DFS (Gandhinagar) by the Technology Information Forecasting and Assessment Council (TIFAC), Ministry of Science and Technology, Government of India. His work is built on studies that were previously done by other researchers including J. Peter Rosenfeld, Lawrence Farwell, and Emanuel Donchin.<sup>[28]</sup>

**Principle:** This forensic investigatory tool is based on collective principles of encoding, storage, and memory retrieval from the brain. The process of encoding occurs only when the person is involved in the participation of the particular event or action. This action can be later recalled in any point of time but is dependent on the efforts which are voluntary and intentional, which would eventually trigger the remembrance of the event. BEOS is therefore based on the principle that an individual who has participated in the vent or in the execution of the events will

show responses when presented cues known as “probes” representing personally acquired knowledge of the event in form of “experiential knowledge.”

### 13.9.3.1 Important Points in BEOS Profiling

**Experiential knowledge:** It is made up of:

- **Sensory-motor information:** It consists of a combination of sensory information and motor acts and responses. Sensory information is acquired through recognition of external and internal situations, for example, eyes detecting light and colors or ears detecting sound waves.
- **Motor acts and responses:** On the other hand, motor acts and responses consist of motor activities which are influenced by the mixing of conscious and unconscious experience. A characteristic feature of emotions is change of psychomotor activities.
- **Proprioceptive information:** “Proprioception” or “kinesthesia is mainly a sense of self-movement and position of the body. It is sometimes also referred to as the “sixth sense.” Proprioception focuses on the awareness of the body and its movement and behaviors. This information is cognitive, while kinesthetic information is more behavioral. The signals of proprioception have an influence directly on an experiential fabric which is then constituted by an individual’s emotional awareness.
- **Emotional experience:** Events or experiences that have an emotional arousal are derived from greater vividness and clarity than past events without emotional loading. Presence of emotions enhances consolidation as well as extraction of the routine information. Since every experience has a relation with emotion, these psychological states of emotions can be described with specific names such as flight and fear, anger, sadness, happiness, etc. Every emotion is linked with specific mental state and behavioral experiences.<sup>[29, 30]</sup>

### 13.9.3.2 Difference between Knowing and Remembrance

Knowing	Remembrance
<ul style="list-style-type: none"> <li>• It refers to recognition of familiarity, e.g., “I know Patrick”</li> </ul>	<ul style="list-style-type: none"> <li>• It is the recall of episodic and autobiographic details of an individual’s life, e.g., “I saw Patrick on MG road”</li> </ul>
<ul style="list-style-type: none"> <li>• This can only occur when an individual intentionally recalls or is in the presence of external cues</li> </ul>	<ul style="list-style-type: none"> <li>• Remembrance only occurs when it is cued by stimulus and is automatic</li> </ul>
<ul style="list-style-type: none"> <li>• Brain areas involved: dorso-frontal cortex</li> </ul>	<ul style="list-style-type: none"> <li>• Brain areas involved: ACC, ventral brain, medial temporal cortex, and orbitofrontal cortex</li> </ul>
<ul style="list-style-type: none"> <li>• It is mainly the process of sharing information with others</li> <li>• Memory used here is only for the knowledge that is conceptual</li> </ul>	<ul style="list-style-type: none"> <li>• It occurs because of autobiographic episodes and experiences that produce EK</li> <li>• It is related to recalling of events in life which are autobiographic episodes and information with reference to time and space</li> </ul>

<b>Category 1</b>	<b>Neutral probes</b>	These probes are used for detecting the semantic processing of the subject. Eg: Monkey jumps, $2+2 = 4$
<b>Category 2</b>	<b>Control Probes</b>	These are the events confirmed by both, that is the subject as well as the investigator. Eg: occupation, marriage etc.
<b>Category 3</b>	<b>Target-A probes</b>	Events that are thought to be committed by the suspect according to the investigator.
<b>Category 4</b>	<b>Target- B probes</b>	Events that occurred according to the version of the suspect, which the investigator doesn't agree with.

**Fig. 13.4** Categories of the probe

**Probes:** The probes induce the psychological state alike to the state an individual had at the time of occurrence of events. There are four types of probes that are used to trigger remembrance (Fig. 13.4):

### Principle of Probes

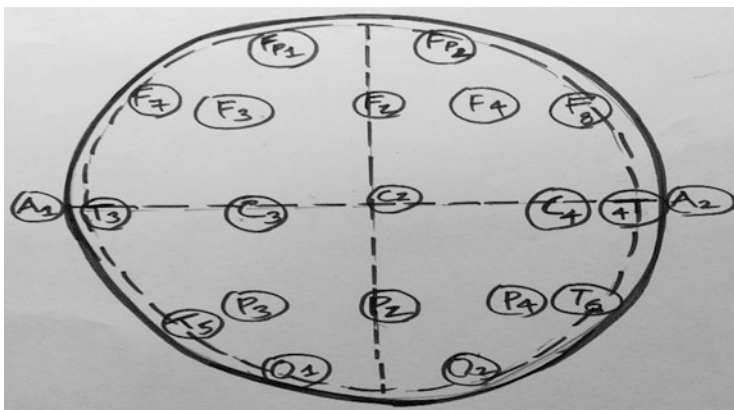
1. Deciding the scenarios.
2. Designing probes for each scenario approx. for 60–70 min.
3. Probes are sequentially arranged.
4. Length of the sentence (5–6 s).
5. Probe should contain up to seven words.
6. What each probe can indicate.
7. Deciding the codes for every probe based on the effect of its cuing.
8. Response of the brain is in 10 s; the maximum length of the probe is 3.5 s<sup>[31]</sup>
9. Total epoch length = 10 s (duration of pre-probe epoch is 3 s and probe epoch, 7 s).

### Neuropsychological Principles for Designing the Probe

- Sequence of events
- Sequence of components of events
- Sequence of actions and fixing contextual specificity of actions and experiences
- Description of components of events
- Sequence and description of perceptual components
- Description of emotional arousal
- Verbalization of actions, perceptions, emotions, and intentions

### Stages of BEOS Profiling

1. Interview the investigator and the subject.
2. Designing probes and scenarios.
3. Probe recording and event markers for different scenarios and presentation schedule of probes.
4. Familiarize the subject or suspect with scenarios and probes.
5. Probe recording is done using the VASP (visual and auditory stimulus package) in the computer.



**Fig. 13.5** 10–20 system of EEG electrode placement

6. Familiarize the subject with instructions details of the test which includes asking the subject to stay calm with closed eyes and listening to probe alertly as he or she will be later on asked to recall the probes. The subject is asked not to respond to any of the probes. The subject is also instructed to inform the examiner if there is a need to pause the test. Instructions are also given for the posture and position of the head.
7. Obtain the written informed consent of the subject (Fig. 13.5).

**Data analysis:** An automated analysis is carried out by the system which produces an automated report in form of PDF. The report contains the list of probes, ID of probe used, and result derived by the analysis of program. The number of probes which produced experiential knowledge and other results are calculated from each of this report for additional statistical analysis [32].

### 13.9.4 Forensic Hypnosis

Hypnosis can be well defined as change of consciousness and concentration in which the individual displays a sharp state of suggestibility with the awareness being maintained. Forensic hypnosis is the use of hypnosis in the process of investigation and can be used in both civil and criminal cases.

#### 13.9.4.1 Session of Forensic Hypnosis

When the subject enters the room, right then and there, audio and video taping of the session begins. The hypnotist initially greets the subject which is an informal meeting. After this, pre-session interview which is the initial interview commences where the subject's personal information is taken. The hypnotist also explains about the hypnosis and steps of its conduction. Memory of event before conducting hypnosis is recorded. The next step is induction which means that the subject is

made to relax. The next step is to clarify all the details and findings while the subject is under hypnosis or to ask any additional questions. Once the hypnosis session comes to an end, the subject is brought out from hypnosis. The audio and video recording of subject are stopped once the subject leaves.

**Reasons as to why hypnosis is not admissible in court:**

- Hypnosis lacks the general scientific acceptance and reliability in differentiating truth from false statements.
- There is always a possibility that the subject who is hypnotized can deliberately fabricate the statements or can pretend to be hypnotized.
- The panorama that the hypnotized subject in his or her heightened state of suggestibility can produce the distortion of the fact.
- The whole process of hypnosis is dependent on the skill and state of mind of the examiner, and that is too subjective to permit the admissibility of hypnosis [33].

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### **13.10 Different Roles of the Forensic Psychologist**

There are many roles that a forensic psychologist can play apart from just working with the forensic investigating tools. The forensic psychologist also plays a significant role in defining whether the defendant is competent to stand trial, that is, whether the defendant is able to understand and comprehend the process of legal proceedings that are charged against him and if he is able to cooperate efficiently with his defense counsel. These professionals are able to narrow down the list of possible suspects and therefore help in solving criminal cases by deducing the role of the suspect, witness, and accused in crime with the help of various psychological aids.

The forensic psychologist plays the role of expert witness which means reformulating the findings of psychological report into the legal language of court, thereby providing information to the legal personnel in such a manner that is easily understood by him or her.

Clinical assessments of suspects, witness, or accused are very important since these assessments help in evaluating the individual's past, present, and future psychological status which in turn can also be used as legal fact finder to aid a variety of law setting.

Sometimes, forensic psychologists are appointed by the court to assess the state of mind of the defendant's and to assess the criminal responsibility at the time of offence. These professionals may also be called to provide sentencing recommendations or any other knowledge requested by the judge, for instance, information regarding mitigating factors, assessing future risks, and evaluating credibility of the witness.

Forensic professionals can also work in criminal or family law and also civil cases like cases of child custody, deciding guardianship, or even settling land disputes. The field of forensic psychology can be very beneficial in preventing crimes as well;



professionals in this field may be called upon to provide rehabilitation of convicts and help them become law-abiding citizens.

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