Interdisciplinary I

Teaching Material

Prepared by:

Philipos petros

&

Samuel Mitikie

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INTERDISCIPLINARY I

INTRODUCTION

This course, Interdisciplinary I, deals with two major specialist areas of focus: psychology for lawyers and forensic science. It has strong interface with other courses including law of persons, family law, constitutional law, law of evidence, criminal law, etc. Hence this should be considered in the process of dealing with this tantalizing course. Throughout the course, we will examine the various aspects of human psychology and forensic science with the context of legal system's basic assumptions, principles, approaches and procedures in light of empirical, social and scientific evidence and perspectives.

This teaching material, which should be handled by a team of lecturers (psychology/social psychology, forensic science, those trained in interdisciplinary study I, etc) focuses on the conceptual, theoretical and methodological frameworks and practical aspects of human psychology and forensic science. It covers the subject matters, importance, theories, principles and approaches of psychology and forensic science for law students.

The material contains two parts with thirteen chapters. The first part of the material deals with psychology by focusing on the subject matter, key concepts, sub-fields, theories, research methods and relevance of dealing with psychology for lawyers. The second part deals with the principles, methodologies/techniques and importance of forensic sciences.

Part one covers the first six chapters. Chapter one deals with the meaning, goals, concerns, historical development, sub-fields, perspectives and research methods of psychology. Chapter two is concerned with social psychology, aspects, dimensions and relationship between attitude and behavior, attribution and social influence. The third chapter deals with the forensic psychology and law, including legal and criminal psychology; psychology and psychiatry relating to offenders, victims, criminal

responsibility, insanity and civil incapacity. Chapter four is concerned with the aspects of personality and human development including parenting styles, personality traits and structures. The fifth chapter covers the concept, theories of learning, memory, forgetting, aspects of motivation and emotions. Abnormal psychology that deals with anti-social behavior/maladjustment problems and the management aspects is covered under chapter six.

The second part of the material has seven chapters where it starts from the seventh chapter. This chapter deals with the concept and concerns of Forensic Science; chapter eight focuses on Forensic Science and Evidences. Chapter nine covers Fingerprint and DNA Evidences. Chapter ten deals with**,** Ballistics and Trace Evidences The eleventh chapter on the other hand covers Blood and other Body Fluid Evidences. Chapter twelve deals with Arson and Explosive Evidences whilst the thirteenth chapter covers Medico legal aspects of Death and Toxicology.

In sum, this material provides you with the knowledge and skills pertaining to the aspects of psychology and forensic sciences so as to make you more capable in dealing with multitude of problems related to behavioral and personality disorders that have legal concerns.

OBJECTIVES OF THE COURSE

After being through this course, the students will be able to:

- define psychology and forensic science;
- know the principles, perspectives and approaches/methods of psychology and forensic science;
- define behavior, attitude, thought, personality, motivation, emotion, personality and their disorders;
- know the importance and contributions of psychology and forensic science for lawyers;
- differentiate between forensic psychology and criminal /legal/ psychology;
- know the interaction between the fields of psychology, forensic science and law;

- give expert advice on cases relating to disorders in behavior, motivation, emotion, personality, thought; mental illness, etc… to the law enforcement and other relevant institutions and settings,
- resolve personal and social maladjustment problems ,
- give forensic evidence and advice to the concerned organ of social institutions including the court, judges, etc

PART I. PSYCHOLOGY FOR LAWYERS

Unlike other animals, because of our imagination, conscience, we human beings (*social animals*) like to know how and why people act the way they act. Alternatively, most of us want to understand why people do what they do. We would simply wish to know or understand others. We attempt to predict and some times monitor or control what this person or that person is doing now or will do next. We human beings are not only concerned about others but also ourselves as individuals. We often ask questions like (to mention only few):

- "Who are we?"
- "What is our character?"
- "What is our personality?"
- " What is our behavior?"
- "What is our attitude?"
- "How do you think globalization, culture, economic recession and financial crises affect human behavior?"
- "What is the key concern of psychology (social psychology)?"
- "Why some people are deviant while others not?"
- "Why some individuals commit crime while others not?"

Whenever we find ourselves beyond our understanding and control(*might be due to emotional feelings, irrational beliefs, thoughts, perceptions, negative attitudes,…),* we commonly tend to attribute them to some sort of possessions and magic. A more systematic body of knowledge and methods has emerged recently to provide us with a framework towards an accurate and reliable understanding of

ourselves and others. This body of knowledge and approaches is known as psychology.

CHAPTER ONE: SUBJECT MATTER OF PSYCHOLOGY

This chapter covers and presents the subject matter of psychology, perspectives and methods. It gives due attention to:

- the meaning, features and concerns, goals and development;
- sub-fields/specializations of psychology;
- relationship between psychology and law;
- the importance/utility/ of psychology for lawyers;
- theoretical perspectives, and
- research methods used in psychology.

OBJECTIVES:

Up on completion of this chapter, students will be able to:

- define psychology and related concepts including behavior, attitude, personality, emotion, motive, imagination, perception, etc;
- know the concerns, features and goals of psychology;
- know the roots, development and theoretical perspectives of psychology;
- acquaint themselves with the major research methods in psychology;
- describe sub-fields of psychology;
- explain the relationship between psychology, sociology and law;
- apply their knowledge of theories and research methods by writing short essays on relevant practical cases ;
- explain the importance of psychology in dealing with the legal issues and concerns.

Basic Questions

1. What is psychology (give narrow and broad definitions)?
2. Why do you think psychologists study animal behavior?
3. Describe the concerns and features of psychology.
4. What are the basic goals of psychology?
5. Discuss how globalization, culture, financial crises and inflations affect the aspects of human behavior.

6. Differentiate between the ‘old’ and ‘modern’ perspectives of psychology.
7. Discuss the major research methods in psychology.
8. Compare and contrast the major sub-fields of psychology.
9. Explain the relationship between psychology and law.
10. Describe the importance of psychology for lawyers.

1.1. MEANING, CONCERNS , GOALS AND HISTORICAL DEVELOPMENT

1.1.1. THE MEANING OF PSYCHOLOGY

Different scholars define psychology differently. Thus defining psychology is not as such an easy task. Throughout the history of psychology, there have been a lot of controversies among psychologists themselves concerning its very nature and about its focus as the science. Because of these reasons, there were common senses and misconceptions like “every body is a psychologist by him/her self per se.”

The meaning of the word psychology derived from two Greek words (1) Psyche- meaning “mind” or “soul/life/spirit”, and (2) Logos/Logy meant “study/knowledge/discourse”. Therefore, the term ‘psychology’ simply refers to the study of the mind, soul/spirit/life and it is often represented by Ψ, the Greek letter **psy** (‘**sy’**) [Baron, 1996; Feldman, 1997; Morgan, King, Weisz & Schoper, 1996].

However, currently the definition of psychology has been revised as:
“the scientific study of human and animal behavior.”
“systematic study of behavior and mental processes, the physiological processes underlying thinking, motives, emotions, attitudes and personality.”
The above broader definitions consist of two important issues:

(i) what psychology studies(i.e., its subject matter)- the subject matter of psychology is mind, behavior and physiological processes, and
(ii) how psychology studies behavior(i.e., its methods or approaches)-psychology uses the scientific methods in investigating its fields of study.

The scientific study implies the use of research methods such as observation and experimentation to gather information about human behavior, personality and cognition and then achieve the goals of psychology.

Why Do You Think Psychologists Study Animal Behavior?

Most social scientists contend that human beings are social animals. Their justification is that human beings always socialize through interaction and learning. What makes however human beings different from animals is their imagination, critical and logical thinking, capacity of memory, intelligence and habits, duties and responsibilities, customs, morals and values, rational thinking and acting. Psychologists often conduct scientific research (experimental study) on animal behavior which might sometimes be related to the behavior of human beings. In addition, putting human being in a natural laboratory setup, critically investigating the variables/attributes associated with behavior, and using them as experimental animals is very difficult and even sometimes unethical. Thus, psychologists study animal behavior in the laboratory and use their findings for inductive/deductive reasoning.

Example:
Vicarious attitudes and behaviors of the following animals are often related to that of some individuals. These animals include peacock, donkey, giraffe, snake, chameleon, mouse, cat, lion, and the like. Students are encouraged to mention some of the vicarious attitudes, characters and behaviors of these animals by relating it with the behavior of some persons whom they know through social interactions and daily life.

Human behavior is influenced or affected (positively or negatively) by multitude of attributes and factors, which could be internal or external factors. Among those internal factors, the major ones include natural or biological factors. Whilst, external factors include culture, globalization, environment, technology, developmental and economic factors like poverty, unemployment, inflation, financial and stock market crises as well as management approaches and leadership styles determine are the most common factors that affect behavior (normal or abnormal or good or bad aspects of human behavior).

1.1.2. CONCERNS AND FEATURES OF PSYCHOLOGY

- Psychology is one of fields of social sciences or behavioral sciences concerned particularly with the investigation of individual behavior- mainly vicarious/overt behaviors and often with hidden/covert behaviors. Usually, its questions are individual related: Why do individuals behave the way they do?
- Psychology is positive science, soft science and helping profession that deals with ameliorating psychosocial and maladjustment problems of individuals.
- Psychology often relies on scientific approach for the assessment of individual behavior with social contexts.
- Psychology is *useful*, *interesting* and *tantalizing* science because it deals with something we already know and live on it but not well aware of it(unconsciously), it explores human mind(which has more than 100 billion neurons, has both destructive and constructive aspects) and related to human thoughts, feelings, beliefs, attitudes, perceptions, personality and behavior.

1.1.3. GOALS OF PSYCHOLOGY

The study of psychology has five basic goals:

1. Describe – The first goal is to observe behavior and describe it, often in minute detail, what was observed as objectively as possible.

2. Explain – While descriptions come from observable data, psychologists must go beyond what is obvious and explain their observations. In other words, why did the subject do what he or she did?

3. Predict – Once we know what happens, and why it happens, we can begin to speculate what will happen in the future. There's an old saying, which very often holds true: "the best predictor of future behavior is past behavior."

4. Control – Once we know what happens, why it happens and what is likely to happen in the future, we can excerpt control over it. In other words, if we know you choose abusive partners because your father was abusive, we can assume you will choose another abusive partner, and can therefore intervene to change this negative behavior. Not only do psychologists attempt to control behavior, they want to do so in

a positive manner, they want to *improve* a person's life, not make it worse. This is not always the case, but it should always be the intention.

5. Change/Management of abnormal behavior. We have said that psychology is positive science & helping profession, thus psychologists are involved in managing and changing negative or anti-social aspects of behaviors and maladjustment problems through psychological approaches/therapies (e.g. psychotherapy, counseling, clinic psychology, forensic psychology, etcetera).

Historical development

It is well known that learning about the rise of scientific disciplines is fundamental in dealing with academic disciplines. Therefore, to appreciate the nature of psychology today, you must know its origin and history.

- Psychology was first coined in the 16th century as the study of "soul" or "spirit" but emerged as a science of mental life in 1879 with the opening of the first psychological laboratory in Europe. Credit for the establishment of psychology as a science usually goes to Wilhelm Wundt [VIL-helm-voont), who formally founded this first laboratory in 1879, in Leipzig, Germany. Thus until the 19th century, psychology was not a formal independent discipline of behavior. Of course most of the great thinkers of history raised questions that today would be called psychological. For instance, the early Greek philosophers Socrates and Aristotle urged us to know ourselves, to use logic to make inferences about mind, and to systematically observe behavior. It was Aristotle who argued that an empirical approach, rather than dialogue, was the best route to knowledge. Direct observation remains an important dimension of psychology today.
- For centuries, philosophers enjoyed arguing and debating questions like these: How do we acquire knowledge? Does information come to us through our senses and our experiences with the environment, or is it born? However, these scholars of the past did not rely heavily on empirical evidence. Often, their observations were based simply on anecdotes or descriptions of individual cases.
- Although such speculation fueled a great deal of intellectual passion, it didn't yield much in the way of concrete answers. It wasn't until the 19th century, in Germany, that psychology emerged as a science.

- With Wundt Psychology began as the science of mental life. His focus was on understanding mental processes, focusing on inner sensations, feelings and thoughts. Until the 1920's, psychology remained as the science of mental life.
- From 1920's to 1960's, American psychologists led by *J.B. Watson* refined psychology as the science of observable behavior. They focused only on observable and measurable behavior. After the 1960's, psychology is considered to be concerned both with mental processes and outer behavior.
- During the first decades of psychology's existence as a formal discipline, psychologists came to hold quite different views about the nature of the mind and the best ways to study it.
- About the same time fundamental questions were raised about what should be studied in Psychology: should psychology be the study of the mind, should it study behavior, or should both mind and behavior be included?
- Different influential psychologists of the time held quite different views on the nature of mind and the proper subject matter for psychology.

[Baron, 1996; Feldman, 1997; Morgan, King, Weisz & Schoper, 1996].

There are two important ideas that were rooted from philosophy and relevant for the rise of psychology in the modern era: *Empiricism* (the view that knowledge can be gathered through careful observation, which is also known as seeing the aspects of behavior through the eye the *BODY*; and *Rationalism* (the view that knowledge can be gained through logic and careful reasoning, also known as 'seeing the aspects of behavior through the *eye* of *MIND*). Some scholars also consider religion as part of the roots of psychology and narrowly speaking, psychology deals with the study of spirit and mysticism as seeing the aspects of behaviors through the *eye* of *SPIRIT.*

Activity 1.

Dear instructor, allow 15 minutes.

Direction: Write short notes on the meaning, features and basic goals of psychology.

Comment: Answering the above question should help students broadly define the concept and understand the features and basic goals of psychology.

1.2. SUB-FIELDS OF PSYCHOLOGY

The study and practice of psychology encompasses a vast range of topics and a large number of subfields, and specialty areas have developed as a result. Because human mind is so dynamic and human behavior is so varied, the number of subfields in psychology is constantly growing and evolving.

Generally speaking, psychology can be roughly divided into two major sections: *research*, which seeks to increase our knowledge base-known as academic field of specialization, and *practice*, through which our knowledge is applied to solving problems in the real world-known as professional field of specialization. Both the *academic and professional* fields/*specializations* complement each other. Each field of specialization is further divided into sub-fields, which in turn, contains sub-sub fields. For example, a psychologist specializing in the field of forensic aspect or sensation and perception might be interested in the sub-field of vision (sub-field of color vision, eyewitness,..). Because psychology touches on a number of other subjects including biology, philosophy, anthropology, and sociology, new areas of research and practice are continually forming. Some of these subfields have been firmly established as areas of interest, and many colleges and universities offer courses and degree programs in these topics[Bernstein, Douglas A et al, 1994; Baron, 1996; Morgan, King, Weisz & Schoper, 1996].

1.2.1. ACADEMIC FIELDS OF SPECIALIZATIONS

- Experimental psychology: the largest field of academic specialization mainly concerned with the laboratory research on the basic psychological processes including perception, learning, memory, thinking, language, motivation and emotion.
- Biopsychology: study biological base of behavior and mental process (its subject matter is the biological base of behavior). It deals with how nervous, biological and physiological makeup and functions/dysfunctions affect human behavior(positively or negatively).

- Comparative psychology: studies the similarities and differences in the psychology, behaviors and abilities of animals including human beings. Comparative psychologists study motives related to eating, sexual behavior, drinking, and aggression, courtship, mating and parenting.
- Personality psychology: concerned with differences in behavior among individuals. This field seeks answers to such questions as: are our personalities determined more by nature or by nurture? And to what extent do people behave consistently from one situation to another?
- Developmental psychology**:** studies the factors responsible for physical (motor), cognitive (thought & knowledge), and social changes across the life span of the person. Developmental psychology is the study of growth and maturation of an individual from conception to death, i. e. the study of human development from life to death (more comprehensive than educational or other sub specializations).The main argument of developmental psychology is that "as age changes, human behavior changes." Thus the developmental psychologists study mental, physical and social development of humans over the entire life span including parenting styles and skills. Child psychology, the study of children's behavior, comprises a large part of developmental psychology. But, developmental changes also occur in adolescence, adulthood, and old age; and so the study of these changes is also a part of developmental psychology.

- Social psychology: studies the effects of people have on one another, factors affecting interpersonal attraction, the problems of "groupthink", social pressure, social influence, in making important decisions,, and the reasons why people are often all too willing to harm the other human beings. Social psychology is the scientific study of all aspects of social behavior, attitude and thoughts.

Generally speaking, social psychologists study the way we affect and are influenced by other people, both in groups and in intimate relationships. This focus covers a wide range of possible interests. For example, it includes the study of the ways in which we perceive other people and how those perceptions affect our

behavior toward them. Similarly, it involves concerted efforts to understand the determinants of interpersonal influences and of attitude change. Thus, social psychologists might study how perceptual stereotypes affect interactions or how the decisions of a committee member are influenced by what others on the committee do or say. Social psychologists focus on the behavior of individuals from societal point of views. We will learn more about social psychology in the second unit.

Question: Why do you think Ato X killed Ato or Wrt/Wro Y? Why do you think *Ato. Yiberta*, *Wrt. Siti*, *Ato Ashebir* comit pickpocketing and burglary?

1.2.2. PROFESSIONAL FIELDS OF SPECIALIZATIONS

- Educational Psychology: It is a sub-specialization of psychology that deals with studying educational systems, methods of teaching, curricula, and other factors influencing the teaching-learning process. Educational psychology is thus concerned with the learning behaviors and experiences of an individual from birth to old age. Educational psychology may include school psychology, but educational psychologists as such are usually involved with more general, less immediate problems than are most school psychologists or school counselors. Educational psychologists are especially concerned with increasing the efficiency of learning in school by applying their psychological knowledge about learning and motivation to the curriculum.

- School Psychology: Much of the school psychologist's job consists of diagnosing learning difficulties and trying to remedy them. Using tests and information gained from consultations with the students and his parents, the school psychologist tries to pinpoint the problem and suggest action to correct it. For instance, a school psychologist might suggest that a poor reader be assigned to a remedial reading class. Other school psychologists are involved in vocational and other forms of counseling. These are the school counselors.

- Clinical Psychology: Clinical psychology is a branch of psychology involving the assessment and treatment of those with psychological /mental disorders. Clinical psychologists assess and treat mental, emotional, and behavioral disorders. These range from short-term crises, such as difficulties resulting from anxiety, minor depression, stress, emotional disturbances, to more severe, chronic conditions such as schizophrenia, mania or psychosis. A wide range of psychological difficulties may be dealt with, including anxiety, depression, relationship problems, learning disabilities and serious mental illness. To assess a client, a clinical psychologist may undertake a clinical assessment using a variety of methods including psychometric tests, interviews and direct observation of behavior. Their effort aims to reduce psychological distress, maladjustment problems, enhance/promote psychological well-being and reducing aggression. They are trained to do psychotherapy with highly disturbed people, as well as with those who are simply troubled or unhappy or who want to learn to handle their problems better. Clinical Psychologists typically do four or five years training of graduate work in psychology, plus at least a year's internship under the direction of a practicing psychologist.

People often confuse clinical psychologist with three other terms: psychotherapist, psychoanalyst, and psychiatrist. But these terms mean different things.

- Counseling Psychology:

Counseling psychologists are concerned with "normal" problems of adjustment that most of us face sooner or later, such as choosing a career or coping with marital or sexual problems. They deal with countless personal problems that do not involve psychological disorders. A number of counseling psychologists try to help people who are having problems with; family living; these are marriage and family counselors.

Counseling psychology deals with personal problems not classified as illness, such as academic, social, emotional, personality or vocational problems of individuals, usually applied in non-medical settings. It focuses on helping individuals solve their psychological problems that did not stem from serious mental disorders. The practice of counseling psychology requires a high level of self-awareness and competence in relating the skills and knowledge of personal and interpersonal dynamics to the

therapeutic context. Example-counseling for career development, effective interpersonal skill development, HIV & AIDS counseling, grief and bereavement counseling, marital counseling, sexual therapy counseling, rape victim counseling, etc.

- Forensic Psychology:

What is forensic psychology? Although there is continued debate on the accuracy of its definition, forensic psychology is generally defined as a sub-field of psychology that deals with the legal aspects of human behavior and mind function focusing on deviance, delinquency and crime. In some literature, forensic psychology is equated with legal psychology, criminal psychology and psychology of law. We will learn more about these and forensic psychology in the third unit of this course.

- Abnormal Psychology:

Abnormal psychology involves the diagnosis of mental malfunctioning and maladjustment problems such as anxiety, depression, schizophrenia, frustration, conflict, phobia, sexual disorder, etc. Abnormal psychology and its various aspects including the management of psychological disorders will be dealt in the 6th unit of the first part of this course.

- Health Psychology:

Health psychology is one of the most commonly used sub-specialization of psychology concerned with investigating the effect of emotions, cognitions, attitudes and human behaviors on preventing physical illness, maintaining good health, and responding to medical problems. It is the study of how psychological factors influence the origin, prevention, and treatment of physical illness in the process of health service delivery system. Health psychologists believe that our own beliefs, thoughts, personality, emotions, attitudes and behaviors might contribute significantly to the onset or prevention of illness, lead us to anti-social or deviant behaviors or prevents us from such behaviors.

- Industrial/Organizational/Occupational psychology:

Industrial psychology is often used interchangeably with organizational psychology or occupational psychology. In some instances, it is equated with managerial psychology (yet the two are different concepts). This field of specialization of psychology considers the relationship between people, their behavior, their jobs and working/organizational environment with the context of effective and efficient productivity and performances. It is concerned with the performance of people at work in training, how organizations function and how individuals and small groups behave at work. The aim is to increase the effectiveness of the organization, and to improve the job satisfaction of the individual. Industrial/Occupational psychologists often work for large companies including public sector institutions, management training centers and for consultancy companies, and NGOs. These specialists study people's behavior in the workplace and they often work alongside other professionals such as managers, trade union representatives, training officers and specialist staff from the firm or industry concerned. In some instances, management psychology is also related to industrial/organizational psychology focusing on efficient leadership and change management linking it with the issues of motivation and reinforcements principles. Some key areas of focus: They address the problems of training personnel, improving working conditions, and studying working effects of automation on humans. The primary concern of industrial//occupational or organizational psychologists is to make-work as pleasant and productive as possible. They apply psychology to problems of management and employee training, to supervision of personnel, to improving communication with in the organization, to counseling the employees, and to alleviate industrial strife.

The following professional disciplines have very close relationship with the vast majority of professional sub-fields of psychology:

• Psychiatry is not a branch of psychology but related to it in various aspects. Psychiatry is a branch of medicine dealing with the diagnosis and treatment of mental disorders or the application of the healing art and science to mental diseases. A psychiatrist is a medical doctor who has done 3 to 4 years of residency training in psychiatry, the medical specialty concerned with mental disorders, maladjustment, and

abnormal behavior. During the residency period, a psychiatrist learns to diagnose and treat mental disorders under the supervision of more experienced physicians.

- A psychoanalyst is a person who practices/ uses the particular psychotherapeutic techniques, which originated with Sigmund Freud and his followers. Anyone who has the training to use these techniques can be a psychoanalyst. Psychiatrists and clinical psychologists do similar work, but psychiatrists, because of their medical training, tend to focus on possible biological causes of mental disorders and to treat these problems with medication. Psychiatrists can write prescriptions, whereas clinical psychologists most of the time cannot. In most cases, psychiatrists are untrained in current psychological theories, principles and methods.

Activity 2.

1. *Compare and contrast forensic and industrial psychology. Allow 15 minutes*
2. *In the table below you are given the two broad field of specialization in psychology (column 1). In column 2, you have a list of the sub-fields, found in the two broad specialist areas. Complete the table by providing information about the application of each sub-field in column 3 and indicate whether or not the sub-fields are relevant to your field of study/work in column 4.*

Comment: Answering these questions should help students understand the scope of psychologists' specializations in a host of different areas within the field and identify themselves by many different labels.

NO	Broad fields(1)	Sub-fields of specialization(2)	Application of sub-field(3)	Relevance of the sub-field to your own field of study/work(4)		
1	**Academic Specialization**	1.1. Experimental Psychology		Yes	No	How, if Yes,
		1.2. Biopsychology				
		1.3.Comparative Psychology				
		1.4 Developmental Psychology				
		1.5Personality Psychology				
		1.6 Social Psychology				
2	**Professional Specialization**	2.1Clinical Psychology				
		2.2. Counseling Psychology				
		2.3 Forensic Psychology				
		2.4. Educational psychology				
		2.5 School Psychology				
		2.6. Industrial/occupational Psychology				
		2.7 Health Psychology				
		2.8 Environmental Psychology				
		2.9. Child Psychology				
		2.10. Geriatric Psychology				
		2.11 Engineering Psychology				
		2.12 Sports Psychology				

1.3. PERSPECTIVES AND RESEARCH METHODS IN PSYCHOLOGY

1.3. 1. Perspectives/Theories of Psychology

What is a theory or perspective?
In this material, theory, school of thought and perspectives are used interchangeably.
Theory or perspective is tentative ideas or statements or testable hypothesis. Theory gives a general insight about the issue under consideration; it might also lead to or provokes research. It could be accepted, rejected or modified after empirical study/ research. Thus theory has interaction and relationship with research.

To appreciate the importance and differences among the psychological schools of thoughts/theories/ perspectives, we want you to think how each perspective might explain your classmates or instructors' classroom behavior. Let us assume that your instructor of Interdisciplinary I is usually "happy" or "witty" person, smiling, cracking jokes and complementing students on their brilliant insights. Why do you think your instructor or classmate behaves the way he/she does?

Generally speaking, there are two broader perspectives/theories/schools of thoughts about psychology or human behavior:
(A) Old (early) Schools of Thoughts, and
(B) Modern Schools of Thoughts/perspectives about behavior.

1.3.1.1. EARLY PERSPECTIVES /SCHOOLS OF PSYCHOLOGY

Scholars described multitude of 'old' or early theories/perspectives of psychology. However, we shall focus on the following five theories that are important for understanding the modern theories and other units of the course.

I. STRUCTURALISM

- Wundt developed the first widely accepted school of thought known as structuralism. Structuralism is an early view suggesting that psychology should focus on conscious experiences, analyzing experience in to its basic parts (structures). He said that "the task of psychology is analyzing conscious experiences, sensations, feelings, etc. Structuralists underscored the importance of dealing with the three levels/elements of the human mind development: the unconscious, the semi-conscious & the conscious levels".

What is the difference between consciousness and unconsciousness?

Consciousness is an awareness of the thoughts, images, sensation and emotions that flow through the mind at a given time. Consciousness is regarded to comprise qualities such as subjectivity, self-awareness, sentience, sapience, and the ability to perceive the relationship between oneself and one's environment. It is a subject of much research in philosophy of mind, psychology, neuroscience, and cognitive science. Consciousness depends on the brain's ability to integrate information. In common parlance, consciousness denotes being awake and responsive to one's environment; this contrast with being asleep or being in a coma.

Unconsciousness, more appropriately referred to as loss of consciousness or lack of consciousness, is a dramatic alteration of mental state that involves complete or near-complete lack of responsiveness to people and other environmental stimuli. Being in a comatose state or coma is an illustration of unconsciousness. Fainting due to a drop in blood pressure and a decrease of the oxygen supply to the brain is an illustration of a temporary loss of consciousness. Loss of consciousness must not be confused with altered states of consciousness, such as delirium (when the person is confused and only partially responsive to the environment), normal sleep, hypnosis, and other altered states in which the person responds to stimuli. Loss of consciousness should not be confused with the

notion of the psychoanalytic unconscious or cognitive processes (e.g., implicit cognition) that take place outside of awareness. Loss of consciousness may occur as the result of traumatic brain injury, brain hypoxia (e.g., due to a brain infarction or cardiac arrest), severe poisoning with drugs that depress the activity of the central nervous system (e.g., alcohol and other hypnotic or sedative drugs), severe fatigue, and other causes.

In jurisprudence, unconsciousness may entitle the criminal defendant to the defense of automatism, an excusing condition which allows a defendant to argue that they should not be held criminally liable for what would otherwise have been actions or omissions which broke the law. Courts are called upon to consider whether "falling asleep" (especially while driving or during any other safety-critical activity) can be an acceptable defense because natural sleep rarely overcomes an ordinary person without warning; however incidents related to epileptic seizures, neurological dysfunctions and sleepwalking may be considered acceptable excusing conditions because the loss of control may not be foreseeable. For a detailed discussion, see automatism (case law). On the other hand, someone who is less than fully conscious cannot give consent to anything. This is relevant in the case of sexual behavior (not allowed with such a person), and also in the case of a patient giving informed consent with regard to starting or stopping a treatment, and euthanasia. In many countries, Paramedics must legally obtain consent from a conscious casualty during an emergency before they can assume patient care. If consent is denied, the service provider can legally do nothing. In the situation where the casualty is unconscious, in most cases, the provider can assume patient care under the legal assumption of implied consent.

II. FUNCTIONALISM

William James, one of the major founders of functionalism, focused on how and why the mind functions than on its structure. Functionalism is an early view of psychology suggesting that psychology should study “the ways in which the ever-changing stream of conscious experience helps us adapt to a complex and challenging world.” According to the functionalists, the mind is always changing so it is important to understand how it functions, and how it helps us adapt a complex world. Human behavior is dynamic because of the mind is changing.”

III. GESTALT PSYCHOLOGY

This school of psychology was founded in Germany in the early 20th century by Max Wertheimer, who led the school of thought, and his colleagues Kurt Koffka and Wolfgang Kohler. The German word **gestalt** refers to form, whole, configuration or pattern. Accordingly, the Gestalts maintained that the mind should be thought of as resulting from the whole pattern of sensory activity and the relationships and organizations with in this pattern.

Gestalt psychology (also Gestalt theory of the Berlin School) is a theory of mind and brain that proposes that the operational principle of the brain is holistic, parallel, and analog, with self-organizing tendencies; or, that the whole is greater than the sum of its parts. The classic Gestalt example is a soap bubble, whose spherical shape is not defined by a rigid template, or a mathematical formula, but rather it emerges spontaneously by the parallel action of surface tension acting at all points in the surface simultaneously. This is in contrast to the "atomistic" principle of operation of the digital computer, where every computation is broken down into a sequence of simple steps, each of which is computed independently of the problem as a whole. The Gestalt effect refers to the form-forming capability of our senses, particularly with respect to the visual recognition of figures and whole forms instead of just a collection of simple lines and curves.

In some scholarly communities (e.g., cognitive psychology, computational neuroscience), Gestalt theories of perception are criticized for being *descriptive* rather than *explanatory* in nature. For this reason, Gestalt principles are viewed by some as redundant or uninformative. In other fields (eg. perceptual psychology and visual display design), Gestalt principles continue to be used and discussed today, which asserts that “the whole is different from the sum of its parts”

In brief, the Gestalts acknowledged and held that the whole is the sum of its parts, a view that had a particular impact on the study of perception. Their goal was to understand the phenomenon of conscious experience in holistic terms and their subject matter was subjective experience with emphasis on perception, memory and thinking (in order to understand the pattern of human behavior, it is also important to recall the

four quadrants of personality /relationship as well: mental, physical, spiritual and emotional.

Gestalts psychology also influenced the field of social psychology and public management and development studies (e.g. leadership, conflict resolution, etc).

IV. BEHAVIORISM

J B Watson, the founder and pioneer of behaviorism, and other proponents including E. Thorndike and B.F. Skinner. John B. Watson (1878-1958),moved psychology away from studying the contents of the mind to studying only observable behavior, an approach known as behaviorism. Behaviorism meant "watching human actions or behaviors to discover facts". He founded an approach that dominated the field of psychology (behaviorism) until well into the 20th century.

According to Watson, who led behaviorism, behavior is "a way of acting" and there are two major types of behaviors: overt and covert behavior. Psychologists should study only observable behavior (he calls overt behavior) than covert behavior. He argued "we can't see 'mind' or 'conscious experience', all we can observe is an overt behavior. And people can't report accurately what goes on in their 'minds' Overt behavior is the only thing we can observe or measure scientifically, so that should be the focus of psychology".

V. PSYCHOANALYSIS

Psychoanalysis was developed in Vienna in the 1890s by Sigmund Freud, a neurologist interested in finding an effective treatment for patients with neurotic or hysterical symptoms. Psychoanalytic theory is a general term for approaches to psychoanalysis which attempt to provide a conceptual framework more-or-less independent of clinical practice rather than based on empirical analysis of clinical cases.

Pioneered and led by Sigmund Freud (1856-1939), psychoanalysis comprises several interlocking theories concerning the functioning of the mind. The term also refers to a specific type of treatment in which the "analysand" (analytic patient) brings up material, including free associations, fantacies, and dreams, from which the patient

with the assistance of the analyst attempts to infer the unconscious basis for the patient's symptoms and character problems and to use this insight to resolve the problems. Unconscious functioning was first described by Sigmund Freud, who modified his theories several times over a period of almost 50 years of attempting to treat patients who suffered with mental problems. The analyst listens carefully, formulates, and then intervenes to attempt to help the patient develop insight into unconscious factors causing the problems. The specifics of the analyst's interventions typically include confronting and clarifying the patient's pathological defenses, wishes and guilt. Through the analysis of resistance (unconscious barriers to treatment), and transference to the analyst of expectations, psychoanalysis aims to unearth wishes and emotions from prior unresolved conflicts, in order to help the patient perceive and resolve lingering problems.

Sigmund Freud became convinced that many of his patients' symptoms had mental, not bodily causes. Their distress, he concluded, was due to conflicts and emotional traumas that had occurred in early childhood and that were too threatening to be remembered consciously.

Freud argued that conscious awareness is merely the tip of the mental iceberg. Beneath the visible tip, lies the unconscious part of the mind, containing hidden wishes, passions, guilty secrets, unspeakable yearnings, and conflicts between desire and duty. We are not aware of our unconscious urges and thoughts as we go blithely about our daily business, yet they make themselves known- in dreams(whether dream cost or benefit, whether true or not, we don't plan for dream), slips of the tongue, apparent accidents, and even jokes. According to psychoanalysts, people don't plan for dreaming; the interpretations and meanings of dream vary with situations and person. Freud for instance argued that for some individuals dream might have important role in giving clues to act or not to act; gives hope and helps to plan for future while for others it might lead to stressful and hopeless situations of life.

Freud's ideas evolved into a broad theory of personality and a method of psychotherapy, both of which became known as Psychoanalysis- stresses on the

influence of unconscious fears, desires, and motivations on thoughts, behaviors, and the development of personality traits and psychological problems.

According to S. Freud, all human behaviors-whether normal or abnormal,… is influenced by psychological motives, often ones of which we are unaware. This belief is known as psychic determinism, which explains misstatements, popularly known as "Freudian Slips," like *that of the radio announcer who began a **bread** commercial by saying "for the **breast** in bed… I mean, for the **best** in **bread**…,"*

We will learn more about psychoanalysis in the 6th unit of the material.

The early schools differed in the following ways:

- In their objective of study (the conscious mind, the unconscious mind or overt behavior);
- In their goal of study(analyzing the contents of the mind, observing the effects of environment on behavior); and
- In their method of study.

1.3.1.2. MODERN PERSPECTIVES /SCHOOLS /OF PSYCHOLOGY

While a few different schools of thought dominated the early years of psychology, the number of topics studied by psychologists has grown dramatically since the early 1960s. Today, few psychologists identify their outlook according to a particular school of thought. While you may still find some pure behaviorists or psychoanalysts, the majority of psychologists instead categorize their work according to their specialty area and perspective.

Every topic in psychology can be looked at in a number of different ways. For example, let's consider the subject of aggression. Someone who emphasizes a biological perspective would look at the how the brain and nervous system impact aggressive behavior. A professional who stresses a behavioral perspective would look at how environmental variables reinforce aggressive actions.

Another psychologist who utilizes a cross-cultural approach might consider how cultural and social influences contribute to aggressive or violent behavior.

Modern psychologists tend to examine human nature through several lenses that predominate psychology today include the biological, learning, cognitive, socio-cultural, psychodynamic and humanistic perspectives. These lenses reflect different questions about human behavior and different assumptions about how the mind works, and different kinds of explanations why people do what they do.

The following are just a few of the major perspectives in modern psychology.

1). The Neurobiological/Bio-psychological Perspective

This area of psychology is known by a number of titles including behavioral neuroscience, psychobiology, and neuro-psychology. Bio-psychologists study the relationship between the brain and behavior, such as how the brain and nervous system impact our thoughts, feeling, moods, personality, and the aspects of behavior. This field can be thought of as a combination of basic psychology and neuroscience. *This perspective focuses on how bodily events/ functioning of the body affect behavior, feelings and thoughts (*this perspective emphasizes the physical and biological bases of behavior). *Psychologists have long recognized this fact and generally agree that understanding these biological roots is an essential component of the field (e.g hunger, sexual arousal/behavior, dream, anxiety, emotionality..,)*

2) The Learning Perspective / The Social Learning Theory /

The learning perspective is concerned with *how the social environment affects the person's behaviors/actions*. With in this perspective behaviorists focus on the environmental conditions (the rewards and punishers) that maintain/discourage specific behaviors. Social Learning Theorists believe that people learn not only by adapting their behavior to the *environment*, but also by imitating others and by thinking about the events happening around them. In other words, these theorists believe that behavior is determined not only by its own controlling environmental

conditions, but also by how thought processes modify the impact of environment on behavior.

3) The Cognitive Perspective

This perspective studies mental processes such as memory, thinking, problem solving, language, and decision-making. Influenced by psychologists such as Jean Piaget and Albert Bandura, this perspective has grown tremendously in recent decades. It mainly emphasizes the mental processes: how we direct our attention, how perceive, how we remember, and how we think and solve problems. One of this perspective's most important contributions has been to show how people's thoughts and explanations affect their actions, feelings and choices.

4) The Socio-cultural Perspective(also known as Cross-cultural perspective)

Cross-cultural psychology is a fairly recent perspective that has grown significantly in recent years. These psychologists and researchers look at human behavior across different cultures-both *tangible*/material and *intangible*/non-material aspects of cultures. By looking at these differences, we can learn more about how our culture influences our thinking and behavior.

It focuses on social and cultural forces outside the individual. It emphasizes that society, culture and gender are essential to understanding behavior, thought and emotion. Most of us underestimate the impact of other people/group affiliations, and cultural rules on our behavior (people usually take social influence for granted).

Advocators of social influence contend that "We, human beings, are like fish that are unaware they live in water; so obvious is water in their lives." Socio-cultural psychologists study the water- the social and cultural environment that people "swim" in everyday. Within this perspective, social psychologists focus on social rules and roles, how groups affect attitudes and behavior, why people obey authority, and how other people(spouses, lovers, friends, bosses, parents and stranger) affect each of us.

5) The Psychodynamic Perspective

This perspective emphasizes the unconscious aspects of the mind, conflict between biological instincts and society's demands, and early family experiences. It deals with unconscious dynamics within the individual, such as inner forces, conflicts, or instinctual energy. The perspective has its origins in Freud's theory of psychoanalysis. Psychodynamic psychologists try to dig below the surface of a person's behavior to get to its unconscious motives; they think of themselves as archaeologists of the mind.

6) The Humanistic perspective **(** or Eclectic perspective)

According to this theory/perspective, human behavior, in the humanists view (Carl Rogers and Abraham Maslow), is not completely determined by either unconscious dynamics or the environment but his/her *free-will*. They stress a person's capability for personal growth, freedom to choose their destiny and positive qualities.The goal of humanist psychology was to help people express themselves creatively and achieve their full potential. Many perhaps most, are eclectic, applying in their research/practice what they believe to be the best features of diverse schools of thought. This theory emphasezes that " each individual has great freedom in directing his/her future, a large capacity for personal growth and development, and a considerable amount of intrinsic worth, and enormous potential for self-fulfillment."

7) The Evolutionary Perspective

This theory deals with the "Nature- Nurture Controversy" of human behavior. Does behavior stem from the inherited (biological/genetic) tendencies or experience/environment/learning/acquired tendencies?

The major question and still debated by many scholars is **"**Is it Nature or Nurture that dominate and influence human behavior *most*?" The answer is both nature and nurture determine behavior. It needs scientific investigation to explore which of these factors predominantly determine human behavior. However, some scholars argued that *nurture* dominates behavior whilst others contend that nature (gene) is the major determinant of behavior (Baron, 1996, Morgan, et al, 1999, Feldman, 1997).

Generally speaking, evolutionary perspective focuses on the study of how evolution explains physiological processes. Evolutionary psychologists and researchers take the basic principles of evolution, including natural selection, and apply them to psychological phenomena. This perspective suggests that these mental processes exist because they serve an evolutionary purpose – they aid in survival and reproduction.

8) Personality Theory

Sigmund Freud is the pioneer and predominant advocate of personality and personality theory. However, other scholars like Anna Freud and Alfred Adler, Eric Erikson, Abraham Maslow, J. Piaget, etc also contributed to the development of this theory. According to S. Freud, " individual's feelings, motivations, behavior, need vary with age… example, feeling of helplessness during childhood lead to an inferiority complex…,however, through positive social interactions, one can overcome the inferiority complex." Alfred Adler, on the other hand, contend that individual's personality and behavior pattern can be understood through social forces, and relationship to one's work and sex"

Concentrating on psychological theories still leaves us with a considerable range of different approaches to deal with. The theories to be outlined are illustrative of psychological approaches. They also constitute a useful body of theory for any forensic and criminal psychologist since they reflect the range of levels of theory from the biological to the social. Since the theories maybe associated with more than one level of psychological theorizing, Table 1.1 lists examples of some theories and the types of psychology they reflect. The classifications, on occasion, may be disputed, but it can be seen that as we move down the table the analysis tends to be more social.

At the start of the table, the theories are much more biological in nature. Also, it should be clear that some theories are practically confined to a particular type of psychology (e.g. the biological only for the first two) but others such as Eysenck's theory, especially, involves several different types of psychology.

Table 1.1 Some theories of crime and the types of psychology they involve

Theory	*Biological*	*Psychoanalytic*	*Cognitive*	*Individual*	*Learning*	*Social*

				differences		
Neuropsychological	✓	×	×	×	×	×
Xyy	✓	×	×	×	×	×
Intelligence	✓	×	✓	✓	×	×
Bowlby's attachment	✓	✓	×	×	×	✓
Addiction model	×	×	✓	✓	×	×
Eysenck's biosocial	✓	×	×	✓	✓	✓
Learning theory	×	×	×	×	✓	✓
Social constructionism	×	×	×	×	×	✓

(http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*).

Activity 3.

1. *Differentiate between the early perspectives of psychology*
2. *Compare and contrast the modern theories of psychology.*

1.3.2 RESEARCH METHODS IN PSYCHOLOGY

Somewhere in this lecture note, we have already mentioned that psychology is not an absolute science and is often referred to as a 'Soft Science.' This is because it deals with human thoughts, feelings, and behavior, and as we are all aware, human behaviors are not always static, predictable and reliable. Instead, we interact with our environment in ways that alter how we behave, how we think, and how we feel.

Research is the process of collecting, analyzing, interpreting and documenting information or data. Research in psychology mainly uses data on human feelings, beliefs, thoughts, attitudes, needs, perception, and related factors influencing human behaviors

Generally speaking, there are two categories and approaches or methods: quantitative and qualitative research methods. The former mainly focuses on measurable, quantitative data, facts and evidences while the latter focuses on qualitative data or information. However, there is no as such perfect method; each method has its own

weakness and strength. Thus, to cope with these challenges, a researcher is advised to use mixed method, known as *triangulation*, very common in social sciences.

Basically, there are two major types of research (1) Action or problem solving research, also known as operational research; and (2) Basic research which deals with gathering and interpreting basic information, including data on the various aspects of human behaviors. Both action and basic research could be used together in order to achieve the intended purpose of the research.

Research in psychology mainly helps us to gather empirical evidences and facts ; test hypotheses or assumptions or theories ;understand and know what makes people think, feel, and act in certain ways; allows us to categorize psychological disorders in order to understand the symptoms and impact on the individual and society; helps us to understand how intimate relationships affect us as individuals and as a society; and helps us to develop effective treatments to improve the quality of life of individuals and groups.

In this sense, psychological research is typically used for the following:

- Understand and manage the various aspects of behavior
- Test hypotheses/perspectives/theories so that we could accept, reject, modify the existing perspectives and/or craft new theories
- Study the behavior and its dimenstions, attributes or its causes
- Study changes, the influence of internal/external factors and understand the roles they play on individuals' mental health and behavior.
- Study people with specific psychological disorders and symptoms.
- Develop therapeutic approaches to improve individuals' mental/behavioral disorder.

In the following sections, you will learn about how research on human behavior is conducted, and the different types of research methods used to gather and analyze

information on behaviors.

There are about six types of research methods in psychology but not all are equally important.

1. Experimental Method

Often considered as a ***prototypical*** method when the researcher carefully control conditions in a laboratory. It is very difficult and unethical to study human behavior/disorders by putting human subjects in the laboratory and controlling their behavior. What we do here is "develop assumptions/hypothesis, identify *variables* and conduct research on these.

What is a variable?

A variable is an attribute or factor or event that is changing. It is a factor used either/both as a cause or effect. Examples of variables age, sex, race, religious denomination, ethnicity, tribe, political affiliation, level of education, personality, behavior, family background, residence, income, occupation, marital status, etc. In social and behavioral sciences research, there are three types of variables:

- Independent Variable (***IV***) - the variable that is manipulated by the experimenter (input variable or cause). Example: age, sex, education, health status, marital status, residence, religion, ethnicity, color, etc
- Dependent Variable (***DV***) - the outcome variable or effect (results of the experiment). It is the issue under study/research. Example: sexual behavior, corruption, rape, vagrancy, insanity, depression, aggression, insomnia, etc
- Control Variable ***(CV*) -** the variable that is neutral.

By defining our variables that we will use to test our theory we derive at our Hypothesis which is a testable form of a theory.

As an example of this, let's say that we have a theory that people who drive sports cars are more aggressive in theory interactions with others. Our independent variable would be the type of car you drive (Vitara, Kest, Toyota, Volvo, Isuzu, etc.). Our dependent variables, the outcome of our research, would be aggression. We would need to further define aggression so that it is something we can test such as speeding

or cutting other people off in traffic. We now have the basics of our very simple experiment and can write our Hypothesis: People who drive sports cars drive over the speed limit more frequently than people who drive other types of cars.

Researchers systematically alter and measure these variables in order to determine whether such changes will influence some aspects of behavior. It is a typical method of carrying out a series of observation under controlled conditions for the purpose of testing hypothesis. Although preferably used by many psychologists, it must, of course, be borne in mind that there are certain difficulties in conducting full-fledged experimental studies. The main reason for this is that it is very difficult to control the attitudes and behavior of human beings. Example: the health status of a child is determined by the nutritional behavior of the mother; the behavior of children is determined by parenting style; pattern of social relationship/interaction determines individual's deviance or conformity.

Starting from the general and moving to the more specific, the first concept we need to discuss is theory**.** A theory can be defined as a "general principle and tentative idea proposed to explain how a number of separated facts are related". In other words, a theory is an "idea about a relationship." In order to test whether a theory is correct or not, we need to do empirical research.

Theories are stated in general terms, so we need to define more accurately what we will be doing in our experiment (Students need to be aware of the techniques of experimental methods in the study of human subject's behavior, which is not same as doing experimental study among animals in the laboratory. That of human beings is conducted by using and manipulating variables and testing the hypothesis one can do experimental research on human behavior and then achieve the goal of psychology).

Every experiment has two or three types of variables (& control variable) which are designed and, manipulated by the researcher himself/herself.

2. Naturalistic Observation

Perhaps this is the simplest form of research method in psychology. Observing behavior in their natural environment often involves counting behaviors, such as number of aggressive acts, number of smiles, etc. Some other literatures describe

naturalistic observation method as “a qualitative methodology in which various aspects of behavior are carefully and systematically observed in the settings where such behavior is naturally occurring. It is relatively the best method to observe human behavior and find out its patterns.”

3. Case Study(or Case history or Anecdotal Account)

Following a single case, typically over an extended period of time can involve naturalistic observations, including psychological testing, in-depth interviews, application of a treatment or systematic observations.

4. Survey Method

It is a research method in which relatively large number of study subjects required to answer questions (through a filling of questionnaires or interviews) about aspects of behavior or attitudes and experiences in their settings and sectors. It requires follwoing cetain sampling techniques and proceudures so as to ensure validity and reliability of data. Survey method mainly relies on probability sampling techniques and procedures in order to ensure representativeness of sample respondents. These sampling techniques include simple random sampling, stratified sampling, systematic sampling and so on. With other courses you will learn more about the principles, techniques and values of survey research method.

5. Correlational Study

Correlational study is a method of collecting data in which researchers select a group and assess the relationship between already existing variables/attributes.Correlation means relationship, so the purpose of a correlational study is to determine if a relationship exists, in what direction the relationship is, and how strong it is. It is a research method in which investigators observe two or more variables to determine whether changes in one are accompanied by changes in the other. It is used to investigate and find out the degree of relationship between the variables. Example, correlation between cigarette smoking and lung cancer; between drug abuse and crime; alcoholism and traffic accident, , etc can be studied through this method.

6. Psychological Testing

It is an objective and standardized measure of a sample of behavior that provides a systematic basis for making inferences about people. That is, utilizing testing to gather information about a group or an individual.

Ethical considerations

In the processess of research businesses, the researcher should take the following consideration into account:

- introduce yourself and promote debriefing about your research,
- get informed consent from the study subjects and other concerned body,
- avoid deception and subjectivity,
- avoid plagiarism(stealing from one source /others' idea without acknowledgement).

Sources of data

There are two sources: (1**)** Primary and (2)Secondary sources. Data can be gathered from both the secondary (published and un published documents including books, journals, court and police records,newlettrs, news papers, internet, etc) or primary (first hand information through observation, interview, discussion, case study) sources.

Activity 5. What is the relevance of learning research methods in psychology for lawyers?

1.4. RELATIONSHIP BETWEEN PSYCHOLOGY AND OTHER SCIENCES/DISCIPLINES

The study of behavior is not just for psychologist but anthropologists, sociologists, lawyers, medicine/health science, economists, geographers, etc also study various dimensions of behavior.

Psychology and other fields of science have more general similarities though they are different in terms or more specific issues and concerns.

Together with psychology, the above stated fields make up the group of knowledge areas known collectively as the behavioral sciences.

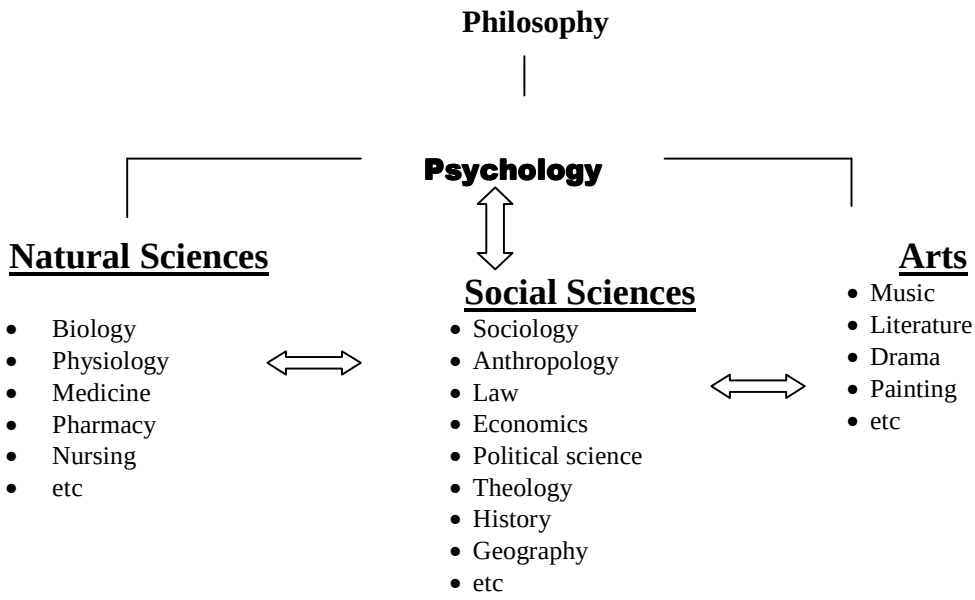
Yet, we have to be specific and be able to understand the context of psychology: What sets psychology a part from the other behavioral sciences is:

- partly its exclusive interest in behavior,
- partly its focus on individuals, and
- partly the wide range of behavior it covers(individual, social/cultural, organizational) .

Anthropology, for example compares behavior across cultures; sociology studies the behavior of people in groups/dyads; economics is concerned with the behavior involved in the production/distribution of goods and services; health/medicine studies about the wellness-illness behavior. Thus in the study of behavior, there is overlap with psychology... the boundaries are blurred.

In view of the wide scope of its subject matter, psychology draws much from other disciplines in order to explain and predict behavior (see the diagram below, block arrow shows strength of relationship).

The following graph demonstrates the general overview of the relationship.



Major similarities:

Generally speaking, like other disciplines, psychology is a science because it relies on scientific methods, focuses on human (individual) behavior and the associated problems.

Major differences:

What makes psychology and other disciplines different is their subject matter, specific areas of concern, techniques of data collection/analysis and dealing with behavior and solving problems significantly.

RELATIONSHIP BETWEEN PSYCHOLOGY AND LAW

Even though their specific approaches, techniques and areas of concerns vary, psychology and law have meaningful relationships and linkages. As you all know well, law is mainly concerned with regulating human interactions, relationships and behaviors. It regulates the behavior of individuals, group, family, community, society, institutions and so on. For instance, the 1995 Constitution of Ethiopia, as can be read from Article 85-92 and so clearly describes the linkage between the various laws and policies including family law, social laws/customary laws. Students should note that more insight will be gained from Interdisciplinary II, which broadly covers modern organizations and social institutions including the role of government and legal institutions. The social policies (such as education and training policy, health policy, women's policy, HIV/AIDS policy, culture policy,..) on the other hand clearly stated the instrumentality of dealing with the aspects of human behavior hence the study of psychology has greatest utility. While, psychology is mainly deals with scientific study of individual behaviors with social context. Thus both psychology and low are concerned with human behaviors.

*Activity 4**:** Please read article 85-92 of the Constitution; Objectives/strategies of Ethiopian HIV/AIDS policy and discuss the legal issues addressed and/or missing.*

The interaction between psychology and law has greatly increased over the past few decades in the following overlapping areas:

- Legal psychology-applied empirical research on issues important to the legal system (such as eyewitness accuracy, police selection, procedural justice, and legal assumptions about human behavior relevant to the rights of defendants, victims, children, and mental patients) ,
- Forensic psychology-legally relevant clinical areas where psychologists act as expert witnesses and consultants (as with the insanity defense, competence to stand trial, and civil commitment to mental hospitals) , and
- Psychological jurisprudence- efforts to develop a philosophy of law and justice based on psychological values *(Wrightsman, Lawrence S, 2001; Howitt Dennis, 2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998).*

Psychology's values are clearly relevant to legal policy and practice. Psychologists can and should explicitly base their law-focused research and their policy recommendations on the maximization of psychologically desirable values such as dignity, autonomy, privacy, psychological sense of community, equality, and justice. Since conflict over such values lies at the heart of many legal conflicts, a psycho-legal jurisprudence that explicitly uses these values as a yardstick to measure the desirability and effectiveness of legal policy is a welcome addition to psychology's concern with social and legal issues.

It is well known that psychological studies focus on the perceptions, beliefs, motor, sensory, cognitive and social development , attitudes, personality, motivation, emotions, aspects of behavior and maladjustment problems/anti-social behaviors(including deviance, delinquency, sexual abuse, crime, etc) of a person. For instance, the findings of the various studies and approaches of psychologists can be used as an entry point in the cases that demand legal investigation, interpretations and decisions. Some aspects of forensic psychology will be dealt in the third unit of this part of the course.

Activity 5

What is the basic relationship between psychology and sociology? How do you think law is related to psychology?

1.5 IMPORTANCE OF PSYCHOLOGY

The application and *utility of psychology* and psychological principles, approaches and findings in law and law enforcement continued throughout the 1920's and 1930's. This is, so mainly in more developed countries than less developed countries. To this day, however, globally, there is still a special interest in extending psychology to the law enforcement institutions (e.g. courts and police work). The demand for psychologists in the legal system has grown considerably over the past several decades.

- Psychology helps lawyers to *understand self and others' behavior* including both the pro-social and anti-social behaviors.

- Psychology helps formulating social policies and programs, enacting laws, solving practical problems(e.g. social and legal problems) related to human behavior, relationship or interaction that have legal concerns.
- Helps lawyers *enlighten* people's irrational and biased feelings, thoughts, perceptions, beliefs and anti-social as well as deviant behaviors that hampers the normal and healthy life conditions and might lead to criminal behaviors.
- Assist having good and smooth relationship with individuals, groups and institutions, helps to foster good relationship within the work environment and social settings.
- Study of psychology helps lawyers recognize and differentiate between normal and abnormal behaviors and attempt changing the latter to the former. It then helps them practice ethical and professional manners of service delivery by understanding the behaviors of clients. Key tasks undertaken particularly by forensic and legal psychologists include:
    - modifying offender behavior;
    - responding to the changing needs of people in the courts and justice system;
    - advising the law makers, the executives, etc and counseling crime victims;
    - reducing stress for staff and prisoners;
    - providing hard research evidence to support legal practice;
    - undertaking statistical analysis for prisoner profiling;
    - working in partnership with psychologists, sociologists, medical practitioners, law enforcement agencies, the community, etc;
    - giving evidence in court;
    - advising parole boards and mental health tribunals; crime analysis.

Activity 6: Why do you think the study of psychology, its theories, principles and methods is important for lawyers?

SUMMARY

Psychology is defined narrowly as the study of mind, spirit life and soul. Whilst the revised and broader definition of psychology is the scientific study of animal and human behavior, physiological processes of thoughts, motivation, emotional, attitude, perception and personality.

The major goal of psychology is to describe, explain, predict, control and manage human behavior. Psychology emerged as an independent science of behavior in the 19th century (1879) in Germany with the work of Wilhelm Wundit. There are two major perspectives or schools of thoughts on psychology and human behavior: early and modern perspectives. The early thoughts focus on the structure, function of mind, and psychoanalytic, gestalts covert-overt explanations of human behavior, including the unconscious and conscious levels of human mind. The modern schools, on the other hand, deal with the biological, physiological, learning, socio-cultural, evolutionary and cognitive perspectives of behavior.

Like any other scientific discipline and field of study, psychology has also specialization in various aspects. These specializations are classified in to two broad categories: academic and professional fields of specialization. The former include experimental-, social, developmental,- clinical,- etc. psychology while the latter includes counseling-, school-, and educational-, health-, occupational-, forensic-, criminal-, legal-, etc psychology.

Although the subject matter and specific concerns and techniques of dealing with behavior vary, as a scientific study of behavior, psychology has strong relationship with other disciplines including law, sociology, anthropology, medicine, management, economics, etc. Thus, the study of psychology play pivotal role in making lawyers understand and describe the behavior of self and others, justify , control and manage the various aspects of behavior and personality.

Review Questions (RQs)

1. Give short and precise definition of psychology.

……...

2. Discuss the goals of psychology.

……

……

3. What is the subject matter of psychology?

……

……

4. Discuss the historical development of psychology.

……

5. How psychology is related to other sciences such as sociology and law.

……

……

6. Compare and contrast different subfields of psychology.

……

……

7. How are the early and modern perspectives/schools of psychology differ from one another and what did each contribute to the field of study?

……

……

8. Compare and contrast the research methods used in psychology.

……

……

9. Differentiate between dependent, independent and control variables.

……

……

10. Describe and discuss the importance/utility/ and contribution of studying psychology to the lawyers.

……

……

UNIT TWO: UNDERSTANDING SOCIAL PSYCHOLOGY

In chapter one, we have learnt the subject matter of psychology and its various aspects including the meaning, importance, theoretical perspectives and research methods. Chapter two mainly deals with the concern of social psychology, aspects and dimensions of attitude and behavior.

OBJECTIVES:

Up on completion of this chapter, students will be able to:

- define social psychology , attitude, behavior
- discuss the aspects and components of attitude and behavior including key theories, model of attitude change
- explain attribution theory, major attributes affecting human behavior, and the role of social influence on attitude and human behavior.

BASIC QUESTIONS

What is social psychology?

What are the concerns of social psychology?

What is attitude and attitude change?

What are the origins, components, aspects and types of attitude?

Why attitude change is difficult?

What is the best model of attitude change?

What are the major factors affecting attitude change or persuasion?

What is behavior?

What are the two major dimensions of human behavior?

What criteria are used to identify and categorize human behavior?

What are the major theories of attitude and behavior?

What is social influence?

How human behaviors are determined by social influence?

How attitude and behavior is related?

2.1. The Concept, Features, Concerns and Theories of Social Psychology

The Concept of Social Psychology

Social psychologists study the way we affect and are influenced by other people, both in groups and in intimate relationships. Similarly, it involves concerted efforts to understand the determinants of interpersonal influences and of attitude change.

Broadly speaking, social psychology is a discipline that employs scientific methods to understand and explain how the thought, feelings, attitudes and behavior of individuals are influenced by the actual, imagined, or implied presence of others.

Features and Central Concerns of Social Psychology

- Social psychology is the scientific study of how individuals and groups:
  - think about,
  - influence,
  - relate to one another, and
  - view themselves and others.
- The study of social psychology deals with the various aspects of attitudes, perceptions, feelings, opinions, thoughts, imaginations, behaviors, attributions, social loafing, social influence/social pressure, self-fulfilling prophecy, and most importantly the social behavior that includes individual behavior.

- Social psychology deals with the consideration of social relations and the attitudinal and behavioral manifestations of both negative and positive relations.
- Social psychology further discusses prejudice, aggression, interpersonal attraction, and dimensions of attitudes and behaviors.
- Social psychologists often concerned with the meanings and relationship between attitude/attitude change and behavior/behavior change.

- Social psychology recognizes law enforcement institutions such as the courtroom as a social microcosm: many of the principles of social psychology come alive in this setting.

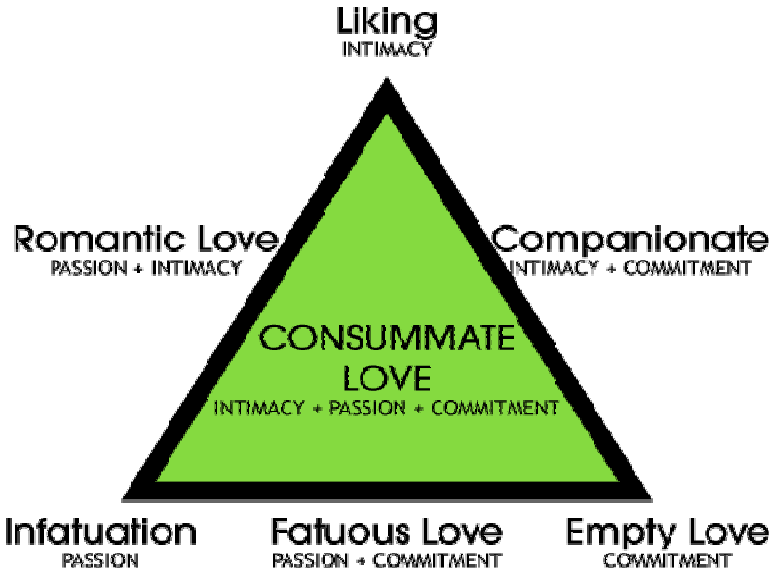
Theories of Social Psychology

Social psychology is a highly empirical field. Rather than seeking global theories of human behavior, as are frequently found in personality theory, social psychologists utilize a wide range of specific theories for various kinds of social and cognitive phenomena. Here is a sampling of some of the more influential theories that can be found in this branch of psychology.

- *Attribution theory* - is concerned with the ways in which people explain (or attribute) the behavior of others. The theory divides the way people attribute causes to events into two types. External or "situational" attributions assign causality to an outside factor, such as the weather. Internal or "dispositional" attributions assign causality to factors within the person, such as ability or personality.
- *Cognitive dissonance theory* - was originally based on the concept of cognitive consistency, but is now more related to self-concept theory. When people do something that violates their view of themselves, this causes an uncomfortable state of dissonance that motivates a change in either attitudes or behavior.
- *Self-perception theory* - emphasizes that we observe ourselves in the same manner that we observe others, and draw conclusions about our likes and dislikes. Extrinsic self perceptions can lead to the over justification effect.
- *Self-verification theory* - focuses on people's desire to be known and understood by others. The key assumption is that once people develop firmly held beliefs about themselves, they come to prefer that others see them as they see themselves.
- *Social comparison theory* - suggests that humans gain information about themselves, and make inferences that are relevant to self-esteem, by comparing to relevant others.

- *Social exchange theory* - is an economic social theory that assumes human relationships are based on rational choice and cost-benefit analyses. If one partner's costs begin to outweigh his or her benefits, that person may leave the relationship, especially if there are good alternatives available.
- *Social identity theory* - examines how categorizing people into in-groups or out-groups affect perceptions, attitudes, and behavior.
- *Observational learning* - suggests that behavior can be acquired by observation and imitation of others, unlike traditional learning theories which require reinforcement or punishment for learning to occur.
- *Triangular theory of love* - characterizes love in an interpersonal relationship on three different scales: intimacy, passion, and commitment (known as **IPC** of love triangle). The experience of love is a function of **levels** of IPC. In the table below, for each type of love, a plus sign indicates the presence of each dimension of love, and a minus sign indicates that the dimension is not present.

	Intimacy	Passion	Commitment
Nonlove	-	-	-
Liking	+	-	-
Infatuated Love	-	+	-
Empty Love	-	-	+
Romantic Love	+	+	-
Companionate Love	+	-	+
Fatuous Love	-	+	+
Consumate Love	+	+	+



The three components and measures(IPC), pictorially labeled on the vertices of a triangle, interact with each other and with the actions they produce and with the actions that produce them so as to form seven different kinds of love experiences (*nonlove* is not represented). The size of the triangle functions to represent the "amount" of love - the bigger the triangle the greater the love. The shape of the triangle functions to represent the "type" of love, which may vary over the course of the relationship.

2.2. UNDERSTANDING ATTITUDE AND BEHAVIOR

Why do you think the study of people's attitude is important for lawyers and legal practices?

2.2.1. *ATTITUDE* ***AND ITS ASPECTS***

THE MEANING OF ATTITUDE AND ATTITUDE CHANGE

The fact that psychology is primarily concerned with individual behavior (with the social context). The study of attitude is instrumental to understand behavior, the essence of psychology in general and social psychology in particular.

Different scholars conceptualize the term attitude differently. Its definition lacks precision because attitude is determined by complex factors (biological, social, cultural, religious, political, environmental, etc). Consider the following general definitions,

- Attitude is a relatively enduring and stable position to react in a certain way towards person, objects, institutions, issues or events.
- Attitude is a hypothetical construct that represents an individual's like or dislike for an item. Attitudes are positive, negative or neutral views of an "attitude object": i.e. a person, behavior or event. People can also be "ambivalent" towards a target, meaning that they simultaneously possess a positive and a negative bias towards the attitude in question.
- Attitude is people's relative feeling, stand, perception, like or dislike, attraction or aversion

Attitude plays key role in directing and channeling social as well as individual behaviors and relationships.

Attitude Formation: What is the Source of Attitude?

Knowledge and Information (it might be legitimate or illegitimate) through various sources such as *learning* (formal or informal) or *socialization* and *interactions* is the major source of attitude. However, biological/hereditary factors can also be source of attitude. For example, un like personality, attitudes are expected to change as a function of experience. Hereditary variables may affect attitudes - but they may do so indirectly (example, if one inherits the disposition to become an extrovert, this may affect one's attitude to certain styles of music).

Understanding the types and examples of attitude:

There are three types of attitudes: Positive, Neutral and Negative attitudes.

(i) Positive attitudes are unbiased/helpful regards towards persons, issues, institutions and so forth. Examples of good attitudes include altruism, sympathy, empathy,

amiability, benevolence, confidence, gallantry, companionable, friendly, graciousness, humble, humanitarian, outgoing.

(ii) Negative attitudes are biased and irrational perceptions or feelings with or without adequate information or fact (knowledge). Negative attitudes sometimes affect the psychological, moral, legal norms, values, rights and dignity.

Examples of negative attitudes:

- Prejudice

  Prejudice is negatively toned attitude and opinion developed in the absence of sufficient knowledge (fact) or information. It is a biased attitude towards people(e.g. violating the natural and constitutional rights), objects, events and institutions. It is prejudgment based on little or no information about something. Prejudice is subjective prejudgment based on stereotypes. Prejudice is also described as forming of hostile feelings toward an individual/institutions/object, usually associated with stereotyping and discrimination;

- Stereotyping is an overly simple and standardized belief and rigid generalization. Whilst discrimination is meant prejudiced behavior, favoring one group/person over another as a result of biased feeling;
- Stigmatization- labeling the person with nick (bad) names (discrimination is a behavior that often emanates from stigma).

Other examples of negative attitudes include arrogance, condescension, cruelty, detachment, impudence, malevolence, snob, cynic, abusive, accusatorial, aggressive, boastful, impatient, insensitive, snobbish, etc. Dear student, please be informed that we will deal with some aspects of the negative attitudes(and the associated outcomes) towards individuals and groups in the constitutional law, Law of persons and Interdisciplinary II courses.

(iii) Neutral attitudes include posture, sentiment, temper and characters of a person

Components of Attitude

1. Cognitive component: deals with the thinking, knowledge (facts) that a person would have about a person/event/ issues /institution.
2. Affective component: deals with the feelings & emotions about people/issues.

3. Behavioral component: deals with the activity/action.

Theories of Attitude

Theorists assume attitudes serve a function- such as processing information, lifting self-esteem, or helping us fit in with others.

- Consistency Theories: "Humans are striving for consistency." According to this theory, people want to be internally consistent. In order to stay consistent and maintain homeostasis, we change our attitudes.
- Cognitive and Affective Consistency: If a liked object helps attain other liked objects, attitudes are consistent. If a liked object hinders attainment of other liked objects, there is inconsistency. When inconsistency exceeds tolerance, attitudes will change to achieve consistency.
- Congruity Theory**:** assumes attitudes are simplistic and tend toward extremes. It also assumes that if a liked and disliked object becomes related, the feeling toward both will become more neutral.
- Cognitive Dissonance: focuses on consequences of incompatibility between two related cognitions. For example- if one studies hard for a test, s/he expects to do well. But if s/he studies hard and fails, dissonance is aroused. A person who received a small reward for a difficult task said it wasn't so bad, but those who got a large reward for the same task said the task was horrible.
- Cognitive Balancing Theory**:** suggests there is only one relationship between two objects. The relationship is affective and can be positive, negative, or null.

- Nonconsistency Theories**:** emphasize that attitudes have adaptive significance to the people who hold them.
- Learning Theory**:** Attitudes are learned through reinforcement or congruity.
- Self-persuasion Theory**:** People develop attitudes from repeated action. For example, question, "Do you like *Kocho(equated with bread in Wolayta, Gurage, Sidama,* of Ethiopia*)*?" Answer, "I guess I do because I am always eating it."

- Task-experience Theory: When someone works toward a goal, the nature of the task (easy or hard), the nature of the operations (socially cooperative or individualistic), and the nature of the outcome (success or failure) will shape attitudes.

- Functional Theories: Functional theorists feel that attitude serves a useful purpose(processing information, help us fit with others, understand vicarious attitudes) and when it is no longer useful, a new one will be adopted.They feel that man/woman struggles for goals and will adjust attitude to meet those goals.
- Motivational Constructs**:** Believes there is an adjustive function of motivation. This serves an ego-defensive function because it helps protect one's self respect. It also serves a value-expressive function because one struggles with being true to one's beliefs.
- Conflict Theory**:** In this theory, new information presents a challenge to existing attitudes. When this happens, the individual will seek out alternative actions. It is shown through a five step process which includes:
    - Appraisal of the challenge
    - Appraisal of alternatives
    - Selection of the best alternative (known as BATNA)
    - Commitment to a new policy
    - Evaluation of the system in place
- Reinforcement Theory: Attitude change results from learning produced through reinforcement. Receiving, hearing, or accepting new opinions is the key to a change in attitude.
- Cognitive and Perceptual Theories: These theories focus on discrepancies between attitude of communication, attitude of listener, and perceived usefulness of the message.
- Adaption-level Theory: This theory tries to arrange attitudes unidimensionally. They believe that if you adapt to a difficult situation, easier situations will be very simple by contrast. A good example is to lift 10 lbs. then to lift 1 lb. The one lb. weight will seem very light. If you lift a 1 oz weight, then a one lb. weight, the one lb. weight may seem heavier by comparison. They believe

behaviors represent a person's adaptation level, and the level changes with new stimuli.

- Perspective Theory: In this theory, one's attitude about an object can change without any belief about that object changing. An example of this is saying, "This politician is no good, but compared to the other, s/he isn't so bad." I may still think s/he's no good, but my attitude has changed.

Aspects of Attitude and Attitude Change

1. Persuasion: the process through which one or more persons attempt to alter the attitudes of one or more others.

2. Cognitive dissonance:a process through which we sometimes actually seem to change our attitude (we may have conflicting attitudes).It describes the uncomfortable tension that may result from having two conflicting thoughts at the same time, or from engaging in behavior that conflicts with one's beliefs.

3. Communication: refers to the process by which an idea/information is transferred from a source to receiver with the intent to change attitude/behavior. The aim of communication is transmission, sharing and exchanging information/ideas.

4. Propaganda: is an attempt to influence the attitude of others, mainly concerned with the spreading of ideas, information or rumors for the purpose of helping /hurting institutions, people, policy by influencing people's beliefs, thinking and behavior towards the aim of a propagandist. In most cases, propaganda is a one-way communication, hence less persuasive yet key strategy for enhancing attitude change.

Techniques of Propaganda

- Name calling or using loaded words.
- Band wagon- wagon carrier claim most people agree with considering the merits and tactics.
- Glittering.
- Brain washing is one of key techniques of propaganda but mainly used among political parties & religious people to change public attitude.

Good examples of attitude and behavior change interventions through propaganda include anti-smoking propaganda, safe-driving propaganda to minimize traffic accidents, HIV/AIDS prevention campaigning propaganda, etc. These attitude and behavior change strategies are well stated in the social and economic development policies of the country and regulations.

Attitude change is a relatively permanent change in an individual's predisposition to evaluate a social object in a characteristic way. Attitude change is not a precursor for behavioral change, but is instead a change in personal attribution of attitude as a consequence of a directly instigated change in behavior. The relationship between attitude change and behavioral change not always had been found to be consistent with one another.

Because of various reasons, attitude change is very difficult but not impossible. The four principal causes of self-preservation of attitude include:

i. Deeply rooted attitudes that are supported by strong emotional feelings are highly resistant to change(e.g. it is very difficult to change the opinions of those who have already made a decision to do something- such as smoking cigarette, drinking 2 bottles of beer, etc)
ii. Avoidance of information (if the information is inconsistent & uncomfortable)
iii. Social pressures (family, peer, culture, religion,…)
iv. Selective interpretation of the information

Measurement of Attitude

Attitudes can not be directly observed but must be inferred from behaviors. Attitude measures are concerned first of all with the direction, and intensity/strength of the attitude being assessed and changed. By using *scales*, one can measure attitude changes. The major scales include:

- Likert scale,
- Guttmann's scale, and
- Thurston's scale

Major Factors Affect Attitude Change

The process of attitude change is usually described by models with four distinct parts and their elements, including:

(1) source/sender/ communicator;

(2) receiver (communicatee or target);

(3) message (communication);

(4) surrounding environment (situation).

Scholars also describe the following general components of any communication process:

(1) source of the message;
(2) information/message;
(3) channel;
(4) receiver;
(5) effect , and
(6) feed back.

A useful model of attitude change process with the key elements

Communicator → Massage → Target Audience ← Environment

NB : The amount of attitude change that occurs is determined by variables at each point in the process.

I. Factors related to communicator (person/institution)

- Prestige/credibility/ of the communicator. The greater the prestige of the communicator, the more attitude change is produced. We give more weight to communicate from some one we respect-who has prestige/credibility than the one who has less prestige (prestige means more knowledgeable, experienced, skilled person, who is more persuasive).
- Trust and intention of communicator- objectivity & trustworthiness is important (if the audience trusts the intentions of the communicator, attitude change enhanced).
- Reference group (a group to which the communicator belongs)- has strong source of persuasive pressure.

II. Factors related to communication/message/information

- Organization and clarity(clumsy framework of presentation distractive & should not be vague but clear, neat, short and precise)
- Semantics/language: it should be proper, clear & understandable to the audience
- Discrepancy-telling one thing and doing another thing (message should be uniform)
- One-sided Vs two-sided communication(the later is more persuasive and effective)
- Stating a conclusion: During communication, either state the conclusion explicitly or leave it unstated. Stating the conclusion makes the speakers' position clear thus avoids misinterpretation. Whilst leaving it unstated had two advantages.
- Order of presentation (key and persuasive/impressive presentation first..... then at the end)
- Novelty of information (the information must be novel than boring or already known by the target group)

III. Factors related to the target audience

The characteristics of the target groups are important in attitude change. In some cases, even after a message has reached the target, the problems of attitude change are not over.

1. Personality related factors:
    a) Self-esteem: Persons with low self-esteem are more persuasible than those with high self-esteem. Self-esteem means the value or recognition or worth people give to themselves
    b) Intelligence: Less intelligent people can be convinced easily than high intelligent ones.
    c) Sex difference: It is easy to persuade women than men.
    d) Defensive style: Too much defensive people are very difficult to change.
2. Commitment: The lesser the commitment, the lesser the change of attitude.
3. Fore warning (alert ahead of time). It is very difficult to persuade if forewarned.

IV.Factors related to the environment /situation

Any communication takes place in an environment that will affect communication either positively or negatively.

(a) Reinforcement or rewarding environment is best ;
(b) Fear arousal- small fear is good to change attitude but it has to have a limit (e.g religious people, advocacy on HIV & AIDS, environmental degradation, pollution, traffic accident, cigarettes..);
(c) Distraction: is conflict between getting the message through and getting it accepted; and
(d) Use of various channels.

2.2. 2. UNDERSTANDING HUMAN BEHAVIOR AND ITS ASPECTS

The Meaning and Dimensions of Behavior

Behavior is an activity of an organism that can be observed by another organism or by an experimenter's instruments. There are various dimensions of behaviors. For the purpose of this course however, we will focus on the general categorization: normal/ pro-social and abnormal/anti-social behaviors.

Behavior is dynamic and relative. Behavior that is considered normal by one society may be considered abnormal by another. In addition, abnormality changes over time within same individual/ society. Example: 'abnormal' behavior at one time can become 'normal' at some later time. It is simple to define and describe abnormal behavior than normal behavior because one can easily observe abnormal behavior than normal behavior (Baron, 1996; Feldman, 1997).

Dimensions of Human Behaviors

Based on social, cultural, legal, economic, religious, biological and political factors, human behavior is generally categorized into two. This categorization varies with time, place, culture and related factors.

(I) Pro-Social Behaviors

Pro-social behavior thus is anormal, positive, constructive and helpful behavior. It is an opposite of antisocial behavior, in conformity with the group/ societal norms and values. A good example of pro-social behavior is altruism, which is a behavior that benefits others, peoples' concern for others. It is unselfish regard for the welfare of others. Example- passersby sometimes give some one the time, street directions and even money on request. In Ethiopia, there are many people who have altruistic behavior-engaged in acts of sharing, cooperation, helping, … as an examples of pro-social acts (signs of empathy). There are internationally recognized people for their altruistic behaviors- Wro Abebech Gobena of Ethiopia, and Mother Thereza of India.

(II) Anti-Social Behaviors

Antisocial behaviors are also(sometimes) known as *bad behaviors or abnormal* or negative sides of human behavior (darkest tendencies). They lack pro-social and altruistic tendencies. Abnormal/anti-social behaviors are aspects of human behaviors that deviate from conformity to the norms and values of a group or society.

The most common examples of anti-social behaviors include deviance, juvenile delinquency; crime, rape, harassment, drug abuse, prostitution(ethiopia), vagrancy; aggression, homosexuality, lesbianism/gay, etc. We will learn more about deviance, juvenile delinquency, crime, prositution, rape,.. in the Interdisciplinary II and Criminology courses.

ILLUSTRTATIVE CASE EXAMPLE: *RECKLESS SEXUAL BEHAVIOR*

This is where HIV is passed on through a careless rather than deliberate act (sexual behavior). If for example a person who knows he/she has HIV and had unprotected sex with HIV negative person, but fails to inform his/her sexual partner the risk involved, this could be classed as reckless transmission in court. "Reckless' here implies that transmission did take place, but that this happened as part of the pursuit of sexual gratification rather than because the HIV+ person actually wanted to give his/her partner HIV (HIV is of course not 'automatically' transmitted every time someone has unprotected sex).

Question(i)What is then the anti-social aspect of the above case?(ii)Why do you think some individuals(group) more frequently engage in such a risk behaviors than others or not at all(if so)?

Criteria Used To Identify A Behavior As Pro-Social Or Anti-Social Behavior

How can we distinguish between pro-social and antisocial behaviors?

There are many criteria, some of these criteria are discribed below(Baron, 1996, Feldman,1997).

i) Some of the criteria used to distinguish a behavior as prosocial or normal behavior include,

- Emotional well being ;
- Self-esteem acceptance & Self knowledge;
- Efficient perception of reality and Intelligence ;

- Ability to form affectionate relationship with other people reciprocally;
- Ability to exercise voluntary control over own behavior ;
- Ability to restrain from risky behaviors and aggressiveness when necessary;
- Productivity-emotionally disturbed people are less productive; and
- Conformity to group or social norms and values.

ii) Criteria used to distinguish a behavior as anti-social or abnormal behavior include:

1. Deviation from statistical norms (statistical abnormality).

   According to this criteria, "abnormal" means "away from the norm". For instance, height, age, weight, intelligence, etc would be abnormal if the statistical figures are extremely high or low-extremely intelligence, extremely tall, etc would be classified as abnormal. Yet in defining abnormal behavior, we must consider beyond statistical figures;

2. Deviation from social norms/cultural abnormality.Every society has certain standards, norms, for acceptable behavior up on, behavior that deviates markedly from these norms is considered abnormal.Today, such behavior tend to be viewed as differences in life style rather than a sign of abnormality. Thus, definition of abnormal behavior must include more than social norm or social compliance;

3. Maladaptiveness of behavior-to define a behavior as abnormal behavior, the most important criteria is how the behavior affects the well-being of the social group-a behavior is abnormal if it is maladaptive, if it has adverse effects on the individual or on society /group; and

4. Personal distress- the individual's subjective feeling of distress (mental illness, insane, etc).

However, none of these criteria alone is completely satisfactory for diagnosing abnormality. In order to assess the behavior of an individual, all the above factors should be considered.

Relationship between Attitude and Behavior **(A-B** relationship)

Do Attitudes Determine Behavior? Does Behavior Determine Attitudes? Why Do Actions Affect Attitudes?

The attitude-behavior (**A-B**) relation is of utmost importance both in the research and practice of psychology and legal education; thus attitude-campaigns are usually based upon the assumption that a change in attitudes is followed by a change in behavior(and in some instances vice versa).

- An underlying assumption in persuasion research is: Shift a person's attitude in the right direction and behavior will follow.

Examples:

1. If people see the value of wearing their seatbelt, then they are more likely to actually wear it.
2. If people think that smoking is bad for their health, then they will quit.

Example: Classic Study of Cheating

- Relationship between attitudes toward cheating and actual cheating behavior.
- Students took True-False exam then asked to assign themselves a score.
- Instructor also graded the exam.
- Discrepancy between student's self-assigned score and instructor's score was measure of cheating behavior.
- Relationship between attitude toward cheating and actually cheating close to zero.
- Those who did poorly more likely to cheat.

When Do Attitudes Predict Behavior?

- Are there factors that make attitudes more or less predictive of behavior? Four factors that Impact the Relationship: Qualities of the…
  - Behavior (General vs. specific)
  - Person (Who is being asked?)

- Situation (When and how are they being asked?)
- Attitude (How was the attitude formed?)

- Attitudes and behaviors being predicted must be measured at the same level of specificity. Example: A person's attitude toward their general health will not predict their propensity to jog.
- *Specific* attitudes will predict *specific* behaviors.
- Certain peoples' attitudes are more consistent with their behaviors than others.

Example:

- High Self Monitors
  - A high self monitor changes their behavior depending on the situation. Whilst a low self monitor behaves the same way across situations. Dear student! are you a high self monitor?
  - The behavior of low self monitors is consistent with their expressed attitudes.
- Whether attitudes predict behavior may depend on the context in which you ask the question.
- Norms can be so strong that it is unlikely that overt behavior will reflect private attitudes. Example: People who hate their jobs will still go to work because of normative and financial incentives. Attitudes toward work predict attendance when obligation to attend is removed. Question: How many people would show up if I made one class "optional"?

- Attitudes are more predictive of behavior when:
  - People have a vested interest in the issue.
  - When people are under time pressure.
  - When situational cues make your attitude salient (a focus of attention).
- Situations can be changed to make attitudes more predictive.

Case example: Job satisfaction and Performance

- Studies have shown consistently that happy workers are not necessarily more productive.
- Why do think this is the case?
- How can job attitudes become more predictive of behavior at work?
    - Recent study shows that happy workers don't make firms/*organizations* more successful, but successful firms/*organizations* make their employees happier.
- Two theoretical models that explain why attitudes predict behavior.

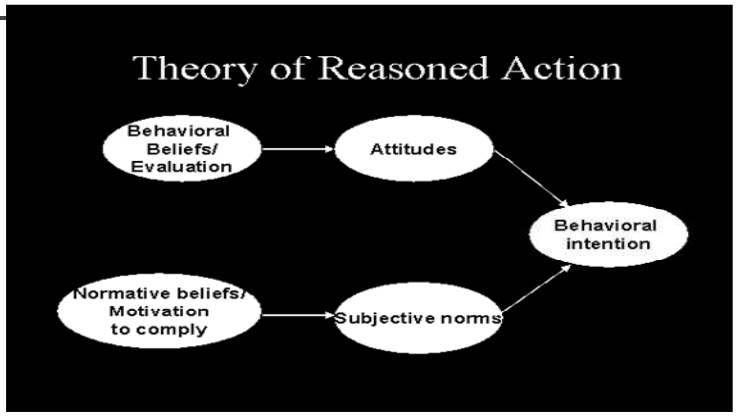
(1)Theory of Reasoned Action:

- Theory relevant when the behavior is thoughtfully planned in advance.

(2)Attitude-To-Behavior Process Model:

- Theory relevant when behavior is a spontaneous reaction to one's immediate situation.

Planned Behavior



Attitude-Behavior Relationship
By Philipos P(Sep 2006)

Stephen L. Franzoi, *Social Psychology*. Copyright © 1996. The McGraw-Hill Companies, Inc. All Rights Reserved.

Psychological Functions of Attitudes

Psychological Functions of Attitudes

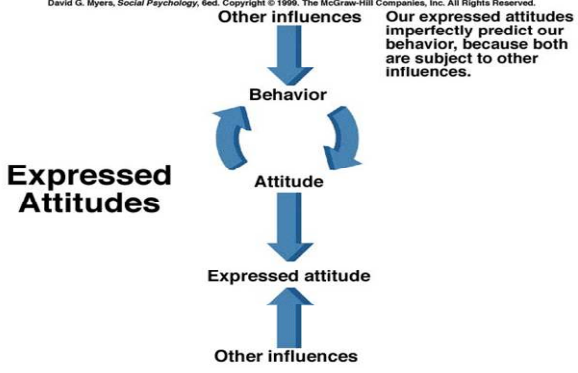
Type of Attitude	Function Served by Attitude	Psychological Perspective
Utilitarian	Helps the person to achieve rewards and gain approval from others	Behaviorist
Knowledge	Helps the person to structure the world so that it makes sense	Cognitive
Ego defense	Helps the person protect himself or herself from acknowledging basic self-truths	Psychoanalytic
Value-expression	Helps the person express important aspects of the self-concept	Humanistic

Attitude-Behavior Relationship
By Philipos P(Sep 2006)

Attitude → Behavior

- Imperfection prediction

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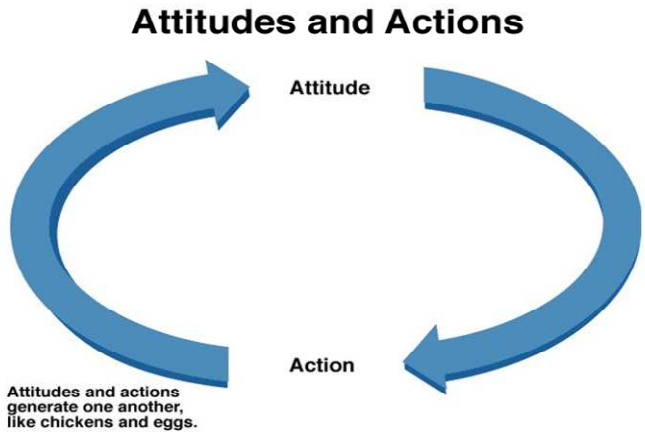


Attitude-Behavior Relationship
By Philipos P(Sep 2006)



Behavior ⇄ Attitude

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Attitude-Behavior Relationship
By Philipos P(Sep 2006)

A ⟶ B Vs B ⟶ A Vs **A~ B** Dear student, read the following and discuss the one that best explains inconsistency between A-B relationship

- **Attitude ⟶ Behavior**
  - Minimizing social influences on expressed attitudes
  - Minimizing other influences on behavior
  - Examining attitudes specific to the behavior
  - Making attitudes potent

- **Behavior ⟶ Attitude**
  - Role playing
  - Saying becomes believing
  - The foot-in-the-door phenomenon
  - Evil acts and attitudes
  - Interracial behavior and attitudes
  - Social movements

Spontaneous behavior

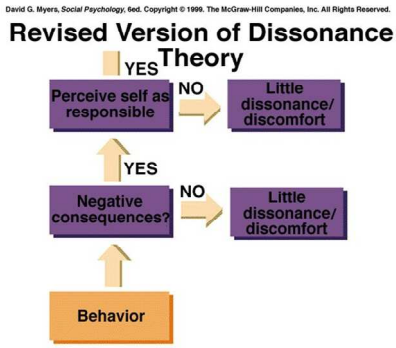
- Sometimes people's attitudes will result in a spontaneous (unplanned) behavior.
- Example: If you hate snake/cockroaches, then you don't have to think about what to do when you see one.
- Reason: Some attitudes are more accessible (memorable) than others.

Attitude Accessibility

- Attitudes guide our interpretation of an object or a situation.
- If the attitude is memorable than it will have an immediate impact on our behavior.
- If the attitude is not memorable than it will impact our behavior only when recalled.

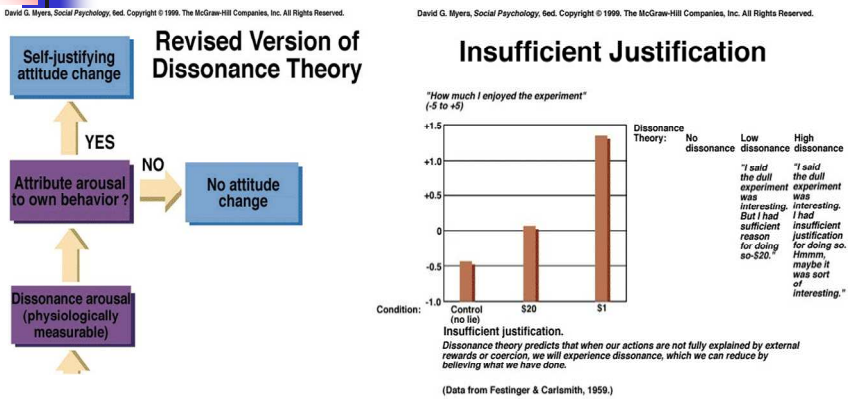
Why does behavior affect attitudes?

- Self-presentation theory
- Cognitive dissonance theory
  - Insufficient justification
  - Dissonance after decision



Attitude-Behavior Relationship
By Philipos P(Sep 2006)

Why does behavior affect attitudes? (cont'd)



Attitude-Behavior Relationship
By Philipos P(Sep 2006)

Why does behavior affect attitudes? (cont'd)

- **Self-perception theory**
  - **Over justification and intrinsic motivations**



- Comparing the theories
  - Self-perception vs. Dissonance Theory

Attitude-Behavior Relationship
By Philipos P(Sep 2006)

In general, the relationship between attitude and behavior is weak. However, it is possible to strengthen this link. Combine attitude with social pressure and make attitude memorable.

2.3. ATTRIBUTION THEORY AND SOCIAL INFLUENCE

Attribution and Attribution Theory

Everybody has heard of peer pressure, but most people argue that they are not affected by it, or at least not affected as 'most people.' The truth is, we are all affected by the people we interact with, many of whom we don't even know personally. Our social environments play a significant role in how we view ourselves, and conversely, how we see ourselves impacts our view of the world.

This part of the unit discusses the interaction between our view of self and others, the role of power in social interactions, and how groups, or the people with whom we interact, affect our decision making process. It is about dealing with the attributes of behavior.

Attribution refers to an inference about the cause of a person's behavior (action). According to the attribution theory, we tend to explain our own behavior and the behavior of others by assigning attributes to this behavior. Many factors play a role in how we assign attributes to behaviors.

Attribution theory is concerned with the ways in which people explain (or attribute) the behavior of others, or themselves (self-attribution), with something else. It explores how individuals "attribute" causes to events and how this cognitive perception affects their motivation. Basically, there are two causes/factors for our behavior; those influenced by situational (external) factors and those influenced by dispositional (internal) factors.

- Internal attribution means an inference that a person's behavior is caused by a personal disposition (personal traits or qualities that distinguish him/her from another). "Internal" or "dispositional" attribution assigns causality to factors within the person, such as their own level of intelligence or other variables that make the individual responsible for the event.

- External attribution refers to an inference that a person's behavior is caused by an environmental (situational) factor. "External" or "situational" attribution assigns causality to an outside factor, such as the weather, culture, politics, globalization, peer pressure, etc.
- Defensive attribution: an attribution of causality that is made to reduce the perceiver's anxiety, known as Self-serving bias or Fundamental Attribution Error.

For example: people often make self serving attributions. So, if something good happens to themselves or someone they like, they tend to see it as a result of their own, stable dispositions. ("I managed the 'Interdisciplinary- I exam' because I'm so intelligent"), and when bad things happen to themselves or people they like they are more likely to make external unstable attributions ("I did badly on the 'Interdisciplinary- I exam' because it was so hard, and I had a headache"). Similarly, they will attribute good things happening to a person that they do not like to a situational factor (they got lucky) and something bad happening to a dispositional factor (they are stupid).

Many factors (e.g. attraction, conformity, etc) play a role in how we assign attributes to behaviors. Obviously, our view of the world, our previous experience with a particular person or situation, and our knowledge of the behavior play an important role. Other factors can influence our interpretation as well, and there are two important errors or mistakes we tend make when assigning these attributes.

I. Fundamental Attribution Error. This is a tendency to over estimate the internal and underestimate the external factors when explaining the behaviors of others. This may be a result of our tendency to pay more attention to the situation rather than to the individual and is especially true when we know little about the other person. For example, the last time you were driving and got cut off did you say to yourself "What an idiot" (or something similar).Chances are that this behavior was assigned mostly internal attributes and you didn't give a second thought to what external factors are playing a role in her driving behavior.

II. Self-Serving Bias. We tend to equate successes to internal and failures to external attributes. Imagine getting a promotion. Most of us will feel that this success is due to hard work, intelligence, dedication, and similar internal factors. But if you are fired, well obviously your boss wouldn't know a good thing if it were staring her in the face. This bias is true for most people, but for those who are depressed, has low self-esteem, or view themselves negatively, the bias is typically opposite. For these people, a success may mean that a multitude of negatives have been overlooked or that luck was the primary reason. For failures, the depressed individual will likely see their own negative qualities, such as stupidity, as being the primary factor.

Why are we attracted to certain people and not others? Why do our friends tend to be very similar to each other? And what causes us to decide on a mate? Many of these questions relate to social psychology in that society's influence and our own beliefs and traits play an important role. Research has found five reasons for attraction and why we choose our friends.

a) Proximity - The vast majority of our friends live close to where we live, or at least where we lived during the time period the friendship developed. Obviously friendships develop after getting to know someone, and this closeness provides the easiest way to accomplish this goal. Having assigned seats in a class or group setting would result in more friends who's last name started with the same letter as yours.
b) Association - We tend to associate our opinions about other people with our current state. In other words, if you meet someone during a class you really enjoy, they may get more 'likeability points' then if you met them during that class you can't stand.
c) Similarity - On the other hand, imagine that person above agrees with you this particular class is the worse they have taken. The agreement or similarity between the two of you would likely result in more attractiveness.
d) Reciprocal Liking - Simply put, we tend to like those better who also like us back. This may be a result of the feeling we get about ourselves knowing that

we are likable. When we feel good when we are around somebody, we tend to report a higher level of attraction toward that person

e) Physical Attractiveness - Physical attraction plays a role in which we choose as friends, although not as much so as in who we choose as a mate. Nonetheless, we tend to choose people who we believe to be attractive and who are close to how we see our own physical attractiveness. This last statement brings up an important factor in how we determine our friends and partner. Ever wonder why very attractive people tend to 'hang around' other very attractive people? Or why wealthy men seem to end up with physically attractive, perhaps even much younger, women? There is some truth to these stereotypical scenarios because we tend to assign "social assets" or "attraction points" to everyone we meet.

These points are divided into categories such as physical attractiveness, sense of humor, education, and wealth. If we view education as very important, we may assign more points to this category making it more likely that our friends or our mate will have more education. If we view wealth as more important, then we will be more likely to find a mate who has more money.

We rate ourselves on these same categories and, at least at some level, know our score. We tend to then pick friends and partners who have a similar score that we do. Hence an attractive person hangs with other attractive people; or a wealthy older man gets the beautiful younger woman. Think about your friends and how you would rate them in these categories to find out what is important to you.

SOCIAL INFLUENCE

Social influence is an aspect of social behavior that deals with the exercise of power by a person or group to change the opinion, attitude and behavior of others. SOCIAL POWER is the basis for social influence. Social influence can also be described by the word power, which means to possess the ability to embrace a person/group of people to one's own will. Usually people who possess beauty, significant sums of money, good jobs and so on will possess social influence on other, "ordinary" people. So even

if the person doesn't possess any "real" or political power but possesses the things listed above (good looks, money, etc.), he could persuade other people into doing something. However, good looks, money, etc. is not solely why attractive people are able to exert more influence than average looking people; for confidence is the byproduct of good looks and etcetera. Therefore, the individual's self-esteem and perceived Persona is the critical factor in determining the amount of influence one exerts.

Scholars further explained social influence as “when the actions or thoughts of individual(s) are changed by other individual(s). Examples of social influence can be seen in socialization and peer pressure. This is the effect of other people on a person's behavior.”

In the case of peer pressure, a person might be forced into doing something (such as doing illegal acts) s/he might not like but is "necessary" to upkeep the positive relationship with the other party, such as the family of their partner. The person could agree to the offering even if he hated it for many reasons; maybe he or she is the possible inheritor of the family/person that asks him or her to come to the opera, the family could want to evaluate the person before letting their son/daughter get married with him/her, etc.

Conformity is an act or ability to abide the norms, values and rules (laws) of the society/country/group/family…. There are three types of conformity:

1. Compliance - This is where the individual says they agree with a particular view point or acts in a certain way in front of the group but doesn't 'really' think that way or 'want' to act that way in private.

2. Identification - This is where the individual says things or acts in a certain way in front of the group because they believe in what they say and do because being part of the group is important to them. This type of conformity is normally only temporary. The individual will revert back to their old beliefs once they have left the group.

3. Internalization - This is where the individual's views are truly altered. The new views become part of the individual's own value system. They don't loose these views even after leaving the group because they wholeheartedly believe the views are correct.

Why Conformity? The two psychological needs that lead humans to conform: (1)Our need to be right (Informational social influence) and;(2)Our need to be liked (Normative social influence).

The other key concepts related to social pressure include self-fulfilling prophecy and social loafing. Self-fulfilling prophecy is the tendency of expectations in regard to a person's behavior or performance to be realized because of the climate, feed back, input, and opportunities for out put that such expectations created. In some literature it is also defined as a false definition of a situation which creates conditions that make it true. Social loafing on the other hand is the concept coined by social psychologists that states "When people work in groups, they work less hard than they do when working individually."

SUMMARY

Social psychology is one of the sub-fields of psychology that deals with understanding and explaining behavioral attributes- how and why people act the way they act, how our behavior affects others and that of others affect our behavior. It deals with these factors known as influences that lead people either to conform or deviate from the agreed up on standard behaviors of human being. Social psychologists are concerned with the meaning, aspects, components and dimensions of attitude, the relationship between attitude and behavior, models of attitude change. Moreover, the study of criteria to identify pro- social or anti-social behaviors.

Social psychology recognizes law enforcement institutions such as the courtroom as a social microcosm: many of the principles of social psychology come alive in this setting

Review Questions (RQs)

1. Give short and precise definition of social psychology

   ……

2. Define attitude and discuss its origins

   ……

3. What are the basic features and concerns of social psychology?

   ……

4. What is the difference between attitude and behavior?

   ……

5. Describe and discuss the components, types and aspects of attitude?

   ……

6. Explain attitude change model with the associated factors

   ……

7. Why attitude change is difficult?

   ……

8. What is behavior?

   ……

9. Discuss the dimension of human behavior and criteria used to identify and distinguish behavior?

   ……

10. . Is there a relationship between attitudes and behavior and, if so, how strong is it? When might such a relationship exist?

    ……

11. How do attitudes influence behavior? In other words, what is the psychological process? Do Attitudes Predict Behavior?

    ……

12. Form a group of 10 and discuss your practical experience on the types, examples and expressions of attitude and behavior and share your experience with the class mates (the instructor will allow 10 minutes for each group for discussion and 3 minutes for reflecting back).

    ……

CHAPTER THREE: FORENSIC PSYCHOLOGY, LAW AND PSYCHIATRY

In chapter two, we learnt the concept, concerns and aspects of social psychology. Now, chapter three deals with forensic psychology. It particularly contains the meaning and roles of forensic psychology and its relationship with legal and criminal psychology, and law. The chapter also comprises topics related to psychology and psychiatry by focusing on relevant issues like criminal responsibility, insanity and civil incapacity.

OBJECTIVES:

Up on completion of this chapter, students will be able to:

- define forensic psychology, legal psychology, criminal psychology and psychiatry
- discuss the roles of forensic psychologists and psychiatrists to the law enforcement institutions
- compare and contrast forensic psychology, legal psychology, criminal psychology and psychiatry
- explain how the knowledge of forensic psychology can be used in dealing with the legal issues including criminal responsibility, insanity and civil incapacity

BASIC QUESTIONS

- What is the meaning of forensic psychology?
- What is the historical development of forensic psychology?
- What are the roles of forensic psychologists?
- What is the difference between forensic-legal- and – criminal psychology?
- What is the relationship between psychology and law?
- What is psychiatry?
- What are the roles of psychiatrists to the law enforcement institutions?
- What is the relationship between forensic psychology and psychiatry?

3.1 FORENSIC PSYCHOLOGY AND LAW: MEANING, ROLE AND RELATIONSHIP

The Meaning of Forensic Psychology

Some authors use a very broad definition for forensic psychology, stating that it encompasses anything that has to do with psychology and the legal system. Others define it within a more applied context. In 2001, the American Psychological Association (APA) formally recognized forensic psychology as:

> *a specialty within the profession, a professional practice by psychologists within the areas of clinical psychology, counseling psychology, neuropsychology, and school psychology, when they are engaged regularly as experts and represent themselves as such, in an activity primarily intended to provide professional psychological expertise to the judicial system.*

While the American Board of Forensic Psychology and APA(1995) defined forensic psychology as:

> *the professional practice by psychologists within the areas of clinical psychology, counseling psychology, industrial psychology, and school psychology, when they are engaged regularly as experts and represent themselves as such, in activity primarily intended to provide professional psychological expertise to the judicial system. Such a definition focuses the field on the mental health aspects of psychology and the law and away from the more experimental areas of selecting law enforcement professionals and eyewitness identification.*

Forensic Psychology is thus the application of the principles, perspectives and methods of psychology to the criminal justice system (Wrightsman, Lawrence S, 2001; Howitt Dennis, 2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998).

The following are terms that are important to be familiar with when students of law learning about Forensic Psychology:

Competency: The mental condition of the defendant at the time of trial is brought up

every now and then by the defendant. If a defendant is found to be incompetent, our justice system will not usually punish him/her.

Insanity: Sometimes forensic psychologists are asked to determine whether a defendant was mentally capable at the time an offense was committed, commonly by employing the substantial *capacity rule*.

Expert Witness: The majority of forensic psychologists testify in court for both the defense and also for prosecuting attorneys about the sanity and competency of defendants, the accuracy of the eye witness, in child custody cases, and also a variety of other things.

Criminal Profiling: With a lot of experience and schooling, one could work closely with local police and also federal agencies to create psychological profiles of defendants.

Consulting: Many forensic psychologists work with attorneys in selecting judges/the police/prosecutors, analyzing the potential verdicts, and explaining actual trial

(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998; (http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*,Charles W. et al ,2007).

Forensic psychology covers a broad range of practices primarily involving courtroom testimony on given issues. Forensic psychologists are appointed by the court to conduct competency to stand trial evaluations, competency to be executed evaluations, sanity evaluations, and involuntary commitment evaluations, provide sentencing recommendations, and sex offender evaluation and treatment evaluations and provide recommendations to the court through written reports and testimony.

Most of the questions the court asks the forensic psychologist are not questions of psychology but rather legal questions. For example, there is no definition of sanity in

psychology. Rather, sanity is a legal definition that varies from state to state or jurisdiction to jurisdiction and country to country. Therefore, a prime qualification of a forensic psychology is an intimate understanding of the law, especially criminal law.

HISTORY OF FORENSIC PSYCHOLOGY

When considering the history of forensic psychology, it could be argued that a relationship between psychology and the law has always existed because in essence both are fundamentally concerned with human behavior. In terms of a tangible landmark in the history of forensic psychology, the most significant development was the founding of the first psychological laboratory in 1879 by Wilhelm Wundt in Leipzig Germany.

Wilhelm Wundt championed and refined the experimental method within psychology. This rigorous methodology provided the framework for a whole host of applied psychological investigations, among them certain legal issues. For instance, in 1895 Cattell conducted experiments into the nature of testimony and in doing so highlighted the effects of situational and individual differences; which incidentally are still being examined today(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998).

Forensic Psychology dates back to at least the turn of the twentieth century. William Stern studied memory in 1901 by asking students to examine a picture for forty-five seconds and then try to recall what was happening in it. He would see how much the person could recall at various intervals after seeing the picture. These experiments came before more contemporary research about the reliability of eyewitnesses' testimony in court. Stern concluded from his research that recall memories are generally inaccurate; the more time between seeing the picture and being asked to recall it, the more errors were made. People especially recalled false information when the experimenter gave them a lead-in question such as, "Did you see the man with the knife?" The person would answer, "yes," even if there was no knife present. Lead-in questions are often used in police interrogations and in questioning witnesses.

Hugo Munsterberg is often called the first forensic psychologist. He wrote a book called *On the Witness Stand*. It was published in 1908, after the work of William Stern. Other psychologists before this, such as Alfred Binet and Sigmund Freud, had also constructed tests that could be used in judicial proceeding. They both did studies suggesting that the time it takes for a person to answer a question could be a factor in determining guilt or innocence.

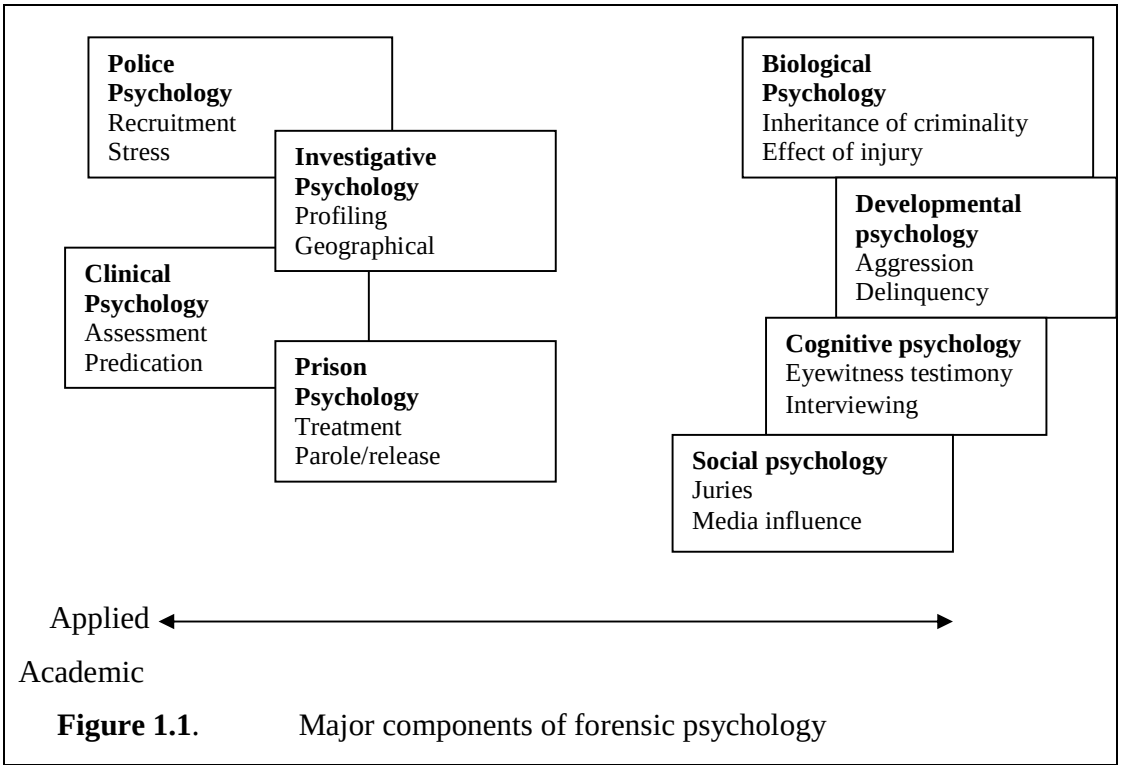


Figure 1.1. Major components of forensic psychology

(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998; (http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*,Charles W. et al ,2007).

The history of forensic and criminal psychology will depend on the teller. Usually, histories are written from a certain point of view. The history as told by an American academic will be different from the one written by a European academic. The history as written by a psychiatrist will be different from that of a psychologist. And the history written by a lawyer would be different from both of these. Some key elements

are shown in Figure 1.2. A number of matters are central to the history of forensic and criminal psychology.

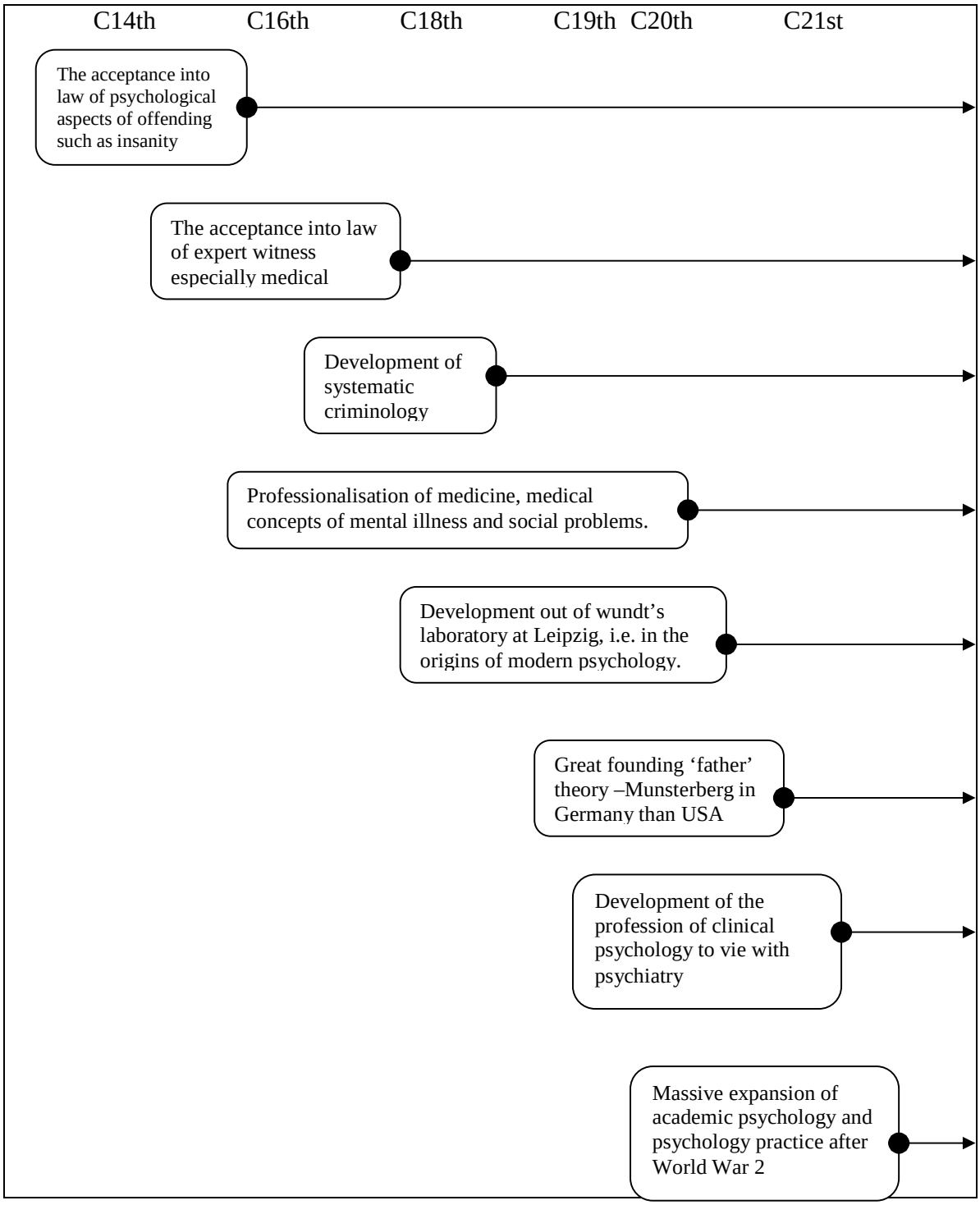


Figure 1.2. Different component in the historical origins of forensic and criminal psychology

(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998; (http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*,Charles W. et al ,2007).

Roles of Forensic Psychologists

There are many specialist areas of psychology that will contribute to the law enforcement institutions (e.g. Forensic-, Legal-, Criminal-, Court-, Correctional-, Clinical- etc psychologists). In dealing with legal matters, there might be an overlap between these specialist areas. However, forensic psychology is the most common field of specialization getting attention in the legal system practices.

Key tasks undertaken by forensic psychologists include the provision of psychological information for the purpose of facilitating a legal decision. They deal with the psychological aspects of legal processes in courts by applying psychological theory to criminal investigation, understanding psychological problems associated with criminal behavior, and the treatment of criminals. However, the roles and involvement of forensic psychologists might overlap with that of legal and criminal psychologists.

Clinical psychologists are broadly concerned with the assessment and treatment of persons with mental illnesses or disorders ranging from the less severe (marital difficulties and minor adjustment problems) to the more severe (e.g., schizophrenia, major depression, mania or psychosis).

Clinical psychologists specializing in forensic psychology work with individuals who may present with a variety of mental illnesses within the context of the criminal or civil arenas of the law. Examples may include personal injury suits, civil commitment proceedings, child custody disputes, or workers' compensation cases. Criminal areas of forensic psychology include those situations in which an individual has committed a crime against society. The following cases necessitate the involvement of a forensic

psychologist: pleading insanity, raising issues of competency to stand trial, assessment of future violence potential during sentencing, or treatment of sex offenders.

Forensic psychologists delve into the vast psychological perspectives and apply them to criminal justice system. They frequently deal with legal issues, such as public policies, new laws, competency, and also whether a defendant was insane at the time a crime occurred. Knowledge of Forensic psychology is used in various forms, such as in treating mentally ill offenders, consulting with attorneys (e.g., on picking a jury), analyzing a criminal's mind and intent, and practicing within the civil arena.

Forensic psychologists perform a wide range of tasks within the criminal justice system. By far, the largest is that of preparing for and providing testimony in the court room. This task has become increasingly difficult as attorneys have become sophisticated at undermining psychological testimony. Evaluating the client, preparing for testimony, and the testimony itself require the forensic psychologist to have a firm grasp of the law and the legal situation at issue in the courtroom, using the various sources of data. This knowledge must be integrated with the psychological information obtained from testing, psychological and mental status exams, and appropriate assessment of background materials, such as police reports, prior psychiatric or psychological evaluations, medical records and other available pertinent information

The practice of forensic psychology involves understanding criminal law in the relevant jurisdictions in order to be able to make legal evaluations and interact appropriately with judges, attorneys and other legal professionals. An important aspect of forensic psychology is the ability to testify in court, reformulating psychological findings into the legal language of the courtroom to provide information to legal personnel in a way that can be understood. Further, in order to be a credible witness, for example in the United States, the forensic psychologist must understand the philosophy, rules and standards of the American judicial system, as well as display competency in psychological practice. There are also rules about hearsay evidence and importantly the exclusionary rule. Lack of a firm grasp of these procedures will result in the forensic psychologist losing credibility in the courtroom. Please read the following for some key areas of forensic psychologist's involvement:

1. Malingering and deception

An overriding issue in any type of forensic assessment is the issue of malingering and deception. A defendant may be intentionally faking a mental illness or may be exaggerating the degree of symptomatology. The forensic psychologist must always keep this possibility in mind. It is important if malingering is suspected to observe the defendant in other settings as it is difficult to maintain false symptoms consistently over time. In some cases, the court views malingering or feigning illness as obstruction of justice and sentences the defendant accordingly. In some countries (e.g US) malingering or feigning illness during a competency evaluation was held to be obstruction of justice and led to an enhanced sentence. As such, fabricating mental illness in a competency-to-stand-trial assessment now can be raised to enhance the sentencing level following a guilty plea.

2. Competency evaluations

If there is a question of the accused's competency to stand trial, a forensic psychologist is appointed by the court to examine and assess the individual. The individual may be in custody or may have been released on bail. Based on the forensic assessment, a recommendation is made to the court whether or not the defendant is competent to proceed to trial. If the defendant is considered incompetent to proceed, the report or testimony will include recommendations for the interim period during which an attempt at restoring the individual's competency to understand the court and legal proceedings, as well as participate appropriately in their defense will be made. Often, this is an issue of the defendant complying with prescribed psychiatric medication for a period long enough for the medication to take effect. If the individual does not gain competence after a suitable period of time, that person may be involuntarily committed, on the advice of a forensic psychologist, to a psychiatric treatment facility until such timeas the individual is deemed.
competent(http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*,Charles W. et al ,2007).

3. Sanity evaluations

The forensic psychologist may also be appointed by the court to evaluate the defendant's state of mind at the time of the offense. These are defendants who the judge, prosecutor or public defender believes, through personal interaction with the defendant or through reading the police report, may have been significantly impaired at the time of the offense. In other situations, the defense attorney may decide to have the defendant plead not guilty by reason of insanity. In this case, usually the court appoints forensic evaluators and the defense may hire their own forensic expert. In actual practice, this is rarely a plea in a trial. Usually any judgments about the defendant's state of mind at the time of the offense are made by the court before the trial process begins.

4.Sentence mitigation

Even in situations where the defendant's mental disorder does not meet the criteria for a not guilty by reason of insanity defense, the defendant's state of mind at the time, as well as relevant past history of mental disorder and psychological abuse can be used to attempt a mitigation of sentence. The forensic psychologist's evaluation and report is an important element in presenting evidence for sentence mitigation (Court of Appeals might reverse the decision of a lower court because counsel might not thoroughly investigate the defendant's mental history in preparation for the sentencing phase of the trial). Specifically, the court stated that such investigation should include members of the defendant's immediate and extended family, medical history, and family and social history (including physical and mental abuse, domestic violence, rape, exposure to traumatic events and criminal violence).

Forensic psychologists are frequently asked to make an assessment of an individual's risk of re-offending or dangerousness. They may provide information and recommendations necessary for sentencing purposes, grants of probation, and the formulation of conditions of parole, which often involves an assessment of the offender's ability to be rehabilitated. They are also asked questions of witness

credibility and malingering. Occasionally, they may also provide criminal profiles to law enforcement.

Dear student! It is important to note and realize that no single Forensic Psychologist performs all of the stated tasks. Specific practitioners need to focus on a specific area of the field, and thereby become an expert in that particular area. For instance, the Court Psychologist tends to have a experimental background, while the Correctional Psychologist is typically a Clinical Psychologist with forensics training, the same is true for Legal psychologist, Criminal Psychologist and so on. The investigative practitioner, however, is a fuzzier boundary.

Relationship between Forensic Psychology and Law

In the first unit we have learnt that psychology is related to law and legal practices. Whilst, in this part of the unit, we will learn how forensic psychology is related to law. We will thus learn the concerns and differences between forensic psychology, legal psychology and criminal psychology.

Forensic psychology, Legal Psychology and Criminal Psychology

Forensic-, legal- and criminal-psychology are aspects and sub-specializations in psychology primarily concerned with the application of psychological methods and principles germane to legal questions and issues.

Forensic psychology generally involves a clinical analysis of individual as it pertains to some legal question or issue. It is the intersection between psychology and the criminal justice system, concerned with the collection, examination and presentation of psychological evidence for judicial purposes.

Forensic Psychology and the Court System

In the court system, Forensic Psychologists are frequently used for both criminal and civil cases. In the criminal realm, the forensic psychologist is often asked to assess competency. Competency assessments can serve a number of purposes. First, a

defendant can be assessed for the ability to stand trial and/or make legal decisions on their own behalf. These evaluations are carried out when the defendant appears to suffer from a mental defect, such as an acute psychiatric disorder (i.e., schizophrenia) or a mental disability (i.e., mental retardation). Secondly, psychologists may also be asked to make an evaluation regarding the defendant's mental state at the time of the offense. The entire "not guilty by reason of insanity" defense relies on the psychological evaluation of a defendant's inability to form criminal intent. Frequently, people forget about the applications of forensic psychology to civil law. Often a forensic psychologist is asked to make evaluations of defendants or plaintiffs disability or level of trauma. From these evaluations the court can decide whether compensatory damages should be provided. Civil-forensic psychologists also work on child custody, sexual harassment, and immigration cases. Virtually, any civil matter that requires psychological evaluation may include the work of a forensic psychologist. It is important to remember that not all Forensic Psychologists work with violent criminals. The forensic psychologist that investigates the social-legal components of the common law court system can provide influential knowledge to both criminal and common law cases. Forensic psychologists often are asked to evaluate potential jury members. To this date numerous 'mock'-jury investigations have been published. From this research, one can determine who is a potentially prejudiced juror. Many believe that a good evaluator can determine, before the case, which jurors are on their side. These psychologists identify jurors who are potentially prejudicial to their case, and whom can thereby be eliminated from the jury panel during jury selection (or 'voir dire' as it is called in the legal realm). Since both sides can challenge potential jurors this will not usually stack the jury in the favor of either the defense or prosecution. The result is hopefully a fairly balanced jury. These jury experts can also inform the attorney in regards to potential ways to influence the jury. This can include a number of things from the defendant's clothing to the lawyers mannerisms. Many social-legal psychologists are also experts at how to psychologically motivate witnesses. They will inform the lawyer of potential questions that could stump a witness or set him/her off on a tantrum. Such theatrics can be very influential in a trial.

Legal Psychology

The term "legal psychology" has only recently come into use, and typically refers to any non-clinical law-related research.

Legal psychology is a research-oriented field populated with researchers from several different areas within psychology (although social and cognitive psychologists are typical). Legal psychologists explore such topics as jury decision-making, eyewitness memory, scientific evidence, and legal policy.

Legal psychology encompasses empirical research on topics exploring the relationship between law and psychological and behavioral processes. Some legal psychologists contend that given the nature of memory, eyewitness testimony can never be totally accurate and reliable.

Criminal Psychology

Criminal psychology is the study of the wills, thoughts, intentions and reactions of criminals. It is related to the field of criminal anthropology. The study goes deeply into *what makes someone commit crime*, but also the reactions after the crime, on the run or in court. Criminal psychologists are often called up as witnesses in court cases to help the jury understand the mind of the criminal.

Criminological psychology is the application of psychological principles to criminal activity, especially criminal behaviour and it's effect on crime prevention, risk assessment and the criminal justice system.

A major part of Criminal psychology, known as offender profiling, began in the 1940's when the United States Office of Strategic Services asked William L. Langer's son Walter C. Langer, a well renowned psychiatrist, to draw up a profile of Adolf Hitler. After the Second World War British psychologist Lionel Haward while working for the Royal Air Force police, drew up a list of characteristics which high-ranking Nazi war criminals might display, to be able to spot them amongst ordinary captured soldiers and airmen. In the 1950's, US psychiatrist James A. Brussel drew up what turned to be an uncannily accurate profile of a bomber who had been terrorizing New York. The fastest development occurred when the FBI (Federal Bureau of

Investigation) opened its training academy in Virginia. It led to the establishment of the National Center for the Analysis of Violent Crime and the violent criminal apprehension program. The idea was to have a system which could pick up links between unsolved major crimes.

Among the most notable people who criticized how psychology and psychiatry treated crime as an identity is French philosopher Michel Foucault in *Discipline and Punish*. Foucault showed how, since its birth, the prison had been criticized by a reformist movement, which showed that it created a class of professional criminals (*recidivists*), separated from the popular classes, and often used by the police as informants and to carry out shady acts for the act. In other words, far from stifling criminality, the reformist movement showed that prison created and perpetrated a class of professional criminals. Henceforth, Foucault concluded that the prison's alleged failure (in rehabilitating criminals) was in fact its success, and that it was used as a disciplinary technology to control the population. Foucault also showed that, if the penal system in Early Modern Europe punished the crime in itself, the act itself, the new disciplinary system punished the person, and not the crime. It did not ask: "what did you do?" (as in the classical school of criminology; i.e. Cesare Beccaria and Jeremy Bentham), but "who are you?" (as in the Italian school, Cesare Lombroso, etc.) In this frame, the role of criminal anthropology, psychiatry, etc., became evident as a tool used to create the notion of "dangerous persons."

Criminal psychology has, in recent years, certainly been typed as an all seeing discipline which can solve the vagaries of crime, especially those related to murder with special emphasis on the serial killer. With films such as Silence of the Lambs and the newly released Hannibal, based on books by Thomas Harris, show that perpetrator profiling can be used to indicate how the criminal thinks, their motivation and modus operandi. However, as with most things, it is not quite that simple. Profiling can indeed be a useful tool. But it must be considered in conjunction with the traditional investigative procedures and evidence gathered at the scenes of crimes by other forensic professionals. In the absence of hard physical evidence, profiling can open up new leads of investigation, but it is a tool that can be used in apprehending the offender.

Criminal psychologists investigate and address questions like “How are criminals made?” They involve in such examinations and believe that criminals just were criminals because of their family traits, chromosomes and DNA, environmental factors, economics through to the current belief that criminals occur because of biochemical imbalance and neurological defects in the brain. Whilst the causative factors that lead to criminality will possibly indicate that many, if not all these factors do indeed have a cumulative effect on a person’s vulnerability to become a criminal, it is a fact that criminals exist and that many continue to escape justice.

3.2. PSYCHOLOGY AND PSYCHIATRY

Psychiatry on the other hand is a branch of medicine which exists to study, prevent, and treat mental disorders and mental illnesses(e.g. depression, anxiety, mania, psychosis, sexual disorder, speech disorder, conflict and other maladjustment problems that have biological nor non-biological origins) in humans. The art and science of the clinical application of psychiatry has been considered a bridge between the social world and those who are mentally ill. Both its research and clinical application are considered interdisciplinary. Because of this, various subspecialties and theoretical approaches exist in psychiatric research and practice. Psychiatrists can be considered physicians who specialize in the doctor-patient relationship utilizing some of medicine's newest classification schemes, diagnostic tools and treatments. Psychiatry also may deal with aspects of criminal behavior.

Ancient psychiatry originated in the 5th century BC with the ideology that psychotic disorders were supernatural in origin. At that time, clergy were the individuals in society with the responsibility of "curing" mental disorders. By the middle ages psychiatric hospitals were first created as custodial institutions to house those with mental disorders. During the 18th century, the idea arose that mental health institutions could utilize treatments. As a result of these early psychiatric interventions, the 19th century saw a massive increase in patient populations. This dramatic increase led to the decline of treatments offered in such institutions and damage to the reputation of psychiatry.
(http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*)

The 20th century saw a rebirth of a biological understanding of mental disorders as well the introduction of disease classification. The shift of psychiatry to the hard sciences moved psychiatry into a different direction which resulted in an altered doctor-patient relationship. These changes were seen by many in society as negative and anti-psychiatry movements emerged. The shift in thinking, as well as the introduction of psychiatric medications, for example, led to the dismantling of psychiatric hospitals in the US. While community treatment was seen as the single solution for those suffering from mental disorders, clinicians soon realized that it was only another treatment option following the drift of disturbed populations into homelessness and prisons(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998). The dramatic changes associated with psychiatric diagnoses and treatments have pushed the field into recognizing the balance between the biological and social sciences and have called for a significant demand of research looking into the origins, classification, and treatment of mental disorders

VIOLENCE AND MENTAL ILLNESS

Mental illness includes a broad range of health problems. For most people, mental illness is thought of as an illness associated with severe behavioral disturbance such as violence, agitation and being sexually inappropriate. Such disturbances are usually associated with severe mental disorder (e.g. psychoses) or common mental disorder (e.g. anxiety, depression, frustration, stress). However, the vast majority of those with a mental illness behave and look no different from any one else. These common mental health problems include depression, anxiety, sexual problems, drug addictions, alcoholism and so on. We, as a human being and as lawyers, are concerned with mental illnesses because they affect us all, they are major social welfare and public health burden.

Empirical studies of violence and mental illness have used many different methods. The relationship between mental illness and violence has long been the subject of debate both within the mental health professions and in the broader public. Indeed, debates about both the need for, and nature of, the care provided to people with mental

illness is often premised on the idea that such individuals are more likely to be perpetrators of violence.

The legal basis for involuntary commitment in almost every jurisdiction is based on the concept of dangerousness to self or others. Similarly, much of the public opposition to community-based programs for people with mental illness appears to reflect concerns about violence.

Research has produced a mixed picture of the connection of mental illness and violence, with empirical studies varying in their conclusions about the relationship between mental illness and violence (Link & Steuve, 1994; Steadman & Mulvey, 1998; Swanson, 1994; Swanson & Holzer, 1990, cited in Charles et al 2007). Some authors have suggested that violence is integrally linked to psychosis and that policies about the treatment of people with mental illness should reflect that connection (Torrey, 1998; Torrey & Zdanowicz, 2001, cited in Charles et al 2007). Others have argued that, absent co-occurring substance abuse, there is only a weak association between mental illness and violence. These differences warrant continued research on the prevalence of violence associated with people who are mentally ill.

The earliest scientific studies of violence and mental illness resulted from judicial orders discharging patients from public hospitals who had previously been found to be dangerous to others by clinical review. These studies used a subsequent review of official records to see what violence had been committed after discharge into the community. These studies concluded that violence among people with mental illness was quite rare. In the early 90s, two large epidemiological surveys challenged the message of the earlier research. Their overall conclusions were that people with mental illness, especially when their lifestyle involved a substantial amount of substance use, were many times more likely to be involved in violence than similar individuals who were not mentally ill. At about the same time, two other studies, using a mixture of sources including self-report, collateral reports from family or friends, and police and medical records, reported that rates of violence were much higher than had previously been thought. Although the epidemiological studies have been widely cited, on balance we believe that the multi-source method used in the subsequent

studies provides more accurate estimates of the rate of involvement in violence. The multisource method finds higher rates of violence and, unless one believes that respondents are making up incidents of violence, this suggests that they are more accurate.

Mental disorder can include any mental abnormality which causes impairment with the exception of voluntary intoxication or transient mental states such as hysteria or concussion. Consequently, personality disorders are eligible for this defence. At the present time this is uncommon, largely because appellate court decisions have rendered it unlikely that an individual with a personality disorder would be unable to appreciate the nature and quality of the act in the manner that the courts have ruled.

FORENSIC PSYCHIATRY

Forensic psychiatry encompasses the interface between law and psychiatry. Some practitioners of forensic psychiatry have taken extra training in that specific area. For instance, in the United States one year fellowships are offered in this field to psychiatrists who have completed their general psychiatry training. In Britain, one is required to complete a three-year subspecialty training in forensic psychiatry, after completing one's general psychiatry training, before receiving a Certificate of Completion of Training as a forensic psychiatrist. In some countries general psychiatrists can practice forensic psychiatry as well. However, in some countries, such as Japan, require a specific certification from the government to do this type of work. Whilst in countries like Ethiopia there is no empirical evidence at this moment on the existence of forensic psychiatrists than medical doctors with specialization in psychiatry(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998).

Forensic psychiatrists work with courts in evaluating an individual's competency to stand trial, defenses based on mental diseases or defects (e.g., the "insanity" defence), and sentencing recommendations. There are two major areas of criminal evaluations in forensic psychiatry: CST and MSO.

i) Competency to stand trial **(CST):** This is the competency evaluation to determination that a defendant has the mental capacity to understand the charges and assist his/her attorney. Forensic psychiatrists are often called to be expert witnesses in both criminal and civil proceedings. Expert witnesses give their opinion about a specific issue. Often the psychiatrist will have prepared a detailed report before testifying. The primary duty of the expert witness is to provide an independent opinion to the court.

ii) Mental state opinion **(MSO):** This gives the Court an opinion, and only an opinion, as to whether a defendant was able to understand what he/she was doing at the time of the crime. This is worded differently in many countries, and has been rejected altogether in some, but in every setting, the intent to do a criminal act and the understanding that it was a criminal act bear on the final disposition of the case. Much of forensic psychiatry is guided by significant Court ruling or laws that bear on this area. "Not guilty by reason of insanity" is one potential outcome in this type of trial. It is important to note that insanity is a legal and not a medical term. Often there will be a psychiatrist(s) for the defense as well as the prosecution.

Forensic psychiatrists are also involved in the care of prisoners, both those in jails and those in prisons, and in the care of the mentally ill and dangerous (such as those who have been found not guilty by reason of insanity).

Many past offenders against other people, and suspected or potential future offenders with mental health problems or an intellectual or developmental disability, are supervised in the community by forensic teams containing a variety of professionals, including psychiatrists, psychologists, sociologists, nurses and social workers. These teams have dual responsibilities, to promote both the welfare of their clients and the safety of the public. The aim is not so much to predict as to prevent violence, by means of risk management.

Risk assessment and management is a growth area in the forensic field. This began with the attempt to predict the likelihood of a particular kind of offence being repeated, by combining "static" indicators from personal history and offence details in actuarial. More recently, use is being made also of "dynamic" risk factors, such as

attitudes, impulsivity, mental state, family and social circumstances, substance use, availability and acceptance of support, to make a "structured professional judgement." The aim of this is to move away from prediction to prevention, by identifying and then managing risk factors. This may entail monitoring, treatment, rehabilitation, supervision and victim safety planning and depends on the availability of funding and legal powers. We will learn more on these aspects and related issues in the forensic science part of the course.

What is the meaning and origins of incapacity?

Art.192 of the Civil Code (Ethiopia) establishes the principle as follows:

> *Every physical person is capable of performing all the acts of civil life unless he is declared incapable by the law.*

According to this provision, capacity is the rule and incapacity is the exception. Unless otherwise provided by law, as we will see in soon, a person is presumed to be capable. It is only when the law explicitly declares that the person is incapable that we say he is. If somebody argues that X is incapable s/he must submit evidence to that effect. But if X claims that s/he is capable, s/he is not required to submit evidence.

Besides, no incapacity is absolute. Even when a person is declared to be incapable by the law, there remains a certain area where s/he has capacity. There are always certain categories of legal life that the incapable person is free to perform. In other words, incapacity applies to acts that are defined by law (refer Law of Persons course).

Articles 193 and 194 of the Code divide incapacities into two:

Art.193-General disabilities
General disabilities depend on the age or mental condition of persons or on sentences passed upon them.

Art.194.-Special disabilities

1. Special disabilities may be prescribed by reason of the nationality of persons or of the functions exercised by them.
2. They shall be as provided by Chapter 5 of this Title (Arts.389-393) and by special laws.

Here, the word disability is equivalent to incapacities. Hence, a minor is a person who is below the age of 18 in Ethiopia. He/she is incapable by reason of his/her age. The law considers people under the age of 18 incapable to perform certain legal acts. They are immature in the ways of life and need care and protection. People with metal disease are incapable of performing certain legal acts by reason of their mental condition. Persons subjected to a criminal sentence are also incapable of exercising certain rights.

What is Insanity?

Insanity, or madness, is a general popular and legal term defining behavior influenced by mental instability. It is defined by the Merriam-Webster dictionary as a deranged state of the mind or lack of understanding.

Today, it is most commonly encountered as an informal term or in the narrow legal context of the insanity defense, and in the medical profession, the term is now avoided in favor of specific diagnoses of mental illness as schizophrenia and other psychotic disorders. When discussing mental illness in general terms, "pathology" is also considered a preferred descriptor.

While in criminal law, insanity may serve as a defense to criminal acts, yet jurisdictions differ in their definition of insanity. As you may know very well, insane persons also need protection. The law seems to make a distinction between notoriously insane persons and persons whose insanity is not notorious. Notorious insanity is apparent insanity. The law considers an insane person a notorious one if he/she is an inmate of a mental asylum and in a community of less than two thousand people if his/her family keeps watch of him/her due to his/her insanity. Psychologists(forensic, legal and criminal psychologists) thus play key roles in insanity cases such as

assessing the defendants and criminal responsibility(Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998).

Exercise: The law provides more protection to the notoriously insane person than to the insane person whose insanity is not notorious. How? Why?

All jurisdictions require a sanity evaluation to address the question first of whether or not the defendant has a mental illness. Most courts accept a major mental illness such as psychosis but will not accept the diagnosis of a personality disorder for the purposes of an insanity defense. The second question is whether the mental illness interfered with the defendant's ability to distinguish right from wrong. That is, did the defendant know that the alleged behavior was against the law at the time the offense was committed.

Besides some jurisdictions add the question of whether or not the defendant was in control of his/her behavior at the time of the offense. For example, if the defendant compelled by some aspect of his/her mental illness to commit the illegal act, the defendant could be evaluated as not in control of his behavior at the time of the offense. The forensic mental health specialists submit their evaluations to the court. Since the question of sanity or insanity is a legal question and not a medical one, the judge and or jury will make the final decision regarding the defendant's status regarding an insanity defense.

In most jurisdictions(e.g. within the United States), if the insanity plea is accepted, the defendant is committed to a psychiatric institution for at least 60 days for further evaluation, and then reevaluated at least yearly after that.

Understanding Criminal Responsibility

For individuals to be found Not Responsible for their act or omission their mental disorder must render them unable to know the nature and quality of the act or that it was wrong. A person is not responsible for criminal conduct if at the time of such conduct, as a result of physical or mental disease, disorder, or defect, he/she lacks substantial capacity either to appreciate the wrongfulness of his/her conduct or to conform his/her conduct to the requirements of law. As you all know, criminal responsibility varies with age as well (Wrightsman, Lawrence S,2001; Howitt Dennis,2002; Wrightsman, L. Nietzel, M., and Fortune, W.1998; http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*,Charles W. et al ,2007).

What Does a Psychiatrist need to assess "Not Criminally Responsible" Issue (NCR)? For more insight please go through the following notes.

- Crown's file including police reports, witness and victim statements
- Previous psychiatric records
- Autopsy report
- Clinical interview with accused
- Mental status examination of accused
- Direct questioning of accused regarding knowledge of wrongfulness
- Detailed account from accused about circumstances of offense
- Possible psychological testing
- Possible neurological examination(s)

Patterns of Criminality and Mental Disorder

- Crime is a response to psychotic symptoms, such as delusions and hallucinations
- Crime motivated by compulsive urges, such as paraphilias or disorders of impulse control

- Crime is the result of a personality disorder
- Coincidental mental disorder not related to crime
- Mental disorder results from the crime – dissociation, depression

- Malingered mental disorder to avoid responsibility

Factors to be considered in assessing Criminal Responsibility

- Evidence of mental disorder currently, in the past and at time of offense, presence of delusions and mood disorder
- Motive for offense
  - if no apparent motive other than psychotic, suggests valid mental disorder
  - if rational motive also present, such as profit, suspect malingering or coincidental mental disorder
- Consider planning and preparation for crime
- Evidence of impaired functioning within a few days of the crime
- Detailed understanding of accused's thinking and behavior before, during and after crime
  - evidence of bizarre behavior
  - attempt to escape or avoid detection
- Consider criminal record and personality disorder
- Consider previous psychiatric history
- Do previous hospital records describe delusions or hallucinations that relate to current offense?
- If the accused did not know the act was wrong, was this due to mental disorder?

Evidence of Knowledge of Wrongfulness. There are different sources of knowledge of wrongdoing:

I. Efforts to avoid detection
   - wearing gloves during crime

- waiting until dark
- taking victim to an isolated place
- wearing mask or disguise
- concealment of a weapon on way to crime
- falsifying documents (passport, firearm permit)
- giving a false name
- threatening to kill witnesses if they report to police
- giving a false alibi

II. Disposing of evidence
- wiping off fingerprints
- washing off blood
- discarding of murder weapon
- burying a murder victim secretly
- destroying incriminating documents

III. Efforts to avoid detection
- fleeing from the crime scene
- fleeing from the police
- lying to the police

IV. Statement by the defendant that he or she knew the act was wrong at the time of the offense

V. Notifying the police that a crime was committed

VI. Expression of remorse or guilt after the crime committed

VII. Absence of hallucinations or delusions suggesting that the offense was justified

What types of mental disorders qualify for Non Criminal Responsibility Defence?

I. Major mental disorders (psychotic disorders) and mental retardation generally not controversial

II. Personality Disorders

- enduring patterns of inflexible, maladaptive ways of perceiving, relating to or thinking about the environment and oneself
- onset in childhood and exhibited in a wide range of important social and personal contexts

- schizophrenia and antisocial behaviors

III. Paraphilias

- recurrent, intense sexual urges and sexually arousing fantasies involving non-human objects, children or non-consenting persons, or the suffering of oneself or sexual partner (sexual deviations, anomalies, perversions)
- no impairment of reasoning
- do not usually think of themselves as mentally disordered
- general public tends to think of them as "bad" rather than "mad"

Psychiatric Symptoms and the NCR Defense

Command Hallucinations

- many mentally ill accused's will report hallucinations that are not directly related to the criminal offense
- some experience hallucinations that demand actions, sometimes compelling the individual against his or her will
- almost half of patients experiencing this symptom did not admit them to the evaluating psychiatrists
- many patients with this symptom reported very frequent unquestioning obedience to their hallucinations
- why have the commands been obeyed on this occasion and not before?
- did the subject try to stop himself from acting? (?immediate and unquestioning more likely involve impaired cognitive judgment)
- any attempt to avoid detection, etc?
- commands from *God /Allah*(selected obedience, e.g. when no one is around)

Paranoid Delusions

- often central to NCR defense
- individual acts out patiently false beliefs that they are being persecuted by others, that their life is in danger and attempt to "protect" themselves from

imagined threats

mere presence of delusions at the time of an offense does not necessarily qualify for an NCR defense

- Was the delusion explicit or just a vague belief e.g. that they "have to carry out the will of God/Allah"?
- Why was it necessary to carry out the offense rather than not?
- Did accused consider non-criminal alternatives?

Automatism

Automatism refers to activity performed without conscious awareness and usually followed by complete amnesia. An artificial distinction has been made between insane and non-insane automatisms based on whether or not the condition arose from intrinsic factors. This special category of defence to a criminal charge, is defined in a leading Canadian case as:

- "unconscious, involuntary behavior, the state of a person who, though capable of action, is not conscious of what he is doing. It means an unconscious, involuntary act, where the mind does not go with what is being done."

Current law requires a two-step approach

- Defense must provide evidence to enable the trial judge to instruct appropriate law enforcement body that, on the balance of probabilities, the accused acted involuntarily. Psychiatric evidence is required as well as consideration of such factors as: severity of the triggering stimulus, evidence of bystanders, history of automatistic-like dissociative states, evidence of motive, and whether the alleged trigger of the automatism was also the victim.
- Judge must determine whether it is a *mental disorder* or *non-mental disorder* automatism
- The first consideration is whether or not there is a mental disorder. There are two approaches to this that should be considered holistically rather than alternatively:
    1. How a normal person would react in the same circumstances – an extremely shocking trigger would be required in a normal person;

2. Any condition likely to present a recurring danger to the public should be treated as a disease of the mind. Absence of continuing danger however does not preclude a finding of disease of the mind. Psychiatric evidence is relevant.

Mental Disorder Automatism

The determination of this is left to the fact finder (judge or appropriate law enforcement body). Cases proceed like any other cases. Certain clinical conditions may produce "mental disorder automatisms":

- Catatonic schizophrenia
- Cerebral tumour
- Cerebral vascular disease
- Epilepsy - especially the type known as temporal lobe epilepsy or complex partial seizures

Several criteria have been proposed though cases have been reliably reported in which many were not present:

- Unequivocal evidence of epilepsy (though not necessarily of automatisms)
- Crime was sudden and with no obvious motive – no planning or premeditation
- Crime appears senseless and there was typically no attempt at concealment or escape
- Abnormal behavior was of brief duration (minutes rather than hours) and never entirely appropriate to the circumstances
- Witnesses may have noticed impairment of awareness (e.g. inappropriate actions or gestures, stereotypic movements, unresponsiveness, irrelevant replies to questions, aimless wandering, dazed, vacant expression)
- Amnesia the rule but no continuing anterograde amnesia for events following resumption of conscious awareness

Non-mental Disorder Automatism (NMDA): These can be determined by the trial judge alone and results in a complete acquittal. Certain clinical conditions may cause NMDA:

- Cerebral concussion
- Hypoglycemia (low blood sugar)
- Drugs (medically administered)
- Alcohol- idiosyncratic or pathological intoxication
- Dissociative state
- Sleepwalking (and sometimes sleeptalking)
- Parasomnias- behavioral phenomena inappropriate to the sleeping state
- Commoner in childhood but can occur for the first time in adults
- Violence can occur in various sleep disorders:
    - associated with sudden wakening
      – sleep drunkenness
      – confusion, disorientation, misinterpretation of reality on sudden arousal from deep (stage 3 or 4) sleep
      – may act as if defending against imagined attack
      – no subsequent recall
    - associated with sleepwalking
      – complex coordinated actions
      – includes destruction of surrounding objects, self injury or injury to others
      – victim usually a spouse or very close kin or sibs
      – repeat actions actually common and repeated
      – genetic predisposition
      – may be precipitated by external factors
    - night terrors
      – probably commonest parasomnia
      – may have some recall of a frightening dream
      – behaviour suggestive of night terror witnessed by others
      –REM sleep behaviour disorder
      – mainly elderly men

– 50% neurological disorder – none with psychiatric abnormality

– dream enactment during REM

(http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; http://springerlink.com,Charles W. et al ,2007).

Illustrative Case Study

ATO GETACHEW GIZAW V THE ADVOCATE GENERAL

Supreme Imperial court, Criminal Appeal No. 95/51 (1959 G.C.)

Reported on Journal of Ethiopian Law Volume 11 (1964)

The case is an appeal from the judgment of the high court, which found the appellant guilty of homicide in the first degree and by majority sentenced the appellant to death; according to the minority judgment a sentence of rigorous imprisonment for life was considered a more suitable punishment in the circumstances of the case.

The fact of the case were not contested by the appellant; indeed there can be no doubt whatsoever that the appellant killed Lieutenant Tsigeh Getaneh by shooting him on the back. The only defence in the high court was, broadly speaking one of insanity, and expert witness were called by the defence to support this plea. The evidence of Doctor Nick A. Capotes, the Medical Director of the Emmanuel Mental Health Hospital in Addis Ababa, is the relevant and material evidence on the point. The conclusion of this medical expert, who had the appellant under his supervision, is that the appellant was a "Constitutional psychopath". To quote the full final opinion of the expert, the appellant "more especially belongs to the group of the emotionally pathological personalities, characterized by defects in the nature or control of the emotional or effective function of the personality, they are impulsive and excitable.

The usual amount stress and strain (Physical and psychological, professional, military discipline") which in the average or so called normal individuals, would not elicit any abnormal reaction is, for this kind of constitutional psychopathy, too

strong, too strong, and owing either to the increased strength of their instinctual drives or to the inability to appropriately control and restrain them- may bring about an unusually pronounced tendency to yield impulses of violence without restraint and thus become dangerous to society. The grounds of appeal are substantially:

a)That the high court wrongly interpreted the provisions of Articles 48 and 49 and in that it confined itself to the consideration and interpretation of the medico – legal phrase "mental disease", an expression which does not appear in those articles.
b)That the high court failed to distinguish between abnormalities of the cognition and from those of affectivity, a material element which is warranted by both the said Articles 48 and 49.
c)That the High Court based its decision on the standards of a normal person, which is contrary to Article 51 and also ignored the finding of the expert witness and overlooked the definite finding that the appellant is a "constitutional psychopath".

What will be the role of psychologist (forensic or criminal or legal psychologist) and psychiatrist in dealing with the above case?

Summary

- Forensic and criminal psychology is defined both broadly and narrowly. The narrowest definitions tend to limit the field to practitioners working directly in court. The field, for the purpose of this book, is better defined broadly to embrace the full range of practitioner and academic issues that relate to this core.
- There is no easy relationship between psychology and the law. They are very different disciplines with different ways of understanding human nature and behavior. The languages of the two are also dissimilar. Nevertheless, continued effort has been devoted to bridging the gap.
- Forensic and criminal psychology developed as a consequence of early changes the law which made psychological issues a central matter and expert witnesses in

court acceptable. Academically, forensic and criminal psychology is nearly as old as modern itself and was being practiced and researched shortly after Wundt set up his psychological laboratory in Leipzig.

- Forensic and criminal psychology has been developed differently in different countries. Nevertheless, it is an important international field of modern psychology which has benefited from this cross-fertilization of ideas.
- Legal psychology on the other hand is a non-clinical law related research field that explores such topics as judges decision making, eye witness memory, scientific evidence and legal policies. Criminal psychology deals mainly with the wills, thoughts, intentions, reactions and behaviors of criminals. They also investigate how criminals behave/act.
- Psychiatry is a branch of medicine concerned with the management of mental disorders and illnesses such as anxiety, depression, frustration, sexual disorder, insanity, mania, psychosis, conflict, speech disorder, etc.
- Forensic psychiatrists often work in the courts in evaluating individual's competency to stand trial, defenses based on mental disorders, maladjustment problems, and sentencing recommendations as well.

Review Questions (RQs)

1. What is the meaning of forensic psychology?

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2. Describe and discuss attribution theory.

……

3. Define social influence, conformity and social loafing.

……

4. Discuss the relationship between forensic psychology, psychiatry and law.

……

……

5. How are forensic-, legal-, and criminal- psychologies related?

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6. Discuss the patterns of Criminality, Mental illness and Mental Disorder.

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7. Discuss forensic psychiatry.

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8. Distinguish between insanity, incapacity, automatism and criminal responsibility.

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9.What are the major roles of psychiatrists?

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10. Discuss how violence and mental illnesses are linked.

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……

11. Describe key contributions of forensic psychiatry to the legal system.

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CHAPTER FOUR: PERSONALITY & HUMAN DEVELOPMENT

The third chapter has dealt with the most important aspects of psychology that have legal concerns: forensic psychology, legal psychology, criminal psychology, psychiatry and their linkage with law and legal practices, including criminal responsibility, insanity and civil incapacity

This chapter covers key aspects of personality and human development which is another important area of concern for legal study and practices.

OBJECTIVES:

Up on completion of chapter four, students will be able to:

- define personality and its structures
- explain the features, stages and structures of personality
- discuss the Big-Fives and theories of personality
- discuss the stages of human development with their behaviors and parenting styles

BASIC QUESTIONS

Who is a person?

What is personality?

What are the types of personality?

Why do people demonstrate different personality?

What are the stages of personality development?

What is personality structure?

What is the relationship between behavior and personality?

What are the big –fives of personality?

What are the approaches/theories of personality?

What are the stages of human development?

What are the expected behaviors at each stages of development?

What is parenting style?

How do parenting styles and skills affect behavior and personality?

4.1. THE CONCEPT, TYPES, STAGES AND STRUCTURES OF PERSONALITY

4.1. 1.The Concept of Personality

Who - or what - is a person? Common definition and legal meaning

At the outset, it is necessary to consider what we mean by our use of the term 'person'. In particular, we must examine the meaning of the term in legal parlance in order to understand what it means to say that something 'is a legal person' or 'has legal personality'.

The dictionary definition of 'person' exposes the variety of meanings which the word potentially may bear. Both the *Macquarie Dictionary* and the *Concise Oxford Dictionary* begin with a descriptive definition of 'person' as an individual human being. In common usage we assume, unless told otherwise, that 'person' is employed as a synonym for 'human being'.

'Person' derives from the Latin *persona,* which originally described the mask worn by an actor, appropriate to the role played by that actor on stage in the ancient theatre. This was the aspect of the term 'person' which was carried over into the legal world and its concept of the 'legal person'. In the words of Ernest Barker, "just as the parts in a play are created and assigned by the dramatists, so ... *personae* in law are created and assigned by similar agencies" in the state.

Although it has no fixed definition, it is commonly described in terms of an entity possessing certain legal rights and freedoms, and bearing certain legal duties and obligations. In this vein, the *Macquarie Dictionary of Law* defines the legal person as "a body with individual legal powers, privileges, rights, duties or liabilities, whether a natural person (a human being) or an artificial person (eg a corporation or an accounting entity)". In this course, personality deals with a natural person than the artificial one. Similarly, many scholars depict the term 'person' as an entity capable of

bearing rights and duties" and suggest that 'legal person' is a classificatory term used to designate "anything to which rights are attributed in a legal system."

In the field of law, the word person has a different meaning. The Ethiopian Law/ Civil Code defines the term 'person' as follows:
" the human person is the subject of rights from its birth to its death"

Another author defines persons as those beings who have rights and obligations. The law is basically interested in rights and duties. Hence, the definition reflects that concern of law and a person. It is one who falls within this definition that can form family, succeed to the property of another, own his own property, enter into contract etc((The Ethiopian Family Law, the Civil Code,..). That is why the definition and the concepts to be discussed in this course lay the foundation for the other laws. The characteristic of personality is the right to hold rights and duties under the law. You may wonder where "duties" came from because Civil Code provision cited above doesn't mention it. But in law it is a well-known fact that where there are rights, there are duties too. In this regard, personality, in a legal sense, may be described as "the quality of being a possible subject of rights and duties".

However, in this course, we will focus on the meaning of personality from psychological point of view. Thus personality is:

> *an individual's relatively distinctive and consistent pattern of thinking, feeling, and acting. It is the characteristic patterns of thought, emotion, and behavior that define an individual's personal style and influence his/her interactions or relationship with the environment.*

Students are advised to recall the "Law of Persons" course to distinguish the meaning and attributes of personality from legal and psychological perspectives.

4.1.2 Types of Personality

As personality has so many aspects and affected by diverse factors, it is hardly possible to exhaustively and accurately list all the types of personality.

The study of personality is the oldest sub-field of psychology. Scholars suggested the existence of about thousand types of personality. However, for the purpose of this course, we will describe commonly observed types of personality: Depressed; Skeptic; Irritable; Optimistic; Calm; Shy; Talkative; Altruistic; Pessimistic; Introvert, queit; Extrovert; Ambivert; Shrewed; and so on.

Why individuals respond to a situation in different ways? *For example, why Sr. Ballote and Ato Anjullo are so talkative and Wro. Bodite or Ato Damtew is so shy and quiet when they meet someone? There are diverse reasons/explanations for such a relative uniqueness: biological (genetic) factors, life experiences, cultural factors and socialization, religion, cognitions, perceptions and behavioral factors.*

The way we think about us/others is key to understand personality or the way we behave towards each other is more important. Some times people misconceive and equate personality with character, temperament, emotion, attitude and behavior (though related, these are different concepts). There are people with different types of personalities such as introvert, extrovert or ambivert type of personality.

Personality is broader concept that includes character, temperament, feeling, behavior and attitude. Please refer the following tables for the difference between extravert and introvert aspects of personality (in common sense usage, they are labeled as character and behavior), and four types of temperaments.

Extraverted	Introverted
psychic energy is directed out of the person to the world outside them	*the person's psychic energy is internally directed*
objective – outward	*subjective - inward*
"... maintains a positive relation to the object. To such an extent does he affirm its importance that his subjective attitude is continually being orientated by, and related to the object...."	*".... attitude to the object is an abstracting one.... he is always facing the problem of how libido can be withdrawn from the object...."*
"an extravert attitude is motivated from the outside and is directed by external, objective factors and relationships"	*"an introvert is motivated from within and directed by inner, subjective matters"*
"behavior directed externally, to influence outside factors and events"	*"behavior directed inwardly to understand and manage self and experience"*

Scholars like Hippocrates and David Kersey described personality by equating with temperaments.

The Four Temperaments

Through most of human history, it has been assumed that people come in four basic personality types, or "temperaments". This was noted by the great Greek physician

Hippocrates as long ago as 400BC (2400 years ago!). Hippocrates named the four temperaments "Melancholic, "Sanguine", "Choleric", and "Phlegmatic" (after various human body fluids which he believed influenced personality). Today we call these four temperaments as "Guardian", "Artisan", "Idealist", and "Rationalist", respectively.

While Hippocrates' body-fluids theory turned out to be a dead end, his observations about human temperament were very accurate indeed. You can see this all around you, in everyone you meet. Some people are fact-oriented (they're "Guardians"). Some people are action-oriented (they're "Artisans"). Some people are ideals-oriented (they're "Idealists"). Some people are theory-oriented (they're "Rationalists"). True, there are some people, especially older people, whose personalities tend to bridge the gap between two or more temperaments; but the vast majority of people do tend to have one particular temperament.

Over the years, several different naming schemes have been proposed for the four temperaments. At least four such schemes are in common use today.

Then a few years later, David Keirsey published his best-selling book entitled "Please Understand Me", in which he gave the four temperaments yet another set of names, by attaching a patron Greek God to each temperament: Epimethean, Dionysian, Apollonian, and Promethean.

To sum up, and avoid confusion, the following table shows the various common names for the four temperaments:

The Four Temperaments		
Descriptive	Hippocrates	Keirsey
Guardian	Melancholic	Epimethean
Artisan	Sanguine	Dionysian
Idealist	Choleric	Apollonian
Rationalist	Phlegmatic	Promethean

4.1.3. Stages of Personality Development

When discussing any type of development, most theorists break it down into specific stages. These stages are typically progressive. In other words, you must pass through one stage before you can get to the next. Think about how you learned to run; first you had to learn to crawl, then you could learn to walk, and finally you could develop the skills needed to run. Without the first two stages, running would be impossibility.

Here we will discuss the most prominent stage theories in regard to motor and cognitive, social and moral development. The following offers an overview of development according to the principles of psychology.

(i) Psychosexual Development (Sigmund Freud)

Sigmund Freud (1856-1939) is the most well known theorist when it comes to the development of personality. Freud's Stages of Psychosexual Development is, like other stage theories, completed in a predetermined sequence and can result in either successful completion or a healthy personality or can result in failure, leading to an unhealthy personality. During each stage, an unsuccessful completion means that a child becomes fixated on that particular erogenous zone and either over– or under-indulges once he/she becomes an adult. Freud believed that we go through **five stages** of psychosexual development and that, at each stage of development; we experience pleasure in one part of the body more than others.

Oral Stage (occurs from birth to 18 months)

During the oral stage, the child is focused on oral pleasures (sucking, chewing, & biting). Too much or too little gratification can result in an Oral Fixation or Oral Personality which is evidenced by a preoccupation with oral activities. This type of personality may have a stronger tendency to smoke, drink alcohol, over eat, or bite his or her nails. Personality wise, these individuals may become overly dependent upon others, gullible, and perpetual followers. On the other hand, they may also fight these urges and develop pessimism and aggression toward others.

Anal Stage (18 months to 3 years)

The child's focus of pleasure in this stage is on eliminating and retaining feces. Through society's pressure, mainly via parents, the child has to learn to control anal stimulation.

Phallic Stage (occurs from 3 to 6)

Freud believed that during this stage boy develop unconscious sexual desires for their mother. Because of this, he becomes rivals with his father and sees him as competition for the mother's affection. During this time, boys also develop a fear that their father will punish them for these feelings, such as by castrating them. This group of feelings is known as **Oedipus Complex** (after the Greek Mythology figure who accidentally killed his father and married his mother). Later it was added that girls go through a similar situation, developing unconscious sexual attraction to their father. Although Freud strongly disagreed with this, it has been termed the **Electra Complex** by more recent psychoanalysts.

Latency Stage (6 to puberty)

It's during this stage that sexual urges remain repressed and children interact and play mostly with same sex peers. It is also known as the stage in which a boy/a girl develops jealousness to the opposite sex.

Genital Stage (Puberty on)

The final stage of psychosexual development begins at the start of puberty when sexual urges are once again awakened. Through the lessons learned during the previous stages, adolescents direct their sexual urges onto opposite sex peers, with the primary focus of pleasure is the genitals.

(ii) Stages of psychosocial development(Erik Eriksson)

Like Piaget, Erik Erikson (1902-1994) maintained that children develop in a predetermined order. Instead of focusing on cognitive development, however, he was interested in how children socialize and how this affects their sense of self. *Erikson's Theory of Psychosocial Development* has **eight distinct stages,** each with two possible outcomes. Successful completion of each stage results in a healthy personality and successful interactions with others. Failure to successfully complete a stage can result in a reduced ability to complete further stages and therefore a more unhealthy

personality and sense of self. These stages, however, can be resolved successfully at a later time.

1. **Trust versus Mistrust** (birth to 1 year): Children begin to learn the ability to trust others based upon the consistency of their caregiver(s). If trust develops successfully, the child gains confidence and security in the world around him/her and is able to feel secure even when threatened. Unsuccessful completion of this stage can result in an inability to trust, anxiety and heightened insecurities.
2. **Autonomy vs. Shame and Doubt** (1 to 3 year): Children begin to assert their independence, by walking away from their mother, picking which toy to play with, and making choices about what they like to wear, to eat, etc. If children in this stage are encouraged and supported in their increased independence, they become more confident and secure in their own ability to survive in the world. If children are criticized, overly controlled, or not given the opportunity to assert themselves, they begin to feel inadequate in their ability to survive, and may then become overly dependent upon others, lack self-esteem, and feel a sense of shame or doubt in their own abilities.
3. **Initiative vs. Guilt** (3 to 6year): Children assert themselves more frequently. They begin to plan activities, make up games, and initiate activities with others. If given this opportunity, they feel secure in their ability to lead others and make decisions. Conversely, if this tendency is squelched, either through criticism or control, children develop a sense of guilt.
4. **Industry vs. Inferiority** (6 to puberty): Children begin to develop a sense of pride in their accomplishments. They initiate projects, see them through to completion, and feel good about what they have achieved. During this time, teachers play an increased role in the child's development.
5. **Identity vs. Role Confusion** (adolescence, the transition from childhood to adulthood): Children are becoming more independent, and begin to look at the future in terms of career, relationships, families, housing, etc. During this period, they explore possibilities and begin to form their own identity based upon the outcome of their explorations.

6. **Intimacy vs. Isolation**. Occurring in young adulthood, we begin to share ourselves more intimately with others. We explore relationships leading toward longer term commitments with someone other than a family member.
7. **Generativity vs. Stagnation**. During middle adulthood, we establish our careers, settle down within a relationship, begin our own families and develop a sense of being a part of the bigger picture. We give back to society through raising our children, being productive at work, and becoming involved in community activities and organizations.
8. **Ego Integrity vs. Despair**. As we grow older and become senior citizens, we tend to slow down our productivity, and explore life as a retired person. It is during this time that we contemplate our accomplishments and are able to develop integrity if we see ourselves as leading a successful life.

(iii) Motor and Cognitive Development (Jean Piaget)

(a)Motor Development in Infancy and Childhood

Most infants develop motor abilities in the same order and at approximately the same age. In this sense, most agree that these abilities are genetically preprogrammed within all infants. The environment does play a role in the development, with an enriched environment often reducing the learning time and an impoverished one doing the opposite.

The following shaded note delineates the development of infants in sequential order. The ages shown are averages and it is normal for these to vary by a month or two in either direction.

2 months- able to lift head up on his own; 3 months- can roll over; 4 months- can sit propped up without falling over; 6 months -is able to sit up without support; 7 months -begins to stand while holding on to things for support;9 months- can begin to walk, still using support; 10 months-is able to momentarily stand on her own without support; 11 months-can stand alone with more confidence;12 months- begin walking alone without support;14 months - can walk backward without support; 17 months -

can walk up steps with little or no support;18 months -able to manipulate objects with feet while walking, such as kicking a ball

(b) Cognitive Development

Probably the most cited theory in the cognitive development in children is Jean Piaget (1896-1980). As with all stage theories, *Piaget's Theory of Cognitive Development* maintains that children go through specific stages as their intellect and ability to see relationships matures. These stages are completed in a fixed order with all children, even those in other countries. The age range however can vary from child to child.

1. Sensorimotor Stage. This stage occurs between the ages of birth and two years of age, as infants begin to understand the information entering their sense and their ability to interact with the world. During this stage, the child learns to manipulate objects although they fail to understand the permanency of these objects if they are not within their current sensory perception. In other words, once an object is removed from the child's view, he or she is unable to understand that the object still exists. The major achievement during this stage is that of Object Permanency, or the ability to understand that these objects do in fact continue to exist. This includes his ability to understand that when mom leaves the room, she will eventually return, resulting in an increased sense of safety and security. Object Permanency occurs during the end of this stage and represents the child's ability to maintain a mental image of the object (or person) without the actual perception.
2. Preoperational Stage. The second stage begins after Object Permanency is achieved and occurs between the ages of two to seven years of age. During this stage, the development of language occurs at a rapid pace. Children learn how to interact with their environment in a more complex manner through the use of words and images. This stage is marked by Egocentrism, or the child's belief that everyone sees the world the same way that she does. The fail to understand the differences in perception and believe that inanimate objects have the same perceptions they do, such as seeing things, feeling, hearing and

their sense of touch. A second important factor in this stage is that of Conservation, which is the ability to understand that quantity does not change if the shape changes. Children in this stage will perceive the taller glass as having more water due only because of its height. This is due to the children's inability to understand *reversibility* and to focus on only one aspect of a stimulus (called *centration*), such as height, as opposed to understanding other aspects, such as glass width.

3. Concrete Operations Stage. Occurring between ages 7 and about 12, the third stage of cognitive development is marked by a gradual decrease in centristic thought and the increased ability to focus on more than one aspect of a stimulus. They can understand the concept of grouping, knowing that a small dog and a large dog are still both dogs, or that pennies, quarters, and dollar bills are part of the bigger concept of money. They can only apply this new understanding to concrete objects (those they have actually experienced). In other words, imagined objects or those they have not seen, heard, or touched, continue to remain somewhat mystical to these children, and abstract thinking has yet to develop.
4. Formal Operations Stage. In the final stage of cognitive development (from age 12 and beyond), children begin to develop a more abstract view of the world. They are able to apply reversibility and conservation to both real and imagined situations. They also develop an increased understanding of the world and the idea of cause and effect. By the teenage years, they are able to develop their own theories about the world. This stage is achieved by most children, although failure to do so has been associated with lower intelligence.

Freud's Theory of Personality Structure

Sigmund Freud's Theory is quite complex and although his writings on psychosexual development set the groundwork for how our personalities developed.

Structural Model

(1) The Id

According to Freud, we are born with our Id. The id is the most completely

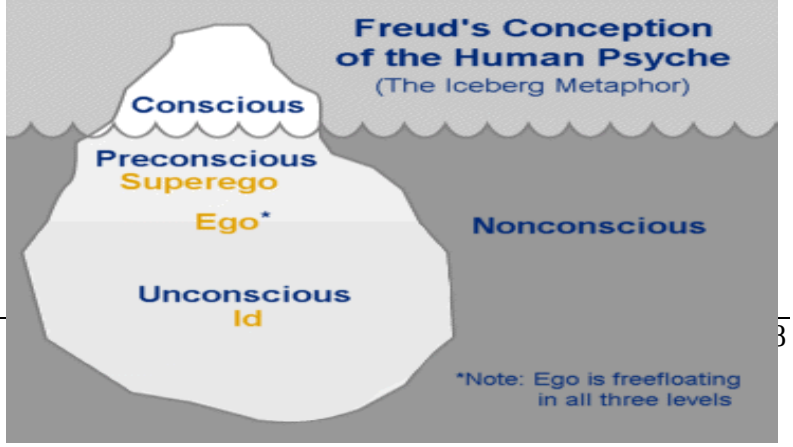
unconscious, the most primitive part of the personality, from which the ego and superego later develop. The id is part of personality, considered as an unconscious , the original reservoir of psychic energy and primitive drives and is present from birth. Aggressive, selfish tendencies and sexual impulses from the id always demand immediate gratification. The id is an important part of our personality because as newborns, it allows us to get our basic needs met. Freud believed that the id operates on the pleasure principle, known as hedonism (seeking pleasure without pain).

(2) The Ego

Within the next three years, as the child interacts more and more with the world, the second part of the personality begins to develop. Freud called this part the Ego. The ego is based on the reality principle. The ego understands that other people have needs and desires and that sometimes being impulsive or selfish can hurt us in the long run. It's the ego's job to meet the needs of the id, while taking into consideration the reality of the situation. The ego comes into existence to deal with objective, outside world and to satisfy the id's wishes and instinctive demands; it deals with the objective and real world. It controls actions and chooses outcomes.

(3) The Superego

By the age of five, or the end of the phallic stage of development, the Superego develops. The Superego is the moral part of us, and develops due to the moral and ethical restraints placed on us by our caregivers. Super-ego is the censoring force or conscience of the personality composed of morals, mores, values, and ethics largely derived from one's parents. Thus, the superego is concerned with morality; with what is "right" and what is "wrong. Many equate the superego with the conscience as it dictates our belief of right and wrong.



Freud's argument on the levels of consciousness and structures of personality

> ….. the majority of what we experience in our lives, the underlying emotions, beliefs, feelings, and impulses are not available to us at a conscious level. He believed that most of what drives us is buried in our unconscious. If you remember the Oedipus and Electra Complex, they were both pushed down into the unconscious, out of our awareness due to the extreme anxiety they caused. While buried there, however, they continue to impact us dramatically.
>
> The role of the unconscious is only one part of the model. Freud also believed that everything we are aware of is stored in our conscious. Our conscious makes up a very small part of who we are. In other words, at any given time, we are only aware of a very small part of what makes up our personality; most of what we are is buried and inaccessible.
>
> The final part is the preconscious or subconscious. This is the part of us that we can access if prompted, but is not in our active consciousness. It's right below the surface, but still buried somewhat unless we search for it. Information, such as our telephone number, some childhood memories, or the name of your best childhood friend is stored in the preconscious.
>
> Because the unconscious is so large, and because we are only aware of the very small conscious at any given time, this theory has been linked to an iceberg, where the vast majority is buried beneath the water's surface. The water, by the way, would represent everything that we are not aware of, have not experienced, and that has not been integrated into our personalities, referred to as the nonconscious.

Body Types, Personality Dimensions and deviant or criminal behaviors

Research by Sheldon (1949) suggested that delinquents compared with college students were very endomorphic and certainly not ectomorphic. Another study, according to Eysenck, gave similar findings (as cited in Howitt, 2002). Crucially,

according to Sheldon, three body types correspond fairly closely to three different personality types:

- *Endomorphs:* relaxed, love of physical comfort, love of eating, sociable, al able, tolerant and communicate feelings easily (this was called *viscerotonia)*
- *Ectomorphs:* assertive, adventurous, like power and dominance, enjoy risk and taking chances, and ruthlessness *(somatonia).*
- *Mesomorphs:* like privacy and need solitude, are not sociable, are very sensitive to pain and are physiologically over-reactive *(cerebrotonia).*

In other words, body type is related to personality which itself is related to criminality.

Eysenck believed that there are three major, largely unrelated, components of personality - *extraversion, neuroticism* and *psychoticism.* These dimensions were obtained by the analysis of numerous measures of personality that he developed based on the work of others and his own ideas. The following indicates the characteristics of each of these personality dimensions:

- *Extraversion:* active, assertive, creative, carefree, dominant, lively, sensation seeking and venturesome types of personality.
- *Psychoticism:* aggressive, antisocial, cold, creative, egocentric, impersonal, impulsive, tough-minded and lacking empathy.
- *Neuroticism:* anxious, depressed, emotional, guilt feelings, irrational, low self-esteem, moody, shy and tense type of personality.

Which are the characteristics of criminals? According to Eysenck, all of them, criminals should show higher levels of extraversion, psychoticism and neuroticism.

We will learn more about the linkages between personality and deviance or crime problems in the course “Interdisciplinary II”

4.2. THE BIG-FIVES AND THEORIES OF PERSONALITY

4.2.1 The BIG FIVES OF PERSONALITY

These five factors used to compare and informally rate the personalities of persons for various purposes and interests including friendship, reward, appointments, and so on. The big fives are also known as the five-factor model of personality(EACNO)

- Factor 1: **E**xtroversion ,

- Factor 2: **A**greableness(and Positive Thinking),
- Factor 3: **C**onscientious,
- Factor 4: **N**euroticism(Emotionally sour), and
- Factor 5: **O**penness to Change and Intelligence

The Meaning of Intelligence

Intelligence is a ubiquitous individual difference reflected in a variety of behaviors which demonstrate a cognitive capacity for:

- thinking and reasoning (e.g positive thinking)
- learning and adapting (person's effective learning and ability to adapt the world)

It is the ability to carry out abstract thinking, the capacity for knowledge, and knowledge possessed. Intelligence is a global concept that involves an individual's ability to act purposefully, think rationally, and deal effectively with the environment.

There are three kinds of intelligence: Mechanical, Social and Abstract(general) intelligence. Mechanical intelligence is the ability to manipulate tools and gadgets and in managing the working of machines. Social intelligence is about understanding people and the ability to act wisely in human/social relationships or interactions. Whilst, abstract intelligence is the ability to handle words, numbers, formulae and scientific principles.

Intelligence is assessed by using intelligence quotient(IQ) test, developed by Alfred Binet(1875-1911) and Alfred & Theodore Simon(1905). William Stern, German Psychologist, introduced IQ , which is obtained when the mental age is divided by the chronological age, which is the actual age of the person in years and multiplied by 100(to avoid decimals). Any person reachs a maximum IQ at about 18 years. There might be differences in IQ because of social, culture, biological(racial, heredity, disease), health, environmental and psychological(emotional) factors. Depending upon favourable conditions such as education and challenging learning experience, the IQ may increase slightly till age thirty. After 30, the IQ doesnot change except that it decreases slightly with old age. There is no difference between the IQ of men and women. IQ tests used to predict how well a person will learn in a program of study(to

predict and determine learning capacity). Although intelligence tests are useful, they must be treated as guides to decisions rather than absolute statements. They do measure certain mental abilities but do not give any clue regarding a person's morals, character, emotions, general temperament and ability to work with other people. Studies in Europe reported the following data on the normal distibution of IQs with the standard deviation of 15.

IQ	Description	% of population
130 & above	Very superior	2.2
120-129	Superior	6.7
110-119	Bright normal	16.1
85-109	Average	59.1
70-84	Borderline	13.6
.	.	.
.	.	.
Below 25	Profoundly mentally retarded	0.0000005

Intelligence and criminal behavior

It has been a traditional theme that offenders tend to be lacking in intelligence and, consequently, are somewhat under-equipped to cope with their social and work environments. Countless early criminological discussions of offenders would describe them as typically being feeble-minded. Superficially, the idea that low intelligence leads to criminality is compelling. Low intelligence, being indicative of poor learning skills might mean that the individual takes senseless risks, lacks the resources to avoid detection, is unlikely to have good earning power in the workplace, and so forth. Some of the factors that are known to be associated with criminality are potentially associated with low intelligence. These factors would include school failure, unemployment and similar characteristics. Nevertheless, few criminal and forensic

psychologists seem to regard intelligence as a particularly important factor in crime. There are, of course, some offenders of low intelligence but, in general, these appear to be seen as a special case not the norm.

Relatively recently the argument that poor intelligence is associated in a causal way to any number of social ills has reappeared - poverty, for example, being seen as a result of low intelligence, genetically determined, rather than social factors. More important to the work of forensic and criminal psychologists is the claim that low intelligence is associated with crime.

Psychoanalysis and criminal behavior

Psychoanalysis, especially that closest to Sigmund Freud's original writings, has little to say directly about crime (Valier, 1998). Freud carried out no analyses of criminals and lacked apparent interest in them. He regarded them as manifesting disturbances of the ego that resulted in their incapacity to be honest. Nevertheless, Freud had some impact on legal thinking. In 1909, Freud was given an honorary doctorate in law from Clark University, Worcester, MA, USA. This recognised his impact on legal thinking through ideas of unconscious motivation and the like. A number of Freud's followers dealt with crime issues directly. However, other psychoanalysts such as Bion and Bowlby did attempt to treat criminality (Valier, 1998 as cited in Howitt, 2002).

John Bowlby is probably the most famous of the 'neo-psychoanalysts' to modern psychologists. This is largely because of his ideas about early separation of a child from its mother. These were enormously influential in terms of justifying social policy about the employment of mothers in the workforce, which was relatively uncommon at the time. Mothers, he indicated, should not work. The reason was that the separation of the ties between mother and baby destroyed the emotional bond between the two that was essential for the effective social development of the child. It was Bowlby's belief that there is a human predisposition to form attachment to others. The primary care givers - usually the parents - are a sort of bedrock for future relationships (Bowlby, 1944, 1951, 1973, 1980 as cited in Howitt, 2002). Positive, intimate attachments are required for attachment to be satisfactory; otherwise, long-term

problems may ensue. Once the bonds are broken, the child develops in ways indicative of an inability to form functional social relationships.

One of Bowlby's cases (he was a psychiatrist) was the child he called Derek who had been hospitalized for nearly a year starting before he was one. When he returned to the family he addressed his mother as 'nurse' and lacked affection for any members of the family. The period of separation, in Bolby's terms, resulted in Derek's inability to form social relationships. Indeed, in his study 'Forty-four juvenile thieves', Bowlby showed the role of maternal separation in the aetiology of a number of delinquents. To stress, this was in terms of the 14 delinquents out of the 14 whom he classified as affectionless characters. Maternal separation was rather rarer in the other delinquents he studied. Valier,1998- as cited in Howitt, 2002) writes of the notion of latchkey kid being a popularisation of Bowlby's ideas - for latchkey kid simply read potential delinquent.

Another Freudian influence was the way that psychology until the last third of the twentieth century regarded homosexuality as a clinical deviation rather than a chosen sexuality. Where homosexuality resulted in individuals being in trouble with the law their homosexuality could be treated - that is, they could be diverted back to heterosexuality. This is an idea that appears to be singularly old-fashioned in the light of current ideas about homosexuality.

Freudian Slip

For Freud, the unconscious mind holds the key to understanding behavior. A twitch, a doodle, a joke, a smile, a scratch, each may have an unconscious reason for appearing. They often slip into our lives without our awareness. For example, '*Eskedar*' is kissing and hugging Ato '*Aschenaki*', whom she is to marry in this month. She says, "Oh, '*Gebre'*, I love you so much." '*Aschenaki*' pushes her away and says, "why did you call me *Gebre*." This example of Freudian slip is known as Tongue slip.

Elements of Positive Thinking

Positive thinking has relation with intelligence and critical thinking capacity of a person and it also involves:

- Self concept/self knowledge/self awareness
- Imagination (critical thinking)
- Conscience
- Independent will
- Self esteem
- Self confidence

As human beings, we have the above six unique human endowments that distinguish us from the animal world. These endowments reside in that space between stimulus and response, for example:

- Self-awareness is our capacity to take a look at ourselves and examine our own thinking, our motives, our habits and our paradigms.
- Conscience serves as our internal guidance system which allows us to sense when we act or even contemplate acting in a way that's contrary to principle.
- Creative imagination is our ability to create in or minds beyond our present reality.
- Independent will is our capacity to act free of all other influences.
- Self confidence is the result of self knowledge and self esteem.

Dr. Norman Vincent described key elements of " *The Power of Positive Thinking"* , some of which are described below.

Belive in yourself

Belive that a peaceful mind generates power

Have a constant energy

Try prayer power

Create your own happiness

Stop fuming and fretting

Expect the best and get it

Don't believe in Defeat

Break the worry ***Habit****(Refer Stephen Covey's 7 Habits of effective People)*

Have power to solve personal problems

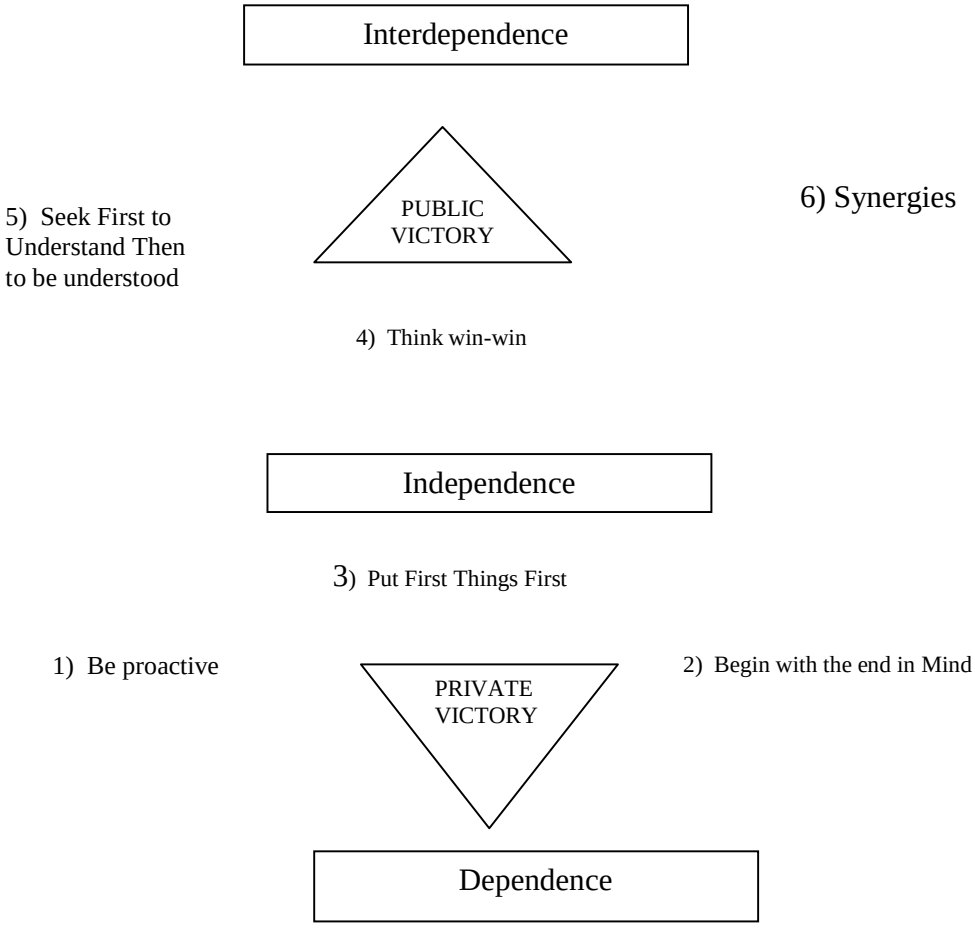
Relax for easy power

Get people to like you

The Seven Habits of Effective People(aspects of Management and Leadership)

[Stephen Covey)

7] Sharpen the saw



4.2.2 Theories of Personality

Personality is fundamental to the study of psychology. The major systems evolved by psychiatrists and psychologists since Sigmund Freud to explain human mental and behavioral processes can be considered theories of personality. These theories

generally provide ways of describing personal characteristics and behavior, establish an overall framework for organizing a wide range of information, and address such issues as individual differences, personality development from birth through adulthood, and the causes, nature, and treatment of psychological disorders.

1. Type theory of personality

Perhaps the earliest known theory of personality is that of the Greek physician Hippocrates (c. 400 B.C.), who characterized human behavior in terms of four temperaments, each associated with a different bodily fluid, or "humor." The sanguine, or optimistic, type was associated with blood; the phlegmatic type (slow and lethargic) with phlegm; the melancholic type (sad, depressed) with black bile; and the choleric (angry) type with yellow bile. Individual personality was determined by the amount of each of the four humors. Hippocrates' system remained influential in Western Europe throughout the medieval and Renaissance periods.

Abundant references to the four humors can be found in the plays of Shakespeare, and the terms with which Hippocrates labeled the four personality types are still in common use today. The theory of temperaments is among a variety of systems that deal with human personality by dividing it into types. A widely popularized (but scientifically dubious) modern typology of personality was developed in the 1940s by William Sheldon, an American psychologist. Sheldon classified personality into three categories based on body types: the endomorph (heavy and easy-going), mesomorph (muscular and aggressive), and ectomorph (thin and intellectual or artistic).

2. Trait theory of personality

Systems that address personality as a combination of qualities or dimensions are called trait theories. Well-known trait theorist Gordon Allport (1897-1967) extensively investigated the ways in which traits combine to form normal personalities, cataloguing over 18,000 separate traits over a period of 30 years. He proposed that each person has about seven central traits that dominate his or her behavior. Allport's attempt to make trait analysis more manageable and useful by simplifying it was expanded by subsequent researchers, who found ways to group traits into clusters

through a process known as factor analysis. Raymond B. Cattell reduced Allport's extensive list to 16 fundamental groups of interrelated characteristics, and Hans Eysenck claimed that personality could be described based on three fundamental factors: psychoticism (such antisocial traits as cruelty and rejection of social customs), introversion-extroversion, and emotionality-stability (also called neuroticism). Eysenck also formulated a quadrant based on intersecting emotional-stable and introverted-extroverted axes.

3. Psychodynamic theory of personality

Twentieth-century views on personality have been heavily influenced by the psychodynamic approach of Sigmund Freud. Freud proposed a three-part personality structure consisting of the id (concerned with the gratification of basic instincts), the ego (which mediates between the demands of the id and the constraints of society), and the superego (through which parental and social values are internalized). In contrast to type or trait theories of personality, the dynamic model involved an ongoing element of conflict, and it was these conflicts that Freud saw as the primary determinant of personality. His psychoanalytic method was designed to help patients resolve their conflicts by exploring unconscious thoughts, motivations, and conflicts through the use of free association and other techniques. Another distinctive feature of Freudian psychoanalysis is its emphasis on the importance of childhood experiences in personality formation.

4. Phenomenological theory of personality

Three key concepts are phenomenology, existentialism, and humanistic. These can be understood as making up the philosophical fabric of phenomenological views about psychology. Historically, the phenomenological perspective can be traced to Wilhelm Wundt who is often considered as having conducted the first formal psychological research in the 1870's. Wundt had people "introspect" that is concentrate on and report on subjective conscious experience.

Phenomenological view and approach of personality was developed during the twentieth century, which emphasizes people's self- perceptions and their drive for self-actualization as determinants of personality. This optimistic orientation holds that

people are innately inclined toward goodness, love, and creativity and that the primary natural motivation is the drive to fulfill one's ***potential***. Carl Rogers, the figure whose name is most closely associated with phenomenological theories of personality, viewed authentic experience of one's self as the basic component of growth and well-being. This experience together with one's self-concept can become distorted when other people make the positive regard we need dependent on conditions that require the suppression of our true feelings. Another prominent exponent of the phenomenological approach was Abraham Maslow, who placed self-actualization at the top of his hierarchy of human needs. Maslow focused on the need to replace a deficiency orientation, which consists of focusing on what one does not have, with a growth orientation based on satisfaction with one's identity and capabilities.

In sum, the phenomenological perspective, and particularly the humanistic perspectives, sees humankind as being intrinsically good and self-perfecting. People are seen as being drawn towards growth, health, self-sufficiency, and maturity. This is a very OPTIMISTIC perspective which focuses on people's POTENTIAL. People are seen as growing and evolving naturally towards greater beauty and more completeness. The major themes and underlying assumptions of this perspective are:

- There is a 'self' which has beautiful and unique form.
- It is changing and growing. Everyone's self is unique.
- Once we provide a nurturing outer and inner environment, growth towards our higher selves occurs naturally.
- We have enormous potential, possibility, and choice.

5. Behavioral theory of personality (Social Learning Theory)

"The experiences of life change us, and they do so in ways that are lawful and predictable." The learning perspective lies at the 'nurture' end of the nature-nurture debate. The underlying assumption of the learning perspective is that all behavior is learned through experiences and by interaction with the environment. Learning theories believes that your personality (individual differences) essentially arose from the moulding (learning experiences) you receive in your environment - i.e., your patterns of behavior are shaped by experience.

The behaviorist approach views personality as a pattern of learned behaviors acquired through either classical (Pavlovian) or operant (Skinnerian) conditioning and shaped by reinforcement in the form of rewards or punishment.

According to social learning perspectives, personality consists of all learned tendencies a person has acquired, including those from social influences. Thus, for example, one of arguments for differences in personality across cultures is different social practices, particularly during childhood. Would you have been the same person you are today had you been brought up in vastly different circumstances in a different society/culture? At the very least, you would probably have quite different beliefs and views of the world and yourself. This is because some cultures encourage and reward certain behaviors, whilst other cultures value and emphasize certain other behaviors.

Cognitive and social learning theorists focus not only on the outward behaviors people demonstrate but also on their expectations and their thoughts about others, themselves, and their own behavior. Like phenomenological theorists, those who take a social learning approach also emphasize people's perceptions of themselves and their abilities (a concept called "self-efficacy" by Albert Bandura). Another characteristic that sets the cognitive-behavioral approach apart from traditional forms of behaviorism is its focus on learning that takes place in social situations through observation and reinforcement, which contrasts with the dependence of classical and operant conditioning models on laboratory research.

Ego Defense Mechanisms

We stated earlier that the ego's job was to satisfy the id's impulses, not offend the moralistic character of the superego, while still taking into consideration the reality of the situation. We also stated that this was not an easy job. Think of the id as the 'devil on your shoulder' and the superego as the 'angel of your shoulder.' We don't want either one to get too strong so we talk to both of them, hear their perspective and then make a decision. This decision is the ego talking, the one looking for that healthy balance.

Before we can talk more about this, we need to understand what drives the id, ego, and superego. According to Freud, we only have two drives; sex and aggression. In other words, everything we do is motivated by one of these two drives.

Sex, also called Eros or the Life force, represents our drive to live, prosper, and produce offspring. Aggression, also called Thanatos or our Death force, represents our need to stay alive and stave off threats to our existence, our power, and our prosperity.

Now the ego has a difficult time satisfying both the id and the superego, but it doesn't have to do so without help. The ego has some tools it can use in its job as the mediator, tools that help defend the ego. These are called Ego Defense Mechanisms or Defenses. When the ego has a difficult time making both the id and the superego happy, it will employ one or more of these defenses as discussed below. In some literature, these are presented under personality disorder while most scholars depict these defenses are not necessarily unhealthy aspects of personality. The writer of this material has the same perspective with the latter scholars.

DEFENSE	DESCRIPTION	EXAMPLE
denial	arguing against an anxiety provoking stimuli by stating it doesn't exist	denying that your physician's diagnosis of cancer is correct and seeking a second opinion
displacement	taking out impulses on a less threatening target	slamming a door instead of hitting as person, yelling at your spouse after an argument with your boss
intellectualization	avoiding unacceptable emotions by focusing on the intellectual aspects	focusing on the details of a funeral as opposed to the sadness and grief
projection	placing unacceptable impulses in	when losing an argument, you state "You're just

	yourself onto someone else	Stupid;" homophobia
rationalization	supplying a logical or rational reason as opposed to the real reason	stating that you were fired because you didn't kiss up the boss, when the real reason was your poor performance
reaction formation	taking the opposite belief because the true belief causes anxiety	having a bias against a particular race or culture and then embracing that race or culture to the extreme
regression	returning to a previous stage of development	sitting in a corner and crying after hearing bad news; throwing a temper tantrum when you don't get your way
repression	pulling into the unconscious	forgetting sexual abuse from your childhood due to the trauma and anxiety
sublimation	acting out unacceptable impulses in a socially acceptable way	sublimating your aggressive impulses toward a career as a boxer; becoming a surgeon because of your desire to cut; lifting weights to release 'pent up' energy
suppression	pushing into the unconscious	trying to forget something that causes you anxiety

Most scholars argue that ego defenses are not necessarily unhealthy as you can see by the examples above. In face, the lack of these defenses or the inability to use them effectively can often lead to problems in life. However, we sometimes employ the defenses at the wrong time or overuse them, which can be equally destructive.

4.3 STAGES OF HUMAN DEVELOPMENT INCLUDING PARENTING STYLES

Developmental psychologists today agree that both nature and nurture interact to produce their effects in human development, attitudes, thoughts, emotions and

behavior. Developmental psychology deals with human development and study of behavior starting from conception to death.

It is very important to underline that growth and development are different concepts with different concerns and indicators. Development is broad and comprehensive concept involving changes in physical growth and mental (psychological) and social activities. Growth on the other hand is a narrow concept involving mere physical change (e.g. weight, height, number of teeth and temporal aspects) while development is a process in which the internal physiological changes and the psychological processes stimulated by them are integrated in a way which enables the individual to master further.

Normal stages of human development include: conception-birth-infancy-childhood-adolescence-adulthood- elderly-death. Developmental psychologists argue that human behaviors vary with age. The study of such stages provides information and help parents understand what to expect (behavior) from their child.

Parenting or Child-rearing Styles

Even though vary with culture and society; generally speaking, there are four styles of parenting.

Parenting style	**Parenting behavior**	**Child's behavior**
1. Authoritarian parenting	Rigid, Punitive, Strict standards(One-way control, Strict limits on child's communication, Strict punishment)	Unsociable, unfriendly, withdrawn, low self-knowledge, low self-confidence, weak productivity
2. Permissive parenting	Lax, inconsistent, undemanding(few rules & little punishment)	Immature, moody, dependent, low self - control(low self-discipline, rebellious)
3. Authoritative parenting	Firm, set limits and goals, use	Good social skills, likable,

	reasoning, encourage independence(enforcement for rules, encouragement)	self-reliant, independent(social competence self-esteem, moral development) and productive
4. Neglectful parenting	Lacks commitment to parental role; At extreme levels – abusive(verbal, physical sexual,….abuse),	Deficits in all aspects of psychosocial functioning by age 2; Aggression; Disobedience; Delinquency

Parents must be curious and sensitive to the needs of their child/children, which include social, emotional, cognitive and physical needs. Dear students, we will deal more about the relationship between family and children when we discuss about socialization, marriage and family establishments and so on in the interdisciplinary-II course.

SUMMARY

Personality is a relatively permanent and unique tendency and pattern of person's feeling, thinking and acting (behavior). Sigmund Freud is the pioneer of psychoanalysis and personality structures, stages of development. Human personality is affected by many factors including biological, social, cultural, environmental and political factors. One person might have multitude of personalities. For instance, a person might be introvert in one time and he/she would also be extrovert in some other instances, time and places. A person might be skeptic, optimistic, aggressive, quiet, shy, talkative, depressed, happy, anxious, moody, shrewd, etc in one instance while he or she might be an opposite in the other instances. Both nature and nurture determine human personality.

In our common day to day life, personality is equated with character, temperament, behavior and thought. These concepts might be the aspects of personality and hence conceptually they are different.

There are different theoretical perspectives of personality. However, trait and type of theories are the major ones which deal with these changing and multitude factors associated with the different personalities. To judge ones personality, it is better to deal with the theoretical perspectives and the causes for these multitude types of personalities. An individual's deviant and criminal behavior is determined by his/her personality as well.

This unit further described the types and features of the major parenting styles: Authoritarian (autocratic), authoritative, permissive and neglectful parenting styles. The features clearly indicate the behaviors of children is affected by the parenting styles and parenting skills(interpersonal relationships, empathic communication, negotiations, listening, understanding, active participatory decisions in the family, addressing the comprehensive needs of children,..).

Review Questions (RQs)

1. What is personality?

……..

2. Discuss the different stages of personality development

……..

3. What are the factors affecting personality?

……..

4. What are the major types of personality?

……..

……..

5. Describe the major theories of personality.

……..

……..

6. How do you think the study of personality contribute to the legal practices?

……..

7. What is consciousness? Discuss its levels.

……..

8. Compare and contrast introvert and extrovert personality.

……..

……..

9. Describe the types of temperament.

……..

……..

10. Describe the structures of personality.

……..

……..

11. What are the major types of defensive styles?

……..

……..

12. Describe and discuss the four types of parenting styles.

……..

CHAPTER FIVE: THE CONCEPT OF LEARNING

In the fourth chapter, we have learn about personality and its various aspects such as the concept, types and structures of personality, stages of development, approaches ,the big-fives and parenting style with the behaviors of parents and children. The present chapter deals with the most important concept in psychology- learning with its methods, forms, styles, principles/theories. This fifth chapter also covers motivation, emotion, sensation and perception; the meaning and aspects of memory, forgetting, remembering and mental deficiency.

OBJECTIVES:

Up on completion of this chapter students will be able to:

- define learning and related concepts
- know the forms, styles, approaches and principles of learning
- compare and contrast the theories of learning and appreciate their application in real life
- describe and discuss the meanings, causes, consequences, expressions and theories of motivation and emotions
- define and differentiate the types and stages of memory
- discuss memory loss , its causes and solutions
- know the meanings of forgetting, remembering and mental deficiency.

BASIC QUESTIONS

What is learning?

How do organisms (people) learn both normal/pro-social and bad/anti-social behavior?

What are the basic forms, methods and styles of learning?

What are the major approaches/principles or theories of learning?

What differentiates the basic principles/theories of learning?

What is motivation?

What is emotion?

How motivation, emotion and learning are related?

What are the theories of motivation and emotion?

What are the basic components and manifestations of motivation and emotion?

What is the difference between sensation and emotion?
What are the types and expressions of emotions?
What are the meanings and aspects of memory?
What are the causes, consequences and mitigation measures of memory loss (amnesia)?
What is the difference between forgetting and remembering?

5.1 THE MEANING, FORMS/STYLES & APPROACHES OF LEARNING

How do we define learning? It depends on the kind of learning that we consider. For example, as I write this note, I am using words that I have learnt. To write such a lecture note on paper I use my wrist muscles. I am using a pen, which has been made by someone. What I write can be meaningful to the readers only when they also know the language I use. I can not only write, but also speak the language that I write, etc.

Educational psychologists are mainly concerned with the learning behavior of a person, learning teaching policies, principles and methods. They are also concerned with thinking and reasoning capacity and ability of a person from birth to old age.

THINKING

To think is to analyze, examine and sort out information and form in the mind ideas or opinions, to perform any mental operation, to reason, to bring to mind or recollect, to determine, resolve and to work things out. Thinking is to conceive thoughts and ideas by reasoning, to form an opinion, to judge, to consider, to employ and to bring one's intellectual faculties to work, to concentrate one's thoughts on any given subject.

Thinking is the act of reasoning from factual knowledge and/or evidence. Thinking is to use the mind for processing imagination and information, to arrive at logical conclusions, from premises known and or assumed to be true for making imaginative decisions. To think is to reason about or reflect on, to ponder. Think how complex is our Milky Way Galaxy. Think the matter through creatively. To decide by reasoning, reflection or pondering, thinking what to believe, what to say or what to do.

To think is to judge or regard, look upon. To think is to learn of, or from, by analyzing what one could learn by thinking about the newly acquired knowledge, thought, suggestion and or idea, in order to learn and accept as truth.

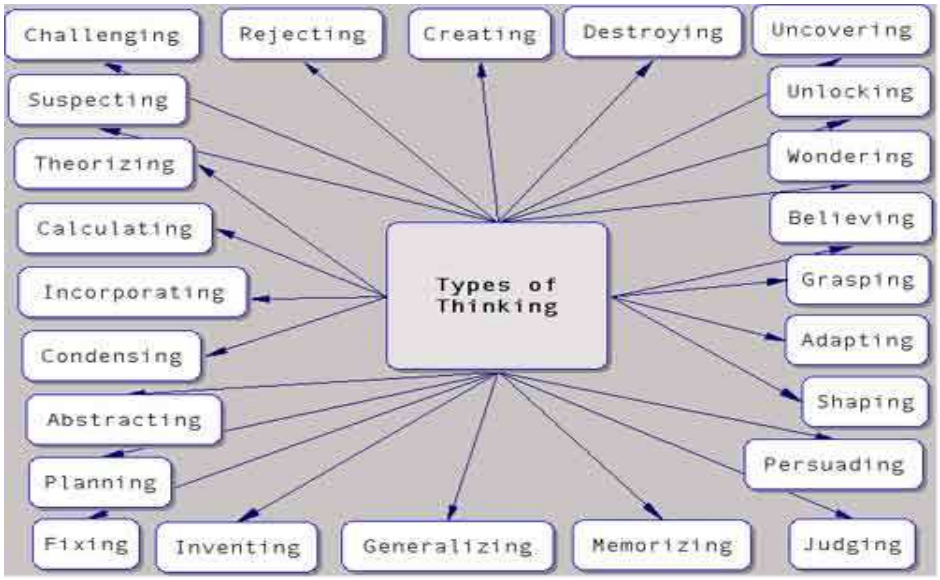
Thinking is to call to mind, to remember, to visualize and recall the images of what was once known to the mind. To think is to have creative thoughts, to bring a thought to mind by imagination or invention to devise or evolve to invent by imaginative thinking. Thinking is to bring one's mind into a given condition by mental preoccupation, to exercise the power of one's mind by reasoning and by conceiving ideas, drawing inferences, and using or arriving to a judgment.

How do we think? The mere ability to pose such question illustrates the distinctive nature of the human ability to think. No other species can contemplate, analyze, recall, or plan in the manner that human can. Yet knowing that we think and understanding what thinking is are two different things. Philosophers, for instance, argued about the meaning of thinking and put it at the core of human beings' understanding of their own existence, personality and behavior.

To psychologists (cognitive), thinking is the manipulation of mental representations of information- the representation may be a word, a visual image, a sound, or data in any other modality. What thinking does is to transform the representation of information in to a new and different form for the purpose of answering a question, solving a problem, or aiding in reaching a goal. We begin by considering our use of mental images and concepts, the building blocks of thought. Think of your best friend, chances are that you "see" some kind of visual image when asked to think of her or him, or any other object, for that matter. To some cognitive psychologists, such mental image represents a major part of thinking.

Generally speaking, there are different aspects and types of thinking: Critical-, Positive-, Logical-, Critical, Strategic-,Concrete-, Abstract -,Problem solving- thinking and so on.

Explanations on some of the key aspects of thinking are given below.



(http://www.apa.org/crsppp/archivforensic.html, 2004; http://www.dennisfox.net/papers/diverted.html; *http://springerlink.com*,Charles W. et al ,2007).

(a) Critical Thinking is for example characterized by a watchful, exact and repeat evaluation and judgment, to conduct a serious search, to read and contemplate before making a decision, or forming an opinion. - Critical Thinking means to judge severely, coupled with careful consideration, to investigate and look to find fault, before forming a judgment, or estimation. - Critical Thinking is to consider very, very carefully, at length and evaluate all the angles, before reaching the crucial and decisive point of decision-making. - Critical Thinking is to lineup all of the essential critical elements of the subject matter in question, and cautiously analyze them one, by one, over, and over again, before deliberating and rendering a decision.

(b) Positive Thinking is a process of choosing positive emotions from stimuli in the environment and applying them to perceptions and beliefs. The objective is to create an outlook that translates into a new or better chosen reality. Human beings practice positive thinking when they derive a positive sense of well being, optimism, belonging, meaning and/or purpose from being part of and contributing back to something larger and more permanent than themselves.

(c) Logical Thinking: There are many everyday life situations in which the ability to think logically is of great importance. If a person stands at a curb and there is a car approaching, his/her life literally depends on whether he/she is able to think logically or not. If he/she can, he/she will understand that he/she must wait for the car to pass; otherwise it will run him/her over. This means that logical thinking is thinking in terms of causes and consequences, which in its turn means that it is sequential thinking. Logical thinking also means following a train of thought. It is like looking into and predicting the future: if this happens, then that will happen. However, this has nothing to do with fortune telling. It is based on the interpretation of certain prevalent conditions and then predicting what will happen if the same conditions continue to prevail.

REASONING

Reasoning is the process by which information is used to draw a conclusion and make a decision. Cognitive psychologists have become to investigate how people reason and make decisions. There are two types of reasoning:

Deductive reasoning: a reasoning process whereby inferences and implications are drawn from a set of assumptions and applied to specific cases. If the assumptions/premises are true, then the conclusions must also be true [e.g.All people are good. Hitler is a person. Therefore, Hitler is good].

Inductive reasoning (the conceptual complement of deductive reasoning) refers to a reasoning process whereby a general rule is inferred from specific cases, using observation, knowledge, experiences, and belief.

WHAT IS LEARNING?

Learning is any relatively permanent change in behavior resulting from experience. Changes produced by learning are not always positive in nature because people are as likely to acquire bad habits/deviant behaviors and negative attitudes as good ones.

It can also be defined as the process leading to relatively permanent behavioral change or potential behavioral change. **John B. Watson** (1878-1958) was the first to study how the process of learning affects our behavior, and he formed the school of thought known as Behaviorism.

The central idea behind behaviorism is that only observable behaviors are worthy of research since other abstraction such as a person's mood or thoughts are too subjective. This belief was dominant in psychological research in the United Stated for a good 50 years. Perhaps the most well known Behaviorist in learning principles is *B. F. Skinner* (1904-1990). Skinner followed much of Watson's research and findings, but believed that internal states could influence behavior just as external stimuli.

According to the social psychologists, learning per se doesn't necessarily lead to change in attitude or behavior, the reason behind their argument is that apart from learning, there are many other factors including personality traits, social influence, cultural, economic, political and religious factors need to be taken into account.

Methods of Learning

The principal forms and methods of learning by animals and human beings include:

1. Learning through imitation/copying (eg children learn from their parents).
2. Learning through conditioned response and repeated stimulus (classical and operant conditioning), also known as associative and experimental learning.
3. Learning through trial and error (natural learning).
4. Learning through insight (observational or vicarious learning).
5. Informal and formal learning

Psychological Approaches to Learning

- Behavioral Learning Approach
- Cognitive Learning Approach
- Principled Learning Approach
- Participatory Learning Approach
- Experiential Learning Approach

Behavioral and Cognitive Approaches

Learning from the behavioral approach is defined as a change in behavior brought on by experience. Contributions to education from the behavioral approach include learning objectives and mastery learning. Learning objectives have instructional objectives which state a clear and unambiguous description of the teacher's educational intentions for students. Mastery learning is based on the assumption that, given enough time and the proper instruction, most students can master any learning objective. The teacher breaks down material into smaller units of study. With each unit, the student is responsible for mastering learning objectives.

Cognitive Approach

With the cognitive approach, students actively choose, practice, pay attention, ignore, reflect, and make decisions as they pursue their goals. Contributions to education from the cognitive approach include supplying guidance on underlining and highlighting, taking notes, and mnemonics. When underling and highlighting, the best method is to apply these to only one sentence per paragraph in order to improve learning. Taking notes focuses attention and helps encode information, thus increasing the chances that it will get into long-term memory. Mnemonics is a systematic procedure for improving memory by using mental memory aids. An example of this would be to form phrases or sentences using the first letters of each word on a list that needs to be remembered.

Styles of learning

- Auditory learning occurs through hearing the spoken word.
- Kinesthetic learning occurs through doing and interacting.
- Visual learning occurs through looking at images, mindmaps, demonstrations and body language.
- Tactile learning occurs through writing notes and drawing diagrams.

Basic features of learning

- Learning pervades our lives.
- Learning is involved in mastering a new skill, subjects, emotional development, social interaction, and personality development.
- We learn what to fear, what to love, how to be polite, how to be intimate, how to act/ behave, how to live with others/society, and so on.
- We learn both pro-and anti-social behaviors.
- Learning per se will not necessarily lead to attitude or behavior change. Many other internal and external factors/attributes need to be taken in to account(e.g. social, cultural, political, environmental, economic, religious, personal factors).

5.2. THEORIES AND PRINCIPLES OF LEARNING

1. Classical conditioning (studied in experiments-e.g Ivan Pavlov's Experiments)
2. Operant conditioning (studied in experiments- e.g Skinner's Experiments)
3. Observational learning or Vicarious Learning

The first two principles or theories are known as associative learning (associating the stimulus and response or cause and consequence or effect).

I. CLASSICAL CONDITIONING

It is a type of learning in which a neutral stimulus, after being paired with an unconditioned stimulus, begins to trigger a response similar to that normally triggered by the unconditioned stimulus(also known as pavlovian conditioning). It is a basic form of learning in which one stimulus comes to serve as a signal for the occurrence of a second stimulus that affect behavior (stimulus leads to response).

One important type of learning, Classical Conditioning, was actually discovered accidentally by Ivan Pavlov (1849-1936). Pavlov was a Russian physiologist who discovered this phenomenon while doing research on digestion. His research was aimed at better understanding the digestive patterns in dogs. During his experiments, he would put meat powder in the mouths of dogs who had tubes inserted into various

organs to measure bodily responses. What he discovered was that the dogs began to salivate before the meat powder was presented to them. Then, the dogs began to salivate as soon as the person feeding them would enter the room. He soon began to gain interest in this phenomenon and abandoned his digestion research in favor of his now famous Classical Conditioning study.

Basically, the findings support the idea that we develop responses to certain stimuli that are not naturally occurring. When we touch a hot stove, our reflex pulls our hand back. It does this instinctually, no learning involved. It is merely a survival instinct. But why now do some people, after getting burned, pull their hands back even when the stove is not turned on?

Pavlov discovered that we make associations which cause us to generalize our response to one stimulus onto a neutral stimulus it is paired with. In other words, hot burner = ouch, stove = burner, therefore, stove = ouch. Pavlov began pairing a bell sound with the meat powder and found that even when the meat powder was not presented, the dog would eventually begin to salivate after hearing the bell. Since the meat powder naturally results in salivation, these two variables are called the unconditioned stimulus (UCS) and the unconditioned response (UCR), respectively. The bell and salivation are not naturally occurring; the dog was conditioned to respond to the bell. Therefore, the bell is considered the conditioned stimulus (CS), and the salivation to the bell, the conditioned response (CR).

Steps in Classical conditioning

Before Conditioning

Neutral Stimulus **(CS)**——————→No Response/ Irrelevant Response
(Bell)

Unconditioned Stimulus **(US)**——————→**UR (**Salivation)
(Meat)

During Conditioning

CS (Bell)

+

US (Meat)——————→ UR (Salivation)

After Conditioning

CS (Bell)⟶ CR (Salivation).

II.OPERANT CONDITIONING

Operant conditioning refers to a type of learning in which behavior is strengthened if followed by reinforcement, or suppressed if followed by punishment. It is basic form of learning by repeating acts that bring good results and avoid acts that bring bad results. Operant behavior is more voluntary and influenced by its consequences. The term "Operant" refers to how an organism operates on the environment, and hence, operant conditioning comes from how we respond to what is presented to us in our environment. It can be thought of as learning due to the natural consequences of our actions. In operant conditioning, an organism (person) learns that a response it makes will be followed by a particular consequence. The operant conditioning is a learning force which affects desired response more frequently by providing reinforcing stimulus immediately following the response (behavior changes according to its immediate consequences).

Reinforcement

Reinforce means to strengthen, reinforce, stimulus and is used in psychology to refer to anything stimulus which strengthens or increases the probability of a specific response. For example, if you want your dog to sit on command, you may give him a treat every time he sits for you.

There are two types of reinforcement:

(1)Positive Reinforcement:

The examples above describe what is referred to as positive reinforcement, think of it as adding something in order to increase a response. For example, adding a treat will increase the response of sitting; adding praise will increase the chances of your child cleaning his or her room. The most common types of positive reinforcement or praise and rewards, and most of us have experienced this as both the giver and receiver.

(2) ***Negative Reinforcement:***

Think of negative reinforcement as taking something negative away in order to increase a response. Imagine a teenager who is nagged by his mother to take out the garbage week after week.

III. OBSERVATIONAL/VICARIOUS LEARNING

Observational/vicarious learning is learning by observation, watching, modeling and imitating the behavior of others.

There are four separate types of vicarious learning. These are worth knowing, because they enable you to expect learners to change their behavior as a result of observing someone else experience the principles described throughout this chapter. These four types of vicarious learning are summarized in the Table below.

- The Modeling Effect occurs when a person almost directly duplicates a behavior he has seen someone else perform and which the observer has not previously suppressed. The observer displays new behaviors that prior to the modeling had a zero probability of occurring. For example, my son bats the way he does because Barry Larkin is successful with that batting stance.

- The Eliciting Effect occurs when the observer performs a behavior to the model's, but still somewhat different. For example, if I hear that a famous celebrity has donated 5 million Ethiopian Birr to charity, I would be demonstrating the Eliciting Effect if this generosity prompted me to volunteer to umpire Ethiopian National Football Team.

- The Disinhibitory Effect occurs when a person who has previously refrained from a behavior goes ahead and performs that behavior after seeing a model perform the behavior without receiving any negative consequences. For example, if I already knew how to speed in my automobile but refrained from doing so out of fear of a speeding requirement, I could demonstrate the disinhibitory Effect by driving more quickly after several cars passed me on the highway or ring road with no apparent negative consequences.

- The Inhibitory Effect occurs when a person refrains from a behavior after seeing a model punished for engaging in that behavior. For example, I once

stopped asking questions in a high school class after I saw several students receive assignments to write reports on topics about which they asked questions.

Accidental Modeling: Vicarious learning can occur by accident.

As the Table shows, any of these four types of vicarious learning can lead to the development of either desirable or undesirable behaviors.

Descriptions and Examples of Specific Types of Vicarious (Observational) Learning

Types of Learning	Description	Positive Example	Negative Example
Modeling Effect (A person directly imitated - models-the behavior of another person.)	A person almost directly duplicates a behavior he has seen someone else perform and which the observer has not previously suppressed.	The teacher uses an effective thinking strategy to solve a word problem, and the student employs that same strategy when faced with a similar problem in the future.	The teacher responds sarcastically to a student question. Students who witness this sarcasm later use the same strategy in responding to their peers.
Eliciting Effect (A behavior is elicited - drawn forth - rather than duplicated.)	A person performs a behavior to the model's, but still somewhat different.	The teacher uses an effective thinking strategy to solve a word problem. When the student is faced with a similar problem in the future, he tries a different strategy which is similar (but not identical) to the one used by the teacher and which the student already knew how to employ.	The teacher responds sarcastically to a student question. A student who witnesses this sarcasm later punches a friend who annoys him.

Disinhibitory Effect (The person gets rid of an inhibition - hesitation - to do something.)	A person who has previously refrained from a behavior goes ahead and performs that behavior after seeing a model do so without receiving any negative consequences.	A student is afraid to give a speech to the class because she thinks her classmates will make fun of her. A friend gives a speech, and no one makes fun of the friend. The student is now more willing to give her own speech.	A student refrains from chewing gum in class, because she knows this behavior will be punished. A classmate in the front row chews gum, and the substitute teacher does nothing about it. The first student also begins chewing gum.
Inhibitory Effect (The person is inhibited - stopped - from doing the behavior.)	A person refrains from a behavior after seeing a model punished for engaging in that behavior.	A child stops cheating on tests when he sees a movie in which a child is punished for cheating on tests.	A child stops volunteering information in class because he thinks the teacher reacts harshly to other children who volunteer information.

Important Factors in Vicarious Learning

There are three major factors that influence the likelihood that vicarious learning will occur: the similarity of the model to the observer, the prestige of the model, and the observability of the behavior to be imitated.

- An observer is more likely to imitate a model who is perceived as similar to the observer. Similarity is especially important when observers have little information about the functional value of the modeled behavior (Bandura, 1986). The degree of similarity, of course, is determined within the mind of the observer. A young boy who thinks he is similar to Michael Jordan is likely to imitate what he sees Michael Jordan doing on television, even if most impartial judges would agree that there is actually not even a remote similarity.

- An observer is more likely to imitate a model who is perceived as prestigious. Again, the degree of prestige is determined within the mind of the observer. A

person who is perceived to be very low in prestige by a parent or teacher may be viewed as highly prestigious by a young child.

- Behaviors that are more easily observed are more easily imitated. Observability can be increased by such strategies as having the model perform the behavior very deliberately, using slow-motion or videotaped replays, verbalizing or otherwise focusing attention on behaviors that are difficult to observe, and pairing written instructions with visually modeled behaviors.

Models that people imitate take a wide variety of forms. A student may imitate another student, a teacher, a parent, a sports celebrity, a movie star, a cartoon character, a fictional character in a novel, a person demonstrating a skill in an educational film - anyone performing a behavior that can be observed (even in the observer's imagination) can qualify as a model.

It is also important to note that the behavior to be imitated takes shape within the mind of the observer. This means that if the observer thinks the model has been reinforced for performing a behavior, then the observer is likely to imitate that behavior - even if the model did not really perform that behavior or even if the model himself perceived the consequences to be unpleasant rather than pleasant.

It is even possible to have people serve as models for themselves. For example, a teacher could view a videotape of her own performance in the classroom. If her performance contained errors, feedback from a knowledgeable colleague could enable her to visualize how she would do a better job next time. Athletes often use tapes of themselves during good times to teach themselves ways to improve during a slump in their performance.

5.3. MOTIVATION AND EMOTION: CONCEPTS, THEORIES& MANIFESTATIONS

5.3.1. Understanding Motivation and Theories of Motivation

What drives you to learn about psychology, or law? Why did you choose your career? Are your drives different from other people or do we all share the same goals in life?

This part of the course will discuss the various aspects of motivation and emotion. You will learn the different views on motivation, from those deemed instinctual, internal, and those viewed as external. You will also be presented with the theories of emotion, an abstract concept which has yet to have an agreed upon definition.

All needs of human being may not be satisfied simultaneously. These needs or wants are unlimited. Words such as want, needs, motives, urges, drives are sometimes used interchangeably. We may not be able to perceive a motive directly, we can only infer from its manifestation (from behavior).

Motivation refers to an inferred internal process that activates, guides, and maintains behavior overtime. It is a useful concept for understanding behavior (sexual motivation and motivation to food are the most commonly cited examples).

Theories of Motivation

1. Instinct Theory**:** this theory suggests that many forms of behavior stem from innate urges.
2. Drive Theory: a theory of motivation suggesting that behavior is "pushed" from within by drives stemming from basic biological needs. Example: What do being hungry, being thirsty, being too cold, and being too hot had in common? They are all unpleasant and cause us to do something to eliminate such feelings. They all create unpleasant states of arousal- as hunger, thirst, fatigue, and so on. In order to eliminate such feelings and restore a balanced physiological state (homeostasis), we engage in certain activities.

3. Arousal Theory: a theory that suggests human beings seek an optimal level of arousal/i.e. seeking optimal activation/. This theory focuses on our general level of activation, reflected in physiological measures such as heart rate or blood pressure, muscle tension, and brain activity.
4. Expectancy Theory: a theory of motivation suggesting that behavior is elicited by expectations of desirable outcomes. Why are you reading this handout? Not for biological drive but you expect that doing so will help you to reach important goals/ gain useful and important knowledge, to get a higher grade on the next exam/.

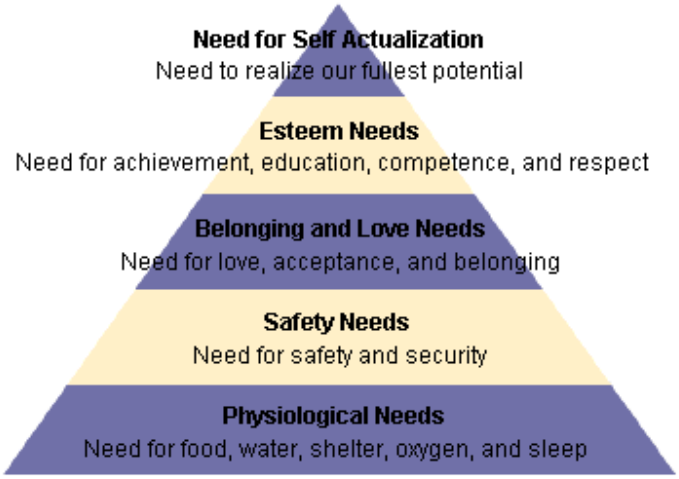
5. Psychoanalytic Theory

Sigmund Freud believed that humans have only two basic drives: Eros and Thanatos, or the Life and Death drives. According to Psychoanalytic theory, everything we do, every thought we have, and every emotion we experience has one of two goals: to help us survive or to prevent our destruction. This is similar to instinct theory; however, Freud believed that the vast majority of our knowledge about these drives is buried in the unconscious part of the mind. Psychoanalytic theory therefore argues that we go to school because it will help assure our survival in terms of improved finances, more money for development and change, or even an improved ability to find a spouse or build beautiful house in *Awassa*. We demand safety in our dormitory, class rooms and in our homes. We want deviant or criminal locked away, and we want to be protected against poisons, terrorists, and any thing else that could lead to our destruction. According to this theory, everything we do, everything we are can be traced back to the two basic drives

6. Humanistic Theory

Last, but not least, humanistic theory is perhaps the most well know theory of motivation. According to this theory, humans are driven to achieve their maximum potential and will always do so unless obstacles are placed in their way. These obstacles include hunger, thirst, financial problems, safety/security issues, or anything else that takes our focus away from maximum psychological growth.

The best way to describe this theory is to utilize the famous pyramid developed by Abraham Maslow (1970) called the Hierarchy of Needs. He believed that humans have specific needs that must be met and that if lower level needs go unmet, we can not possible strive for higher level needs.



Maslow's Hierarchy of Needs

Throughout our lives, we work toward achieving the top of the pyramid, self actualization, or the realization of all of our potential. As we move up the pyramid, however, things get in the way which slow us down and often knock us backward. Imagine working toward the respect and recognition of your colleagues and suddenly finding yourself out of work and homeless. Suddenly, you are forced backward and can no longer focus your attention on your work due to the need for finding food and shelter for you and your family.

According to Maslow, nobody has ever reached the peak of his pyramid. We all may strive for it and some may even get close, but no one has achieved full self-actualization. Self-actualization means a complete understanding of who you are, a sense of completeness, of being the best person you could possibly be. To have achieved this goal is to stop living, for what is there to strive for if you have learned everything about yourself, if you have experienced all that you can, and if there is no way left for you to grow emotionally, intellectually, or spiritually.

What specific motives influence behavior at any given time? Abraham Maslow asks. One answer has been provided by him that motives or, as he puts it, ***NEEDS***, exist in a hierarchy, so that those lying near the bottom of the hierarchy must be at least partially satisfied before those lying higher up can influence behavior. That is, needs exist in a hierarchy and only when lower-order needs are satisfied can higher-order needs be activated.

Maslow's Hierarchy of Needs shows that at the lower level, we must focus on basic issues; he terms physiological needs such as food, sleep, and safety. Without food, without sleep, how could we possible focus on the higher level needs such as respect, education, and recognition? One step above these are the safety needs (needs for feeling safe/secure in one's life). Above the safety and security needs are social needs (needs to have friends, to be loved and appreciated, and to belong-to fit in to a network of social relationships). Maslow describes physiological, safety, and social needs as *deficiency needs*: they are the basics and must be satisfied before higher levels of motivation (or growth needs) can emerge. Above the social needs are esteem needs, or needs to develop self-respect, gain the approval of other, and achieve success.

Finally, at the top of the hierarchy are self-actualization needs. These involve the need for self-fulfillment, the desire to become all that one is capable of being. Self actualization needs include concerns not only with ones selfish interests but also with issues that affect the well-being of others, and even of all humanity.

5.3.2. Emotion and Theories of Emotion

The concept emotion: It is a feeling? Then what is a feeling? These terms are difficult to define and even more difficult to understand completely. People have been attempting to understand this phenomenon for thousands of years, and will most likely debate for a thousand more. This section will present the various theories related to the acquisition of emotion.

The mainstream definition of emotion refers to a feeling state involving thoughts, physiological changes, and an outward expression or behavior. But what comes first? The thought? The physiological arousal? The behavior? Or does emotion exist in a vacuum, whether or not these other components are present? There are six theories which attempt to understand why we experience emotion.

Emotion is an acute disturbance of an individual and instinctive feelings involving behavior and conscious experience. It is reactive feeling characterized by specific cognitions, sensations, physiological reactions, and expressive behaviors tending to appear suddenly and to be difficult to control.

Emotions have costs and benefits. Can we imagine life without emotions? No**!** Because we cannot live without joy, anger, sorrow or incidents of emotions. Thus, emotions are essential to our personal existence, without them, we would not really be ourselves. Some types of emotional feelings, thoughts, reactions might lead people to act against the norms, values and laws of the society/culture. Example, emotional reactions like anger might lead a person/group of people to agression, which is a crime.

Types of Emotions

- Universal emotions: The major examples include: joy/happiness, anger, disgust, fear, surprise, sadness, grief, worryness, trust, relief, interest, shame, guilt, etc.We are biologically predisposed to acquire some fears; the enormous variety of human fears is explained by learning. Whilst anger is most often aroused by events that are not only frustrating or insulting but also interrelated as willful and unjustified.
- Early emotions- are expressive reactions felt by infants or children when they need biological or physiological necessities (e.g. if hungry, they cry for food; happy if their need fulfilled, etc).
- Mixed emotions-peoples emotions are often mixed (e.g: an individual can love and at the same time hate the same person/thing /event based).
- Fickle emotions-human's emotions are continually changing and hence fickle emotion is one example.

Components of Emotions

I. Subjective cognitive states;

II. Physiological components; and

III. Behavioral components

Physiological changes within our bodies include shifts in heart rate, blood pressure, etc.

From the three components, the most vivid aspects of emotion are the subjective-cognitive aspect (often reflected on faces).

Behavior during emotional responses includes facial expressions, gestures, and actions.

Theories of Emotion

1. James-Lange Theory

The James-Lange theory of emotion argues that an event causes physiological arousal first and then we interpret this arousal. Only after our subjective interpretation of the arousal can we experience emotion. If the arousal is not noticed or is not given any thought, then we will not experience any emotion based on this event. Example: You are walking down a dark alley late at night. You hear footsteps behind you and you begin to tremble, your heart beats faster, and your breathing deepens. You notice these physiological changes and interpret them as your body's preparation for a fearful situation. You then experience fear.

EVENT ⇢ AROUSAL ⇢ INTERPRETATION ⇢ EMOTION

2. Cannon-Bard Theory

This theory argues that we experience physiological arousal and subjective emotional reactions at the same time (such events include watching an exciting sports events), but give no attention to the role of thoughts or outward behavior. Example: You are walking down a dark alley late at night. You hear footsteps behind you and you begin to tremble, your heart beats faster, and your breathing deepens. At the same time, as these physiological changes occur, you also experience the emotion of fear.

EVENT ⇢ AROUSAL
EVENT ⇢ EMOTION

3. Schachter-Singer Theory

According to this theory, an event causes physiological arousal first. You must then identify a reason for this arousal and then you are able to experience and label the emotion. Example: You are walking down a dark alley late at night. You hear footsteps behind you and you begin to tremble, your heart beats faster, and your breathing deepens. Upon noticing this arousal you realize that is comes from the fact that you are walking down a dark alley by yourself. This behavior is dangerous and therefore you feel the emotion of fear.

EVENT ⇢ AROUSAL ⇢ REASONING ⇢ EMOTION

4. Lazarus Theory

Lazarus Theory states that a thought must come before any emotion or physiological arousal. In other words, you must first think about your situation before you can experience an emotion. Example: You are walking down a dark alley late at night. You hear footsteps behind you and you think it may be a mugger so you begin to tremble, your heart beats faster, and your breathing deepens and at the same time experience fear.

EVENT ⇢ THOUGHT ⇢ EMOTION
⇢ AROUSAL

5. Facial Feedback Theory

According to the facial feedback theory, emotion is the experience of changes in our facial muscles. In other words, when we smile, we then experience pleasure, or happiness. When we frown, we then experience sadness, it is the changes in our facial muscles that cue our brains and provide the basis of our emotions. Just as there are an unlimited number of muscle configurations in our face, so to are there a seemingly unlimited number of emotions. Example: You are walking down a dark alley late at night. You hear footsteps behind you and your eyes widen, your teeth clench and your brain interprets these facial changes as the expression of fear. Therefore you experience the emotion of fear.

EVENT ⇢ FACIAL CHANGES ⇢ EMOTION

5. Opponent-Process Theory

This theory suggests that strong emotional reactions are followed by opposite emotional reactions.

5.3.3. Relationship Between Emotions, Motivation and Behavior

- Emotions and motives are closely related. They are the most basic feelings.
- Need sometimes alters emotions, which in turn leads to motivation. Motivation usually arouses behavior, which may alter emotion which in turn increases /decreases motivation.
- Emotions are mainly triggered from the outside, while motives often activated from within(i.e. emotions are usually aroused by external events, and emotional reactions are directed toward these events. Whilst, motives are often aroused by internal events and are naturally directed toward particular objects in the environment such as food, water).

Emotional Responses and Manifestations

- Internal bodily responses: Involve autonomic nervous system. Body reaction, for example, you may some times tremble or raise your voice.
- Belief or cognitive appraisal : Collection of thoughts that accompany the emotion (e.g. experiencing joy often involves thinking about the reasons for the joy-example, "I did it -I'm accepted into college!") .
- Facial expression: Fundamental human emotion often shown overtly through facial expressions. When a person experiences disgust, he/s probably frown, often with mouth open, wide and eye lids partially closed.
- Reaction to the emotion (e.g. anger may lead to aggression …).

Most psychologists belive that facial expressions have been studied more than any other behavioral component.

Dear student! Identify and discuss some of the criminal acts induced due to emotionality by relating it with physiological, subjective cognitive or behavioral components.

5.3.4. Sensation, Perception and Attention

Although intimately related, sensation and perception play two complimentary but different roles in how we interpret our world.

SENSATION

Sensation refers to the process of sensing our environment through touch, taste, sight, sound, and smell. This information is sent to our brains in raw form where perception comes into play. Just as the computer takes in information through key boards, we take in information by seeing, hearing, smelling, tasting, pain and touching-five conventional sense organs. A large amount of information is being sensed at any one time such as room temperature, brightness of the lights, someone talking, a distant train, or the smell of perfume/coffee/*doro wot,*…..

PERCEPTION

Perception is the way we interpret these sensations and therefore make sense of everything around us. Perception also refers to the way the 'world' looks, sounds, feels, tastes, or smells- whatever is experienced by a person. The way we perceive our environment is what makes us different from other animals and different from each other. So far, our discussions have focused on human perception. But there are solid reasons for studying animal perceptions too(for one thing, animals like Dogs-because of their keen sense of smell, can be trained to perform jobs that are beyond the sensory limits of humans, detecting odors that are too faint /rotten/disgusting/ for human nose… This is why dogs are frequently employed to sniff out illegal drugs or to trace the path of a suspect.

Two major aspects of perception include (1) as a biological process, perceives and registers events in the sensory nervous system,(2) perception involves action/behavior(perceiving usually requires some action on the part of the perceiver, i.e. our behavior depends on what we perceive).

Practical Reasons for Studying Perception

(a) Through the study of perception, one can identify and correct potentially hazardous conditions that threaten the senses and impairs the ability to make decisions,(b)enables to design devices that ensure optimal perceptual performance(traffic lights, telephones, alarm clocks,..),(c)to design aids for individuals with impaired sensory function(e.g hearing aid, satisfies intellectual curiosity about ourselves and the world we live in,(d)identify, describe, justify, control and manage perception related behaviors .

ATTENTION

Attention: the first process of memory is attention. Attention is perceptual process that selects certain inputs for inclusion in our conscious experience/awareness, at any given time. It plays key roles in our sensation, perception, and memory.

5.4 MEMORY, REMEMBERING, FORGETTING & MENTAL DEFICIENCY

5.4.1. What is Memory?

In psychology, memory is an organism's ability to store, retain, and subsequently retrieve information. Thus, it is a mental activity or the capacity to retain and later retrieve information. Memory is a psychological activity as well. All learning implies memory. If we remembered nothing from our experiences, we could learn nothing. Memory is a general word, which includes several mental activities like learning, recall, recognition, and retention. Memory depends on interests, motivation and attention than repetition of experiences alone. Learning in general precedes memory.

5.4.2. Stages and Types of Memory

Human memory, like memory in a computer, allows us to store information for later use. In order to do this, however, both the computer and we need to master three processes involved in memory. The first is called encoding; the process we use to transform information so that it can be stored. For a computer, this means transferring data into 1's and 0's. For us, it means transforming the data into a meaningful form such as an association with an existing memory, an image, or a sound. Next is the

actual storage, which simply means holding onto the information. For this to take place, the computer must physically write the 1' and 0's onto the hard drive. It is very similar for us because it means that a physiological change must occur for the memory to be stored. The final process is called retrieval, which is bringing the memory out of storage and reversing the process of encoding. In other words, return the information to a form similar to what we stored. The major difference between humans and computers in terms of memory has to do with how the information is stored. For the most part, computers have only two types; permanent storage and permanent deletion. Humans, on the other hand are more complex in that we have three distinct memory storage capabilities (not including permanent deletion). The first is Sensory memory, referring to the information we receive through the senses. This memory is very brief lasting only as much as a few seconds.

There are several ways of classifying memories, based on duration, nature and retrieval of information. From information processing perspective, there are three main stages in the formation and retrieval of memory:

1. Encoding Stage or registration (processing and combining of received information). When you were introduced some issues/ names, you somehow deposit it into memory is called encoding stage (put into memory). Once something is attended to, it must be encoded to be remembered. Basically, encoding refers to translating incoming information into a mental representation that can be stored in memory.
2. Storage (creation of a permanent record of the encoded information). It is the stage of retaining or holding the information about the issue/ name for other time in memory. A distinction is often made between short-term and long-term memory. Short-term memory is just that, brief and transient. Think about looking up a new phone number in the phone book and making a call. You may remember it long enough to make the call, but do not recall it later. This is your short-term memory, which can hold a small amount of information for a short period of time. Once you stop attending to the number, perhaps after you make the call and move on to another task, you are likely to forget it. In order

to remember the number for a longer period of time (and after attending to other things), you would need to store it in your long-term memory.

3. Retrieval or recalling stage (calling back the stored information in response to some cue for use in a process or activity). It is recovering from the storage i. e. the process through which information stored in memory is located. Retrieval is the process of actually remembering something when you want to. If you think about tip-of-the-tongue experiences, when you know a word or name but just can't seem to recall it, you will understand how retrieval is different from storage.

Types of memory

There are three types of memory. However, STM and LTM are the common ones.

1. Sensory memory(SM)

SM corresponds approximately to the initial 200 - 500 milliseconds after an item is perceived. The ability to look at an item, and remember what it looked like with just a second of observation, or memorization, is an example of sensory memory.

2. Short-term Memory (STM)

STM is holding memory for relatively short periods of time (seconds or minutes), some of the information in SM is then transferred to short-term memory. STM allows one to recall something from several seconds to as long as a minute without rehearsal. STM takes over when the information in our sensory memory is transferred to our consciousness or our awareness. This is the information that is currently active such as reading this page, talking to a friend, or writing a paper. STM can definitely last longer than sensory memory (up to 30 seconds or so), but it still has a very limited capacity.

> *Psychologists who conducted experiments showing that the store of STM was 7±2 items (i.e. according to research, we can remember approximately 5 to 9 bits of information in our STM at any given time). Modern estimates of the capacity of STM are lower, typically on the order of 4-5 items, and we know that*

memory capacity can be increased through a process called ***chunking****. For example, if presented with the string:*

FBIPHDTWAIBM

people are able to remember only a few items. However, if the same information is presented in the following way:

FBI PHD TWA IBM

people can remember a great deal of letters. This is because they are able to chunk the information into meaningful groups of letters. Beyond finding meaning in the acronyms above, scholars showed that the ideal size for chunking letters and numbers, meaningful or not, was three. This may be reflected in some countries in the tendency to remember phone numbers as several chunks of three numbers with the final four-number of groups generally broken down into two groups.

If STM lasts only up to 30 seconds, how do we ever get any work done? Wouldn't we start to lose focus or concentrate about twice every minute? This argument prompted researchers to look at a second phase of STM that is now referred to as Working Memory. Working Memory is the process that takes place when we continually focus on material for longer than STM alone will allow.

What happens when our STM is full and another bit of information enters? Displacement means that the new information will push out part of the old information. Suddenly, some one says the area code for that phone number and almost instantly you forget the last two digits of the number. We can further sharpen our short term memory skills, however, by mastering chunking and using rehearsal (which allows us to visualize, hear, say, or even see the information repeatedly and through different senses).

There are typically six reasons why information is stored in our short term memory.

1. *primacy effect* - information that occurs first is typically remembered better than information occurring later. When given a list of words or numbers, the first word or number is usually remembered due to rehearsing this more than other information.
2. *recency effect* - often the last bit of information is remembered better because not as much time has past; time which results in forgetting.
3. *distinctiveness* - if something stands out from information around it, it is often remembered better. Any distinctive information is easier to remember than that which is similar, usual, or mundane.
4. *frequency effect* - rehearsal, as stated in the first example, results in better memory. Remember trying to memorize a formula for your math class. The more you went over it, the better you knew it.
5. *associations* - when we associate or attach information to other information, it becomes easier to remember. Many of us use this strategy in our professions and everyday life in the form of acronyms.
6. *reconstruction* - sometimes we actually fill in the blanks in our memory. In other words, when trying to get a complete picture in our minds, we will make up the missing parts, often without any realization that this is occurring.

There are other reasons for why information is transferred. As we all know, sometimes our brains seem to be full of insignificant facts. Repetition plays a role in this, as we tend to remember things more, the more they are rehearsed. Other times, information is transferred because it is somehow attached to something significant. You may remember that it was a warm day when you bought your first car. The temperature really plays no important role, but is attached to the memory of buying your first car.

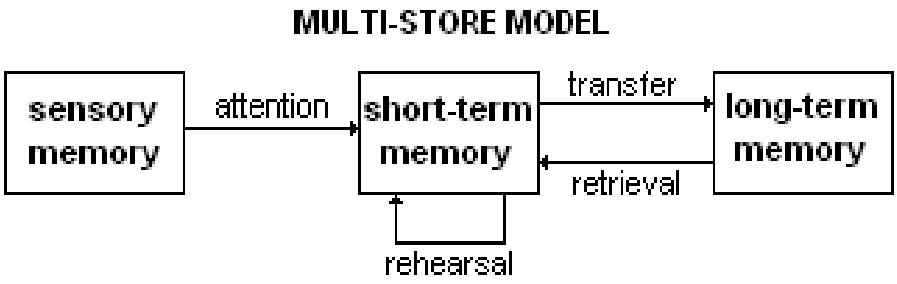
3. Long-term Memory (LTM)

LTM is retention of information over long periods of time. LTM can store much larger quantities of information for potentially unlimited duration (sometimes a whole life span). LTM is believed to rely mostly on an acoustic code for storing information, and to a lesser extent a visual code. Psychologists found that test subjects had more difficulty recalling collections of words that were acoustically

similar (e.g. dog, hog, fog, bog, log). For example, given a random seven-digit number, we may remember it for only a few seconds before forgetting, suggesting it was stored in our short-term memory. On the other hand, we can remember telephone numbers for many years through repetition; this information is said to be stored in long-term memory. While STM encodes information acoustically, LTM encodes it semantically. Scholars who studied LTM discovered that after 20 minutes, test subjects had the greatest difficulty recalling a collection of words that had similar meanings (e.g. big, large, great, huge).

LTM is mostly similar to the permanent storage of a computer. Unlike the other two types, LTM is relatively permanent and practically unlimited in terms of its storage capacity. It has been argued that we have enough space in our LTM to memorize every phone number in Ethiopia or Jimma or London. and still functions normally in terms of remembering what we do now. Obviously, we don't use even a fraction of this storage space.

There are several subcategories of LTM. First, memories for facts, life events, and information about our environment are stored in declarative memory. This includes semantic memory, factual knowledge like the meaning of words, concepts, and our ability to do math and episodic memory, memories for events and situations, memories for academic subjects like legal study, sociology, and psychology. The second subcategory is often not thought of as memory because it refers to internal, rather than external information. When you brush your teeth, write your name, or scratch your eye, you do this with ease because you previously stored these movements and can recall them with ease. This is referred to as nondeclarative (or implicit) memory. These are memories we have stored due to extensive practice, classical/operant conditioning, or habits.



Students are advised to refer the multi-store model (also known as Atkinson-Shiffrin memory model) for more illustrations, which was first recognized in 1968 by Atkinson and Shiffrin.

The multi-store model has been criticized for being too simplistic. For instance, long-term memory is believed to be actually made up of multiple subcomponents, such as episodic and procedural memory. It also proposes that rehearsal is the only mechanism by which information eventually reaches long-term storage, but evidence shows us capable of remembering things without rehearsal.

5.4.3. Remembering, Forgetting and Amnesia

Remembering and forgetting are matters of every day experience. You can't talk about remembering without mentioning its counterpart. It seems that as much as we do remember, we forget even more. Forgetting isn't really all that bad, and is in actuality, a pretty natural and normal phenomenon in our day to day life.. Imagine if you remembere every minute detail of every minute or every hour, of every day during your entire life, no matter how good, bad, or insignificant. Now imagine trying to sift through it all for the important stuff like where you left your keys, your mobile, your watch, your pen/pencil, your lecture notes, your wallet, etc.

There are many reasons for why we forget things and often these reasons overlap. Like in the example above, some information never makes it to LTM. Other times, the information gets there, but is lost before it can attach itself to our LTM. Other reasons include decay, which means information that is not used for an extended period of time, decays or fades away over time. It is possible that we are physiologically preprogrammed to eventually erase data that no longer appears pertinent to us.

Remembering is the ability to recall names, issues, events, actions, etc. Failing to remember something doesn't mean the information is gone forever. Sometimes the

information is there but for various reasons we can't access it. This could be caused by distractions going on around us or possibly due to an error of association (e.g., believing something about the data which is not correct, causing you to attempt to retrieve information that is not there).

There is also the phenomenon of repression, which means that we purposefully (albeit subconsciously) push a memory out of reach because we do not want to remember the associated feelings. This is often sited in cases where adults 'forget' incidences of sexual abuse when they were children. Therefore, forgetting is an inability of a person to remember. Memory can fail at any of the three stages- failure to recall names, remember things, etc reflected a failure in encoding, storage or retrieval. Forgetting observed or occurs either because the items/names are displaced or because the items decay with time due to limited capacity.

The Meaning of Amnesia

Amnesia, which can be psychological or physiological in origin, is a breakdown of memory, i.e. a partial or total loss of memory resulting from various causes, of which some are described as follows:

Causes for Amnesia

- Emotional factors such as stress and stressors
- Biological and chemical factors such as genetic factors and disease(mental illnesses and disorders)
- Social factors such as social learning, type of learning
- Psychological factors such as personality and behavior disorders.
- Other factors such as drug abuse including chewing chat (***khata edulis***), accidents (e.g. car or traffic accident), alcoholism, surgical procedures, old age, etc

Therapies for Amnesia

1. Psychological therapy: by using proper learning systems /principles (operant conditioning, etc), through behavior therapy and the like. By increasing the efficiency of encoding and retrieving. If the event is related to academic

affairs, the use of PQRST method (Preview, Question, Read, Self – Recitation, and Test) is recommended.

2. Clinical therapy: promote adequate diagnosis and investigation of the causes of memory loss or forgetting, and then administer proper drug to treat biological causes.

5.4.4. Mental deficiency

Mental deficiency, also known as feeble-mindedness, is inadequate functioning of the mind in terms of sensation, perception, belief, attitude, behavior, thinking, reasoning and the like. Feeble-minded was a term used from the late 19th century through the early 20th century to loosely describe a variety of mental deficiencies, including what would now be considered mental retardation in its various types and grades, and learning disabilities such as dyslexia. Thus, feeble-mindedness is abnormal development present at birth and characterized by deficiency in intelligence and social inadequacy. It has various causes, including biological (genetic), physiological, environmental and medical roots.

There are three levels of feeble-mindedness:(1) idiot- a person with low intelligence, unable to keep self cleanness and protect from dangers of daily life, always need assistance, support and guidance), (2) imbecile (like idiot but some times individuals are capable of saving own life), and (3) morons – individuals with low intelligence, some times work even with out assistance (e.g. those who are unable to understand from what they learnt and often attempt cheating in the exams).

5.5. Relationship between Learning, Motivation, Emotion, Sensation, Perception and Behavior

Associative learning (classical and operant conditioning)**,** the process by which one event or item comes to be linked to another through experience, is critically involved in human cognition, motivation(recall instinctive, arousal or expectancy theory) and

behavior. It has been proposed that associative learning principles can explain human perceptual and cognitive-emotional and behavior**a**l responses to odors. Specifically, it is hypothesized that odor hedonic [perception], sensation and odor-related behavior results from a learned association between an odor and the emotional context in which that odor was first encountered. The process is proposed to operate and produce effects as follows: (i) the emotion paired with an odor becomes associated to the odor and imbues it with meaning, thus influencing hedonic perception; and (ii) an odor can elicit the emotion associated with its prior exposure and have a general impact on mood and mood-related behavior. Thus, emotional odor-associative learning can explain both how odors come to be liked or disliked as well as how their presence can elicit emotion and influence thinking and behavior**.**

Moreover, human beings learn both undesirable (deviant and criminal) and desirable behaviors through association, vicarious observation and influences. Due to various reasons (economic, social, family, political, biological, personality related factors) some individuals are highly motivated to learn anti-social behaviors, develop undesirable emotional feelings and act against the norms and values of the group or society and engage themselves in criminal acts.

SUMMARY

Educational psychology deals with understanding the concept and aspects of learning. It studies learning, memory, forgetting, thinking, reasoning, amnesia and feeble mindedness. Educational psychologists also deal with the aspects of school psychology and mainly concerned with people's learning behavior from child hood up to old age. They argue that human being learns both good or pro-social and anti-social behaviors in the same ways.

The scope of educational psychology covers the methods, styles, forms and principles or theories of learning as well. The major methods of learning include trial and error, imitation, insight and associative learning. Among the major styles how human being learns include visual learning, auditory learning, tactile learning and kinesthetic learning.

Learning is an eye of our mind and pervasive. Educational psychologists define learning as a relatively permanent change in behavior resulting from experiences and practices. There

are different approaches and methods of learning: formal and informal, associative and vicarious, behavioral and cognitive,… learning approaches.

Learning is strongly related to the individual's sensation, perception, attention, thought, emotions, personality, motivation, culture and mind sets.

Review Questions (RQs)

1.What is learning?

……..

……..

2.Compare and contrast reasoning and thinking.

……..

……..

3.What are the different forms, methods, approaches and styles of learning?

……..

4.What are the factors affecting learning?

……..

……..

5. Compare and contrast the principles and theories of learning and discuss the relevance of these principles to the legal practice.

……..

6.Differentiate between Classical Conditioning, Operant conditioning and Vicarious learning.

……

7. Distinguish between positive and negative reinforcements.

……..

……..

8.Discuss the following concepts:

i. Memory
ii. Types of memory
iii. Stages of memory
iv. Forgetting
v. Remembering
vi. Amnesia
vii. Mental deficiency/Feeble-mindedness/

9. Write your argument with justification on the following statement:

It is impossible to identify the causes and manage the problem of memory loss and improve forgetting."

……..

……..

10. Why do you think we are concerned with reasoning, thinkling, memory, forgetting and feeble-mindedness?

……..

……..

11. Discuss how a person learns both good and bad behavior.

……..

……..

12. Compare and contrast motivation and emotion.

……..

……..

13. Discuss the relationship between learning, motivation and emotion.

……..

……..

14. Differentiate between sensation, perception and attention and discuss the importance of learning these concepts to the legal practice.

……..

……..

15. Discuss the major theories of motivation and emotions with relevant examples.

CHAPTER SIX: ABNORMAL BEHAVIOR /MALADJUSTMENT PROBLEMS

In chapter five we learn the concept learning with its key aspects including thinking, reasoning, methods, styles and principles/theories. The chapter also dealt with the different topical issues related to learning: motivation, emotion, sensation, perception, memory, forgetting, remembering, amnesia and feeble-mindedness.

The 6th chapter covers key aspects of abnormal psychology that deals with maladjustment problems or psychological disorders, including causes and treatment of the problems.

Objectives:

Up on completion of this chapter, students would be able to:

- define abnormal behavior and maladjustment problems
- familiarize themselves with the major problems of maladjustment(e.g. mental illness, anxiety, fear, frustration, conflict, depression, aggression, sexual disorder)
- discuss the causes of abnormal behaviors or maladjustment problems
- familiarize themselves with the strategies of managing maladjustment problems-biological and non-biological therapies including medical therapy, guidance and counseling.

BASIC QUESTIONS

What is abnormal psychology?

What is maladjustment problem?

What are the causes of maladjustment problems/psychological disorders?

What are the major types of maladjustment problems?

What are the mechanisms used to control and manage psychological disorders?

What is counseling?

What is psychotherapy?

What is psychopharmacotherapy?

What is Placebo?

6. 1 TYPES AND CAUSES OF MALADJUSTMENT PROBLEMS

Abnormal psychology is concerned with addressing anti-social behaviors and psychological disorders/maladjustment problems including stress, anxiety, depression, fear, phobia, frustration, conflict, mental illnesses(e.g. mania, insanity, schizophrenia), sexual disorder, Alzheimer's disease, autism, eating disorder, etc.

Most psychological and maladjustment problems are wrestled with in many arenas. In recent years, psychologists have become increasingly active in efforts to influence both the legal system's decision making procedures and the substance of the resulting decisions. For example, psychologists are interested in "psychology and law" do research on maladjustment problems including aspects of mental illnesses(depression, conflict, insanity, etc), emotions and other aspects of personality and behaviors related to jury competence, eyewitness accuracy, child testimony, alternative dispute resolution, and other procedural topics, seeking answers to practical empirical questions confronted by the legal system. Psychologists particularly those dealing with maladjustment problems are involved in assessing maturity, competence, insanity, disability, and sexual morality cannot be reduced to "facts," even in theory and contribute their efforts of addressing the problems.

Some people just have trouble adapting to changes, which is a condition called "adjustment disorder." An adjustment disorder develops when a previously healthy and well-adjusted person suddenly shows behavioral and personality changes as a result of social, economic or related events and factors. Therefore, maladjustment problem is inability or difficulty of a person to adjust him/herself with the personal or social or institutional situations and changes or problems.

6.1.1. Types of Maladjustment Problems

The aim of this sub-section is not to give exhaustive descriptions of maladjustment problems and psychological disorders and it might not be feasible for this course than simple awareness. Thus a brief discussion will be made on those key aspects of the problem under consideration (maladjustment problems).

i. Stress

Stress is a natural part of life, which can be both physical and mental.It is physiological and psychological responses to excessive stimulation. Stress can also be mental: when you worry about money, a loved one's illness, retirement, or experience an emotionally devastating event, such as the death of a spouse or being fired from work

Broadly speaking, stress is a process by which events (social, economic and environmental) threaten or challenge human being. You may face physical stress which is the result of too much to do, not enough sleep, a poor diet or the effects of an illness. The expressions are familiar to us, "I'm stressed out," I'm under too much stress," or "work is one big stress." Much of our stress comes from less drastic everyday responsibilities and normal behaviors. However, when you are constantly reacting to stressful situations without making adjustments to counter the effects, you will feel stress. It is essential to understand that EXTERNAL EVENTS no matter how you perceive those events, which may cause stress. Stress often accompanies the feeling of "being out of control." While stressors are events that release various stress-related hormones.

ii. Anxiety disorder

Anxiety disorder is a blanket term covering several different forms of abnormal, pathological anxiety, fears, phobias and nervous conditions that may come on suddenly or gradually over a period of several years, and may impair the pursuing of normal daily routines. There are different types of anxiety disorder (e.g. panic attack, etc). Some individuals begin to worry excessively and even quit jobs or refuse to leave home to avoid future attacks.

(a)Phobia

A person suffering, for example, from a phobia of snake or spiders might feel so frightened by a snake or spider that he/she would try to jump out of a speeding car to get away from one. People with phobias have especially powerful imaginations, so they vividly anticipate terrifying consequences from encountering such feared objects as knives, bridges, blood, enclosed places, certain animals or situations.

Social anxiety disorder is also known as social phobia. Individuals with this disorder experience intense fear of being negatively evaluated by others or of being publicly embarrassed because of impulsive acts. Almost everyone experiences "stage fright" when speaking or performing in front of a group (meetings, paper presentations,…). But people with social phobias become so anxious that performance is out of the question. In fact, their fear of public scrutiny and potential humiliation becomes so pervasive that normal life can become impossible. It is generally accepted that phobias arise from a combination of external events and internal predispositions. Some phobias such as arachnophobia (fear of spiders) and ophidiphobia (fear of snakes) however, may arise more easily due to an evolutionary trait that conditioned humans to fear certain creatures that could cause them harm.

(b) Mental illnesses/disorder (e.g schizophrenia, insanity)

Schizophrenia refers to psychological/mental disturbance/disorder, mental deterioration characterized by delirium, delusion and hallucination and it affects all areas of functioning: thought, perception, emotion, behavior.

A Schizophrenic individual suffers from impairment in multiple areas of functioning. A change of residence, marriage, divorce, the break-up of a significant relationship, the death of a loved one, graduation, or job loss are all examples of instances that might trigger a depressed mood. Schizophrenia and the associated disorders are directly or indirectly related to psychiatric disorders. In countries like Ethiopia, the overwhelming majority of such disorders are(most often) handled by psychiatrists than psychologists

Types of schizophrenia

There are many different types of schizophrenia. However, we will discuss the following five major categories with their common manifestations of symptoms.

(1) *Catatonic Type***:**

Catatonic schizophrenia is a serious motor behavior disturbance that can take various forms including:

- Stupor (marked decrease in responsiveness to environment, reduction in spontaneous movements, *mutism*);
- Negativism (resistance to all instructions or attempts to be moved);
- Rigidity (maintaining a rigid posture against all efforts to be moved);
- Excitement (purposeless and excited activity and movements);
- Posturing (voluntary assumption of inappropriate or bizarre postures, often for extended periods of time).

(2.) *Disorganized Type* (previously known as *hebephrenia*):
Disorganized type of schizophrenia is a particularly severe (although also less common) type of Schizophrenia, characterized by *incoherent behaviors*, thoughts, and affect. There is extreme loosening of associations. The individual seems to become increasingly indifferent and infantile. Giggling, silliness, weeping, anger and other reactions inexplicable and inappropriate to the situation are common. In some cases, the incoherence progresses to the point where the person "makes no sense at all".

(3) *Paranoid Type of schizophrenia* is characterized by delusions that have themes of suspiciousness, persecution, or grandeur. For example, the individual may become extremely suspicious that everyone at work is trying to kill him/her, or that s/he possesses some profound or even divine powers. Hallucinations will often accompany these delusions, often reinforcing the false beliefs.

(4) *Undifferentiated Type*: a "*waste basket*" category, for those individuals who do not fit neatly into the other categories, but who do show prominent psychotic symptoms (delusions, hallucinations, incoherence, and grossly disorganized behavior).

(5.) *Residual Type*: a category reserved for those individuals who have had at least one episode of Schizophrenia, but where there are no prominent psychotic symptoms. Nevertheless, the individual still exhibits signs of disorder (eg: marked social isolation or withdrawal, peculiar behavior, inappropriate affect, illogical thinking, mild loosening of associations).

Dear Student! Contextualize these disorders with legal practices, psychiatric disorders and the issue of insanity defense, which will be dealt in the second part of the course.

(iii) Depression

Depression, or a depressed mood, may in everyday English refer to a state of melancholia, unhappiness or sadness, or to a relatively minor downturn in mood that may last only a few hours or days. This is generally seen as quite distinct from the diagnosis of clinical depression. However, if depressed mood lasts at least two weeks, and is accompanied by other symptoms that interfere with daily life, it may be seen as a symptom of clinical depression, dysthymia or some other diagnosable mental illness, or alternatively as sub-syndromal depression. In the field of psychiatry, the word depression can also have this meaning of low mood but more specifically refers to a mental illness when it has reached a severity and duration to warrant a diagnosis, whether there is an obvious situational cause or not.

(iv) Conflict

Conflict occurs when a person experiences demands or desires that are incompatible with each other[for example: In approach-approach conflict we are attracted to two equally desirable goals. In avoidance-avoidance conflict we must choose between two equally undesirable demands. In approach-avoidance conflict we have one goal that has positive and negative aspects. And in double approach-avoidance conflict we experience two or more goals, both of which have positive and negative aspects. That is approach-avoidance occurs when an individual moves closer to a seemingly desirable object, only to have the potentially negative consequences of contacting that object push back against the closing behavior.

Goal **Approach/Approach** **Goal**



Goal **Avoidance/Avoidance** **Goal**





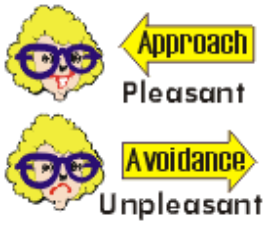


Goal **Approach/Avoidance**

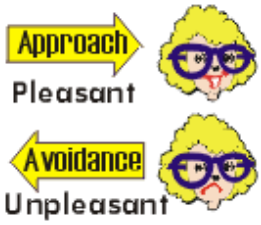




Goal **Double Approach/Avoidance** **Goal**







(v) Sexual Disorder

The major sexual disorders inculde homosexuality, lesbianism, pedophilia, sadism, disorders of interest/need/performance,erection, ejaculation,… To clearly understand sexual disorder, it is better to know the meaning of love, sex, sexual behavior and types of love*(please recall Trianular Theory of Love in chapter two).*

The word **l**ov**e** has many different meanings in English, from something that gives a little pleasure ("I loved that meal") to something one would die for (patriotism, family). It can describe an intense feeling of affection, an emotion or an emotional state. In ordinary use, it usually refers to interpersonal love. Probably due to its psychological relevance, love is one of the most common themes in art and music.

Just as there are many types of lovers, there are many kinds of love. Though love is inherent in all human cultures, cultural differences make any universal definition difficult to establish. One definition attempting to be universally applicable is Thomas

Jay Oord's: to love is to act intentionally, in sympathetic response to others (including God), to promote overall well-being. This definition applies to the positive connotations of love.

Expressions of love may include the love for a "soul" or mind, the love of laws and organizations, love for a body, love for nature, love of food, love of money, love for learning, love of power, love of fame, love for the respect of others, etcetera. Different people place varying degrees of importance on the kinds of love they receive. According to philosophers, the only goal of life is to be happy. And there is only one happiness in life: to love and be loved. Love is essentially an abstract concept, much easier to experience than to explain.

It is important to generally recall the types of love can be either interpersonal or impersonal love.

- Interpersonal love refers to love between human beings. It is a more potent sentiment than a simple liking for another. Unrequited love refers to those feelings of love which are not reciprocated. Interpersonal love is most closely associated with interpersonal relationships. Such love might exist between family members, friends, and couples. While sexual attraction often establishes a new bond, sexual intention is considered undesirable or inappropriate in certain love bonds. In many religions and systems of ethics it is considered wrong to act on sexual desire for immediate family, for children, or outside of a committed relationship. However, there are many ways to express passionate love without sex.
- Impersonal love: A person can be said to love a country, principle, or goal if they value it greatly and are deeply committed to it. Similarly, compassionate outreach and volunteer workers' 'love' of their cause may be borne not of interpersonal love, but impersonal love coupled with altruism and strong political convictions. People can also 'love' material objects, animals, or activities if they invest themselves in bonding their identity with that item. In these cases, if sexual passion is actually felt, is called paraphilia.

Love styles: Susan Hendrick and Clyde Hendrick developed a Loves Attitude Scale based on John Alan Lee's theory called Love styles. Lee identified six basic theories that people use in their interpersonal relationships:

- Eros (love)- a passionate physical love based on physical appearance
- Ludus - love is played as a game; love is playful
- Storge- an affectionate love that slowly develops, based on similarity
- Pragma - pragmatic love
- Mania - highly emotional love; unstable; the stereotype of romantic love
- Agape- selfless altruistic love; spiritual

Hendrick and Hendrick found men tend to be more ludic and manic, whereas women tend to be storgic and pragmatic. Relationships based on similar love styles were found to last longer.

However, psychological factors such as fear or anxiety are considered to be the cause for most forms of *SEXUAL DESIRE DISORDERS* such as impotence and frigidity.

The major sexual disorders inculde homosexuality, gay, or lesbianism-sometimes known as sexual orientations. Although the majority of sexual dysfunction probably has a physical basis, it is fitting to mention some sexual disorders here because dysfunctions, whether mainly due to physical/psychological causes, can result in distress. For example, the individual with a sexual disorder may suffer from related anxiety and sexual frustration which in turn leads to insomnia, and that insomnia may lead to other disorders. The individual's close relationships may suffer and tension may build up in the family as a whole. Sexual dysfunctions are common and often related to emotions and stress but may be caused by physical factors such as fatigue, diabetes or resulting from medication or excessive use of alcohol(some times khat/chat).

There are a dozen or so types of sexual disorders. All have to cause marked distress or interpersonal difficulty to rate as disorders. A short description follows:

(a)Hypoactive sexual disorder(a persistently reduced sexual drive or fantasy, known as libido,

(b) problems of reaching orgasm are often linked to problems in the relationship, depression or self-consciousness.

(c) Paraphilias are abnormal patterns of sexual desire / arousal from unusual sources or objects including fetishism, exhibitionism, voyeurism, sadism, masochism, transvestism, rape and pedophilia. For more insight some terms are defined below.

- exhibitionism (exposure of genitals to strangers);
- fetishism (finding nonliving objects erotic, e.g. women's underwear);
- frotteurism (fantasies, urges or behviour centred around rubbing self against non-consenting other, thestudy findings of psychologists and sociologists in Europe indicated that such a disorder is common among public transport users);
- Sexual masochism and sadis;
- transvestic festishism (cross-dressing *for erotic pleasure;*
- voyeurism (fantasies, urges or behviour centred around watching non-consenting others undressing, or having sex);

Although the majority of sexual dysfunction probably has a physical basis, it is fitting to mention some sexual disorders here because dysfunctions, whether mainly due to physical or mental/psychological causes, can result in distress. For example, the individual with a sexual disorder may suffer from related anxiety and sexual frustration which in turn leads to insomnia, and that insomnia may lead to other disorders. The individual's close relationships may suffer and tension may build up in the family as a whole.

(vi) Alzheimer's disease

Alzheimer's disease is a brain disorder named for German physician Alois Alzheimer, who first described it in 1906. Today, we know that Alzheimer's i**s** a progressive and fatal brain disease in countries like USA. It destroys brain cells, causing problems with memory, thinking and behavior severe enough to affect work, lifelong hobbies or social life(particularly common among the elderly people). Alzheimer's is not the normal part of aging, but it gets worse over time and it is fatal (for e.g. it is the seventh-leading cause of death in the United States). It i**s** the most common form of dementia**,** a general term for the loss of memory and other intellectual abilities serious enough to interfere with daily life. Although Alzheimer's disease has no current cure

but there are treatments for symptoms, combined with the right services and support (such as psychotherapy & psychological counseling), can make life better. Some of its symptoms include forgetfulness severe enough to affect their ability to function at home or at work, or to enjoy lifelong hobbies; confusion, getting lost in familiar places, misplacing things and trouble with language.

(vii) Autism

Autism is classified by the World Health Organization (WHO) as a developmental disability that results from a disorder of the human central nervous system. It is diagnosed by impairments to social interaction, communication, interests, imagination and activities. However, the causes, symptoms, etiology, treatment and other issues are controversial. Autism manifests itself at an early age, "before the age of three years." According to the WHO's International Classification of Diseases; autistic children are marked by delays in their "social interaction, language as used in social communication, or symbolic or imaginative play".

(viii) Personality disorders

Personality disorders are medically and psychologically defined as long-term, pervasive, inflexible patterns of thoughts, perceptions, attitudes, emotions and behaviors that are not well adapted or do not fit within the range of behavior considered normal. These patterns lead to significant difficulties in the ability to reason, think, act or interact with others or to behave appropriately. These disorders can surface at any time, including child hood or old age. People with personality disorders are often involved in repeated episodes of disruptive or difficult behavior. Others often consider these people overbearing, dramatic, or even obnoxious.

Personality Disorders and Crime

Paranoid Personality Disorder is characterized by a pervasive distrust and suspiciousness of others. An individual with this disorder will often interpret another motives as malevolent. This disorder often begins in early adulthood and is presented in a variety of contexts. It is clear how such a disorder could lead to violence.

When a person feels someone is motivated to harm them in some manner, it is not surprising that the individual would act in a violent way to either prevent the acts they expect to have occur or respond aggressively to those they have seem as hostile. Individuals diagnosed with this disorder are the 'psychopaths' we are familiar with from television shows and movies that have sensationalized these individuals.

An individual with Antisocial Personality Disorder has a pervasive pattern of disregard for the rights of others, and violations of them. There is an extremely high tendency for such an individual to be deceitfulness. An individual with the disorder tends to be irritable, aggressive, participate repeatedly in physical fights or assaults, and displays a consistently reckless disregard for the safety of their self or others. Finally, these individuals tend to lack remorse as displayed by their indifference for harming others. Why this disorder would contribute greatly to criminal behavior is clear. It itself is a recipe for criminality.

Borderline Personality Disorders, which is possibly the most difficult mental disorder to treat, also can contribute to criminality. While the disorder, which is reflected by a pattern of instability of interpersonal relationships, self image, affect, and impulsively, predominately leads to self damaging behavior, it also has a external component.

These individuals tend to have a marked instability in mood. They characteristically display inappropriate and intense anger and have very little anger control. This constant and recurrent anger and temper is often reflected with a history of physical fights and abuse.

Personality disorders are categorized according to the types of behaviors that are seen:

Category of Disorder	Types of Behaviors
Paranoid	Narcissistic
Schizoid	Avoidant
Schizotypal	Dependent
Antisocial	Obsessive-compulsive
Borderline	Passive-aggressive
Histrionic	Depressive

Some scholars classify personality disorders into clusters:

1. Cluster A includes the paranoid, schizoid, and *schizotypal personality* disorders. Individuals with these conditions often appear odd or eccentric.
2. Cluster B includes the antisocial, borderline, *histrionic and narcissistic personality disorders*. Individuals with these disorders often appear dramatic, emotional, or erratic.
3. Cluster C-includes the avoidant, dependent and obsessive-compulsive personality disorders. Individuals with these disorders often appear anxious or fearful.

Causes of Personality Disorders

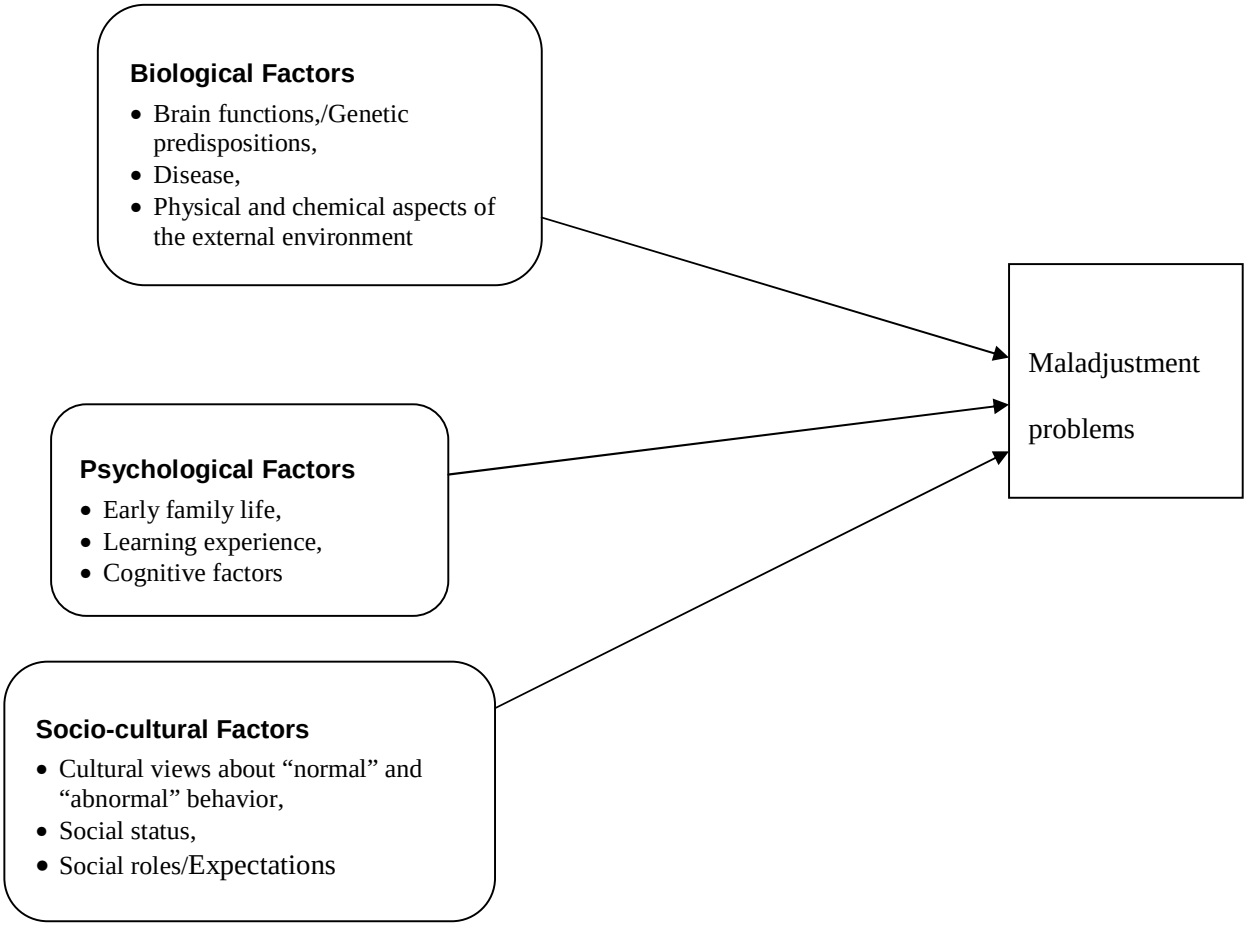
The roots of personality disorder lie in both early life experiences and genetic (ie, inherited) factors. However, severe changes in personality may develop during later life because of the unique stresses experienced by older adults. Many older adults become overwhelmed by losses (eg, deaths among friends and loved ones), medical problems, and stresses that build up over time. This is especially true for people who are not able to cope well or do not have the personal, social, or financial resources to act as a cushion or buffer against these stresses. In institutional settings, personality disorders can show up when an adult person tries to cope with the stresses in their new environment by exaggerating strong personality traits. People who have dependent personalities may feel helpless and panicked if they don't receive enough attention, and respond by clinging or by constantly asking questions or asking for help. People who have paranoid, antisocial personalities may refuse to cooperate with treatment plans or institutional rules.

Personality disorders can typically be diagnosed only by a mental health professional such as a psychiatrist. It requires a detailed lifetime history, which is often beyond the ability of the affected person, or the knowledge of their family and caregivers to provide. In addition, this history often becomes less accurate and distorted because of memory problems or the tendency that we all have to put the "best face" on past behaviors.

People with some types of personality disorders (eg, paranoid) may also be reluctant to speak openly with a mental health professional, aggravating the problem. This means that mental health professionals often need to observe someone for a fairly long time under various circumstances before being able to make a diagnosis.

Separating personality disorders from underlying medical or psychological problems is also difficult. For example, major or clinical depression, psychosis, insanity, or other psychiatric problems can distort personality features considerably. Alzheimer's disease and other dementias are often associated with personality changes, including loss of interest, or impulsive behaviors. Similarly, physical pain and disability can lead to dependency or withdrawal, which can resemble symptoms seen in personality disorders. Brain damage or tumors can also lead to dramatic changes in personality.

Major caues of psychological disorders and maladjustment problems



MODELS ON THE CAUSES OF ABNORMALITY

1. Biological (medical) model
2. Psychodynamic model
3. Behaviourist model
4. Cognitive model

1. The biological (medical) approach or Model

a. Assumptions on the causes of abnormality

i. Infection

Some mental illnesses have been linked to known micro-organisms (germs). Barr et al found an increased incidence of schizophrenia in mothers who had the flu when they were pregnant.

ii. Genetic factors

Individuals may inherit predispositions to certain illnesses, they are carried on in the genes from one generation to the next. Masterson & Davis (1985) found relatives of schizophrenics were 18 times more likely to be diagnosed.

iii. Biochemistry

- Schizophrenia is associated with an excessive amount of dopamine, a chemical substance in the brain. However, we cannot be certain whether excesses are the cause or the effect of schizophrenia

iv. Neuroanatomy

- *Neuroanatomy* means the structure of the nervous system. In the case of schizophrenia, there is evidence from post-mortem studies that their brains are different from non-schizophrenic brains.

v. Aversion therapy (Classical conditioning)

- *Maladaptive behaviour* is associated with something unpleasant (for example, given a sickness drug when lighting a cigarette).

b. Implications for treatment

- If the causes of a disorder are biological, then it is possible to cure the patient by changing their biological processes, there are a number of treatments:

i. Drug therapy

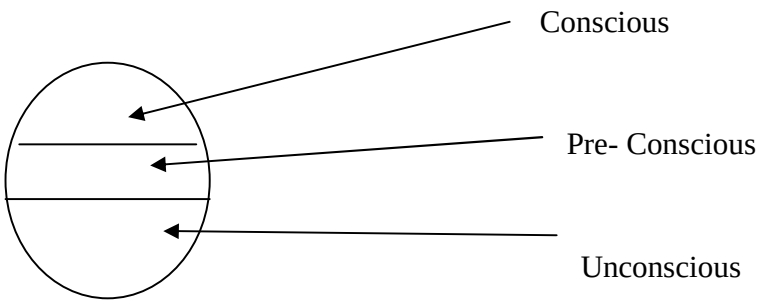
- Drugs may be used to correct biochemical abnormalities, for example decreasing the dopamine levels in schizophrenia sufferers

ii. Psychosurgery

- Brain surgery is used in extremely rare conditions, where no other treatment seems appropriate. Sections of the brain are removed or lesions are made separating parts of the brain. Examples include lobotomies which typically make patients calmer.

2. The Psychodynamic Approach /Model/ (Early 1900s)

- One of the main psychologists in this approach is Sigmund Freud, who believed that the mind is made up of three parts:



Within the mind there are three aspects of your personality that determine how you behave…

Id
This is the part of your personality that demands immediate satisfaction of needs
(It's like a little devil!)

Ego
The part that controls the fights between the Id and the Super-ego

Super-ego
This is the part that contains your morals / conscience

(It's like an angel!)

a. Assumptions of the causes of abnormality

i. Conflict between the id, ego and super-ego

- Conflicts occur between the ids desire for immediate gratification and the desire of the super-ego to maintain moral standards and ideals. The ego is the mediator between the two.

ii. Fixation at the psychosexual stages due to conflict

- There are a number of stages that individuals go through during development. Major conflicts or excessive gratification at any of the stages means that the child will become fixated. At times of great emotional stress, a person may regress to an earlier stage of development or fixation (e.g. thumb sucking / comfort eating in times of distress)

iii. Defence mechanisms that help control conflict

- The conflicts of the id and super-ego lead to anxiety. The ego protects itself against anxiety using defence mechanisms which include repression

b. Implications for treatment

If the causes of a disorder are unconscious, the implication of this model of treatment is to bring the repressed material into the conscious mind; this may be done through;

- Dream analysis
  - Freud believed that dreams are the 'royal road to the unconscious'. There were two parts of dreams, the latent and the manifest content. The manifest content is the storyline and the latent content is the true meaning that is hidden beneath the symbols

- Free association
  - This is where the patient lets his/her mind wander freely and says whatever comes into their head. This often uncovers repressed events and exposes unconscious desires

(Don't forget that Freud also used hypnosis and analysis of slips of the tongue)

3. The Behavioural Approach/ Model/

a. Assumptions of the causes of abnormality

i. *Human behaviour is learnt*

- mental disorders arise from maladaptive learning. Learning can be in the form of classical conditioning, operant conditioning or social learning

ii. Classical conditioning

- A stimulus which does not normally produce a response in an individual will come to do so if paired with a stimulus that does produce a response, for example Pavlov's dogs. This can help to explain how disorders such as phobias develop.

iii. Operant conditioning

- Behaviours which are reinforced are likely to be repeated. For example, if behaviours such as depression are reinforced through increased attention, they may be repeated.

iv. Observational learning and modelling

- With social learning, individuals learn particular abnormal behaviours through observing others and then modelling (copying) behaviour. This may explain how eating disorders develop.

b. Implications for treatment

- If the causes of a disorder are the result of maladaptive learning, then the behaviour can be 'unlearned' using one of the following techniques;
- Systematic desensitisation (Classical conditioning)
  - The client is taught to relax and confront feared objects/situations in a calm and peaceful setting, the idea is that the object becomes associated with calmness
- Token economy (Operant conditioning)
  - Institutionalised patients may be given tokens for behaving in appropriate ways (can be used to obtain privileges).
- Aversion therapy (Classical conditioning)
  - Maladaptive behaviour is associated with something unpleasant (for example, given a sickness drug when lighting a cigarette).

4. The Cognitive Approach/ Model/

Assumptions of the causes of abnormality

- To understand behaviour we must understand thoughts-includes how people see themselves and the world around them. Abnormal behaviour is caused by faulty and irrational thought processes.

- Examples of irrational thinking include:
  - Magnification and minimisation-people magnify failure and minimise achievement.
  - Overgeneralization-a person makes a sweeping conclusion based on a single trivial event.
- Beck used the term cognitive triad to refer to the three main forms of negative thinking-negative views of (1) self (2) world and (3) future.

6.2 MANAGEMENT OF PSYCHOLOGICAL DISORDERS/ MALADJUSTMENT PROBLEMS

The methods of treating psychological disorders are closely linked to the causes and models and perspectives about the causes of such disorders. Therapies can take various forms. They can include medication, talk-therapy, a combination of both, and can last only one session or take many years to complete.

There are many types of therapies used to control and manage maladjustment problems and psychological(mental) disorders. These therapies can be broadly categorized into psychotherapy and pharmacotherapy.

I. PSYCHOTHERAPY

Psychotherapy is the treatment by psychological means of problems with emotional nature by a psychotherapist by developing a professional relationship with the patient /client. It is intended to help emotionally disturbed individuals to modify their behavior, thought, and emotions. The first step in psychotherapy here is to clearly define the problem before setting a specific therapy. Psychotherapy involves and requires the following:

- A positive, healthy relationship(rapport) between a client and a trained psychotherapist(in some instances psychiatrist, psychologist, etc)

- Recognizable mental health issues, whether diagnosable or not
- Agreement on the basic goals of treatment
- Working together as a team to achieve these goals
- Conformity to the code of ethics on counseling clients

Psychotherapy includes Behavior Therapy, Cognitive Therapy, Psychoanalysis (treatment of personality disorder), Insanity Defense (dealing with legal issues to address abnormal behavior, personality disorder and maladjustment problems) and Group Therapy (Marital & Family therapy).

(1) BEHAVIOR THERAPY(BT)

Possibly the first occurrence of "behavior therapy" was in a 1953 research project by B.F. Skinner, Ogden Lindsley, and Harry C. Solomon. Other early pioneers in behavior therapy include Joseph Wolpe and Hans Eysenck.

In general, BT is seen as having three distinct points of origin: South Africa (Wolpe's group), the US(Skinner), and the UK (Rachman and Eysenck).Each had its own distinct approach to viewing behavior problems. Eysenck in particular viewed behavior problems as an interplay between personality characteristics and behavior. Skinner's group in the United States took more of an operant conditioning focus. Skinner's student Ogden Lindsley is credited with forming a movement called precision teaching , which developed a particular type of graphing program called the standard celeration chart to monitor the progress of clients. Skinner became interested in the individualizing of programs for improved learning in those with or without disabilities and worked with Fred Kellar to develop programmed instruction. In the second half of the 20th century, behavior therapy was coupled with the cognitive therapy of Aaron Beck and Albert Ellis, to form cognitive behavioral therapy. In some areas, the cognitive component had an additive effect (for example, sex offender treatment) but in other areas it did not enhance the treatment.

BT is based upon the principles of classical conditioning developed by Ivan Pavlov and operant conditioning developed by B.F. Skinner. There has been up to now a good deal of confusion about how exactly these two conditionings differ and whether the

various techniques of BT have any common scientific base. One answer has come in the form of an online paper called Reinforcing BT which more and more psychologists are now studying and appreciating.

BT is a method of psychotherapy that focuses on maladaptive behaviors by applying learning principles, such as operant conditioning to the elimination of unwanted behaviors and promote behavior modification and /or change. Behavior therapy based its core interventions on functional analysis. Just a few of the many problems that behavior therapy has created functional analysis to include intimacy in couples relationships' forgiveness in couples, chronic pain, stress related behavior problems of being an adult child of an alcoholic , anorexia, chronic distress, substance abuse, depression, anxiety and obesity. Functional analysis has even been applied to problems that therapists commonly encounter like client resistance. Applications to these problems have left clinicians with considerable tools for enhancing therapeutic effectiveness. Many have argued that BT is at least as effective as drug treatment for anxiety and depression.

Behavior change(sometimes used as a synonym for behavior modification) is behavior therapy methods based on the principles of learning and conditioning. It focuses on the behavior itself whilst psychoanalysis focuses on understanding how the individual's past conflicts influence behavior-it attempts to change certain aspect of individual personality.

(2) COGNITIVE THERAPY(CT)

CT is a type of psychotherapy developed by psychiatrist Aaron T. Beck in the 1960s, used to treat disorders in thinking(thoughts), emotions(feelings) and perceptions that lead a person to encounter anxiety, depression, conflict, frustration, stress, and anti-social behaviors like deviance, delinquency, aggression and crime.

One etiological theory of depression is the Aaron Beck's cognitive theory of depression. His theory is regarded as the most verified psychological theory of depression. His theory states that:

- depressed people think the way they do because their thinking is biased towards negative interpretations,
- depressed people acquire a negative schema of the world in childhood and adolescence,
- depressed people acquire such schemas and negative attitudes through a loss of a parent, loss of job, lack of motivation and satisfaction, marital incompatibility, rejection of peers, criticism from teachers or parents, ostracizations and other negative events,
- When the person with such schemas encounter a situation that resembles in some way, even remotely, the conditions in which the original schema was learnt, the negative schemas of the person are activated.

CT seeks to identify and change "distorted" or "unrealistic" ways of thinking, and therefore to influence attitudes, motivations, emotions and behaviors.

(3) PSYCHOANALYSIS

Psychoanalysis is the best form of therapeutic method/approach for neurotic disorders developed by Sigmund Freud (psychoanalyst). Psychoanalysis was born in Vienna by the end of the 19th century and spread with the contribution of Freudian disciples and dissidents, who, more or less loyal to Freudian theories, have issued currents and schools of psychoanalysis with various shades of difference. Psychoanalysis is knowledge acquired from psychic unconscious research and analysis. Such knowledge has gradually made up a new body of science called psychoanalysis. Psycho-analysis is the name (1) of a procedure for the investigation of mental processes which are almost inaccessible in any other way, (2) of a method for the treatment of neurotic disorders and (3) of a collection of psychological information obtained along those lines, which is gradually being accumulated into a new scientific discipline.

As a therapeutic technique, psychoanalysis is different from psychiatry and psychotherapy in general, as it stipulates the existence of a psychic unconscious, and insists on analysis and the integration of the contents of unconscious as therapeutic procedure. Psychoanalysis is gradually built on clinical observation and research, accompanied by reflections and theoretical ideas concerning the dynamics of mental

processes, repression, resistance, transference, and more....Today, psychoanalysis comprises several interlocking theories concerning the functioning of the mind. The term also refers to a specific type of treatment in which the "analysand" (analytic patient) verbalizes thoughts, including free associations, fantasies, and dreams, from which the analyst formulates the unconscious conflicts causing the patient's symptoms and character problems; and then explains these formulations ("interprets" them) to the patient to create insight for resolution of the problems. The specifics of the analyst's interventions typically include confronting and clarifying the patient's pathological defenses, wishes and guilt.

The treatment of personality disorders in later life is complicated and, sometimes, success is limited. Such treatment is meant to decrease stress and intensity of difficult behaviors, rather than to cure the disorder for ever. Treatment for personality disorders includes many forms of psychotherapy, depending on the situation. A variety of possible drug treatments are also available, including medications for depression, anxiety, and psychoses. The best treatment approach often involves a combination of psychotherapy and drug treatment.

(4) INSANITY DEFENSE

The concept of defense by insanity has existed since ancient Greece and Rome. However, in colonial America, a delusional Dorothy Talbye was hanged in 1638 for murdering her daughter, as at the time Massachusetts's common law made no distinction between insanity (or mental illness) and criminal behavior. Edward II, under English Common law, declared that a person was insane if his/her mental capacity was no more than that of a "Wild Beast". The first complete transcript of an insanity trial dates to 1724. The fate of insane defendants was uncertain in the UK until the Criminal Lunatics Act 1800, following the acquittal of James Hadfield, provided for their indefinite detention. The insanity plea was codified in English law with the M'Naghten Rules of 1843, which were formulated as a result of the attempted assassination of British Prime Minister Robert Peel. The rules define the defense as "at the time of the commission of the acts constituting the offense, the defendant as a result of a severe mental disease or defect, was unable to appreciate the nature and

quality of the wrongfulness of his acts." The key is that the defendant could not appreciate the nature of his actions during the commission of the crime.

The insanity defense is based on evaluations by forensic professionals that the defendant was incapable of distinguishing between right and wrong at the time the offense was committed. In addition, some jurisdictions require that the evaluation addresses the issue of whether the defendant was able to control his behavior at the time of the offense. A defendant making the insanity argument might be said to be pleading "not guilty by reason of insanity" (NGRI). A successful NGRI defense can result in an indeterminate commitment to a psychiatric facility (e.g. *Amanuel* Specialized Mental Hospital in Addis Ababa).

> Examples: although several cases have ruled that persons found not guilty by reason of insanity may not withdraw their successful insanity defense in an habeas petition in order to pursue an alternative, other rulings have allowed it. In State v. Connelly, for example, the petitioner who had originally been found not guilty by reason of insanity and committed for ten years to the jurisdiction of a Psychiatric Security Review Board filed a pro se writ of habeas corpus and the court vacated his insanity acquittal. He was granted a new trial and found guilty of the original charges, receiving a prison sentence of 40 years. Thus, the courts might rule that the insanity defense cannot be imposed upon an unwilling defendant if an intelligent defendant voluntarily wishes to forgo the defense.

Those found to have been not guilty by reason of insanity are generally then required to undergo psychiatric treatment, except in the case of temporary insanity. Defendants found not guilty by reason of insanity are generally placed in a mental institution. Unlike defendants who are found guilty of a crime, they are not institutionalized for a fixed period, but rather held in the institution until they are determined not to be a threat. Authorities making this decision tend to be cautious and as a result, defendants can often be incarcerated for longer than they would have been in prison. In 1992 the Supreme Court of the United States for example, ruled that a person could not be held "indefinitely".

An important distinction to be made is the difference between competency and criminal responsibility.

- The issue of competency is whether a defendant is able to adequately assist his attorney in preparing a defense, make informed decisions about trial strategy and whether or not to plead guilty or accept a plea agreement. This issue is dealt with in UK law as "fitness to plead".
- Criminal responsibility, however, deals with whether a defendant can be held legally responsible for his criminal behavior.

Competency largely deals with the defendant's present condition, while criminal responsibility addresses the condition at the time the crime was committed.

II. BIOLOGICAL THERAPY (OR DRUG THERAPY)

Drug therapy is a form of therapy that attempts to reduce psychological disorders through biological means such as the use of drugs or surgery.

Based on biopsychology and other perspectives of psychology, psychological disorders have multitude of origins including biological/chemical causes, for which drug or surgical therapy acts as remedy or a means to mitigate the problems.

Psychopharmacology one of the major biological therapies nowadays used very commonly in both developed and developing countries.

Psychopharmacology refers to “the study of drug treatment of psychological disorders.” Psycho-pharmacologists recommend the following three major categories of drugs as very useful in treating biologically originated abnormal behaviors and maladjustment problems:

- Anti-anxiety drugs/minor tranquilizers/ include Diazepam (valium), *chlordiazepoxide*, etc. This drug is used to control emotional reactions and used in conjunction with other drugs for anxiety disorders or stress related physical disorders.
- Anti-psychotic drugs (major tranquilizers)
- Anti-depressants /anti-manic drugs (MAO- inhibitors)

III. PLACEBO EFFECT

Placebo has no pharmacological effect but very useful in treating psychological disorders, often as effective as medication (for minor anxiety disorders and depressions).

Placebo is a medicine given to humour than cure patient. It could be vitamin pill or simply water for injection administered for mental satisfaction, and a ceremony practiced among medical practitioners in the health service provision units globally, including Ethiopia.

Dear student! Discuss the legal issues and concerns of placebo effect, if any.

IV. GUIDANCE AND COUNSELING

WHAT IS GUIDANCE ?

Guidance is aiding/directing or availing. Some sholars conceptualize guidance as a process of helping the individual in selecting, preparing, entering and progressing in the behavioral patterns, which comprise human activities in the educational, vocational, and recreational as well as in connection with community service groups.

Guidance is a form of advice that doesn't solve the problem by itself but helps individual to solve his/her problem. It also referred as "assisting individual to prepare for his/her future life, to fit him/her for his/her place in society."

Although there are so many forms of guidance, the following three forms are very common:

1) Educational guidance- required in the field of education
2) Vocational guidance-required in the field of profession and vocation
3) Personal guidance - required in the individual's personal life

UNDERATANDING COUNSELING

Counseling is a service designed to help an individual analyze him/her self by relating his/her capabilities, achievements, interests and mode of adjustment to what new decision he/s has made or has to make.

Counseling is designed to provide an interacting relationship as to help a client better understand him/herself in relating the present or future decisions or problems. It is a process involving an interaction between a counselor and a client in a private setting, with the purpose of helping the client change his/her behavior so that a satisfactory resolution of needs may be obtained.

Counseling is a process of clarifying a problem helded by another person(s), enabling them to take appropriate responsibility for that problem, and then assisting them to arrive at some form of resolution of the difficulty.

Joseph Perez (1965) summarized the definition of counseling nicely when he said that counseling is "an interactive process conjoining the counselee, who is vulnerable and who needs assistance, and the counselor who is trained and educated to give this assistance, the goal of which is to help the counselee learn to deal more effectively with him/herself and the reality of his/her environment."

The best example of counseling is "HIV/AIDS counseling"- is "confidential communication between a client and a care provider aimed at enabling the client to cope with stress and to take personal decisions relating to HIV/AIDS".

Who should be a counselor?

There are many dimensions and aspects of counseling which require the intervention of professionals from different fields of specializations. It is a concern of trained people in the principles of counseling and behavioral sciences, including teachers, community workers, clergymen, sheiks, etc.

It encompasses behavioral and social scientist counselors, including psychologists (clinical psychologists, counseling psychologists, forensic psychologists,

industrial/occupational psychologists, criminal psychologists, legal psychologists), sociologists, and social workers. Health professionals like medical doctors, public health officers, nurses, laboratory technicians, druggists, pharmacists, midwives, psychiatrists are also concerned with counseling.

Expected skills from counselors

Although it is unfair to expect a counselor to know every thing and the counselor should not be regarded as an expert in every thing, yet the following skills are needed from counselors:

- Opening and building rapport
- Attentiveness (eye contact, body language and verbal following)
- Empathic Listening
- Paraphrasing during interaction
- The ability to observe, collect and record information
- Understand and evaluate relevant professional language
- Distinguish between comments, opinions, feelings and facts.
- Use time and other resources constructively
- Note the non-verbal signals (like facial and body expressions)
- Hear what is said and note what is left unsaid.
- Pick up emotionally significant cues and Noting the social environment
- Accurately record behavior, and Summarizing

Common Counseling Errors(CCE)

- **i**nterrupting the client;
- looking away frequently;
- frowning, scowling or yawning;
- speaking too quickly or too slowly;
- finishing off the sentences of clients;
- judging;
- moralizing, preaching and patronizing;
- labeling;
- providing unwarranted assurance, diverting a client's attention;

- not accepting the client's feelings;
- advising;
- interrogating, using question in an accusatory way(like 'why?');
- using unacceptable suggestions like: "you should", "will tell you what to do"," must try", "the only way out is", "it is a must", etc.

Difference between Guidance and Counseling	
Guidance	**Counseling**
▪ the body of psychotherapy ▪ informative and didactic ▪ usually initiated by counselor ▪ giving solution to people's problems	▪ the heart of psychotherapy ▪ largely emotional, flexible and less didactic ▪ usually initiated by client ▪ people take suggestions seriously if they are part of finding the solution

ILLUSTRATIVE CASE

CASE STUDY on the Control and Management of maladjustment problems

Instruction

Set a group of 10 students who will discuss in a group and reflect/ role play on the following two practical cases on the "criminalization of HIV/AIDS" Allow 15 minutes.

A New Zealand court has ruled that a man who did not tell his sex partner that he was HIV-positive should not be prosecuted, because he used a condom.

In what is believed to be a legal first, Justin Dalley, 36, was acquitted of two charges of criminal nuisance. New Zealand law says people with HIV should disclose their condition if it could endanger their partner.

The New Zealand Aids Foundation welcomed the ruling, saying it highlighted condoms kept people safe.

Judge Susan Thomas said that the defendant had done his legal duty by taking reasonable

precautions.

"The evidence of health experts in the area is that the use of a condom for vaginal intercourse is sufficient for the prevention of the transmission of HIV and that this can be met without the requirement for disclosure," she said.

Mr Dalley's lawyer, Donald Stevens, welcomed the finding, which he said set an important legal precedent, not only for New Zealand, but for Australia, North America and Britain.

There have been concerns that the law could discourage those who may be HIV-positive from getting tested for the condition.

Rachael Le Mesurier, executive director of the New Zealand Aids Foundation, said the ruling emphasised the importance of a behavior known as 'safe sex.'

"Relying on HIV-positive people to tell you, and assuming that unprotected intercourse is safe if HIV is not mentioned, is a much riskier strategy, especially as approximately one third of people with HIV in New Zealand don't know they have it," she said.

CODE OF ETHICS FOR COUNSELORS

This Code of Ethics serves as a general guide to every day conduct of counselors. It is a belief standard of ethical behavior for counselors in their professional relationships with clients, colleagues, employers, the community and the society at large. It is based on the fundamental values of counseling profession which include the worth, dignity and uniqueness of all persons as well as their duties, rights and opportunities.

The key codes of ethics in counseling include;

- The counselor should maintain high standards of professional conduct in his/her capacity as a counselor.
- The counselor should accept responsibility only on the basis of existing competence or the intention to acquire the necessary competence.
- The counselor should retain ultimate responsibility for the quality and extent of the service that the individual assumes, assigns or performs.

- The counselor engaged in research should protect participants from unwarranted physical or mental discomfort, distress, harm, danger or deprivation.
- The counselor should not engage in any action that violates or diminishes the civil or legal rights of clients.
- The counselor should respect the privacy of the clients and hold in confidence all information obtained in the course of professional service.
- The counselor should not participate in, condone or be associated with dishonesty, fraud, deceit, or misrepresentation.
- The counselor should not misrepresent professional qualifications, education or affiliations.
- The counselor should act to prevent practices that are inhumane or discriminatory against any person or group of persons.
- The counselor should not exploit professional relationships for personal gains.
- Information obtained from clients should be treated as confidential, should not be discussed with persons not directly and professionally concerned with them.

SUMMARY

Abnormal psychology is sub-specialization of psychology concerned with the study of the causes, consequences and management of psychological disorders, abnormal behaviors and maladjustment problems. A person might suffer from either personal maladjustment problems (such as internal conflict, confusions, frustrations, emotional and thought disorders) because of biological or non biological factors that affect his /her day to day behavior. Due to socio-cultural factors or biological and psychological factors, this same person might suffer from social maladjustment problems including social phobia, disorders and abnormal behaviors due to peer pressure, social influence, and so on. There are three broad categories of causes of maladjustment problems or disorders: psychological factors, socio-cultural causes and biological factors. The most common disorders include mental illnesses and disorders such as anxiety, depression, aggression, phobia, schizophrenia, psychosis, insanity, sexual disorder, alcoholism, drug misuse, frustration, stress, conflict,

Alzheimer's disease, autism, sleeping disorder(e.g. sleep taking, sleep walking, insomnia, sleep apnea), speech disorder, eating disorder, and so on.

Psychological disorders can be ameliorated, treated or prevented first by exploring their causes. This can be done by using both approaches: medical and psychological approaches. Medical therapeutic approaches mainly rely on biological methods known as psychopharmacology so as to address biological or chemical causes of maladjustment problems. Whilst psychological therapeutic approaches rely on psychotherapy which include behavior modification, cognitive therapy, psychoanalysis, guidance and counseling principles and techniques.

Lawyers are concerned with understanding the causes of maladjustment problems and attempt to address the practical problems triggered due to these problems. Thus, the study of interdisciplinary study in general and that of psychology in particular enable them to understand the issue under consideration and address accordingly.

Review Questions (RQs)

1. Differentiate between maladjustment problems and abnormal psychology.

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2.What are the major types of maladjustment problems and psychological disorders?

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3.What is the relevance of studying maladjustment problems to the lawyer?

……

……

4.What are the major causes of maladjustment problems and psychological disorders?

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5.What is the difference between mental illness, mental deficiency and personality disorder?

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6. Discuss the major methods of dealing with the various aspects of psychological disorders?

……

7. Compare and contrast the following:

1. Psychotherapy and Psychopharmacology
2. Guidance and Counseling
3. Behavioral and cognitive therapy

8. What is your opinion on the effects of placebo?

……..

9. Discuss the codes of ethics for counseling?

……

10. What roles can a lawyer play in identifying, diagnosing and managing maladjustment problems and anti-social behaviors?

……

CHAPTER SEVEN: CONCEPTS AND CONCERNS OF FORENSIC SCIENCE

INTRODUCTION

In early tribal and clan life, when behavior occurred that violated the rules of the clan, all members were responsible for identifying the violator and determining the means and degree of sanctions to be imposed. Offenses considered serious usually resulted in torture, banishment or death. Lesser offences led to flaying or a similar corporal punishment or giving property to the offended family as atonement of the transgression. It was not uncommon for the tribe to brand or mutilate the culprit to prevent future violations and identify the offender. With the impact of agricultural and industrial revolutions, people's demand for the involvement of the government increased since cities getting crowded -disorders become frequent and crime increased. And police service in different levels took over.

The main and primary objective of organizing a police institution in a country is to secure order and peace within the community guided by the rules and regulations of the government governing that community. To achieve this, it focuses on the prevention of crime and if crime is committed, investigation undertakes to provide timely information for the judicial body for maintaining justice.

In the investigation of crime to locate and identify the suspect, the tactical and technical investigation is applied. The tactical investigation deals with complaints, interrogates, suspects and witnesses to reach to conclusion. In the technical investigation, physical evidences are located, collected, preserved, examined and interpreted to prove the words of the suspect /witness, whether a crime is committed or not or to identify the criminal.

In this days, the world's trend of democratization encouraged human right issues and, are being a burning and sensitive issues.

It is a common practice that political group may attack the subject of human rights in a country, and also stimulate international organizations dealing in human right against their own. It has been found that when ever country investigation departments able to

prove that its justice system is based on scientific and objective evidence collection, analysis and presentation to court, international organizations dealing in human right issues are satisfied and release their pressure.

So we are enforced to convince with enough evidence rather than forcing confession or rely on witnesses' word, things are urging us to give more attention to physical evidences and the use of forensic science is inevitable. It is so important as part of the judicial bodies in the justice system to learn/know about scientific investigation/forensic science/.

OBJECTIVES

By the end of this chapter, students should be able to:

Define and discuss forensic science including its goals and importance in the justice system, and explain concerns of the forensic science

Familiarize them with application of basic science in forensic science.

Appreciate how the forensic science applies basic science for legal issue and concern.

7.1. THE MEANINGS, GOALS, AND HISTORICAL DEVELOPMENT OF FORENSIC SCIENCE

Forensic science is a multidisciplinary subject used for examining crime scenes and gathering evidence to be used in prosecution of offenders in a court of law. Forensic science techniques are also used to examine compliance with international agreements regarding weapons of mass destruction.

The main areas used in forensic science are biology, chemistry, and medicine, although the science also includes the use of physics, computer science, geology, and psychology. Forensic scientists examine objects, substances (including blood or drug samples), chemicals (paints, explosives, toxins), tissue traces (hair, skin), or impressions (fingerprints, tiremarks, shoemarks and footprints) left at the crime scene. The majority of forensic scientists specialize in one area of science.

Forensic science (often shortened to forensics) is the application of a broad spectrum of sciences to answer questions of interest to the legal system. This may be in relation to a crime or to a civil action. The use of the term "forensics" in place of "forensic science" could be considered incorrect; the term "forensic" is effectively a synonym for "legal" or "related to courts" (from Latin, it means "before the forum"). However, it is now so closely associated with the scientific field that many dictionaries include the meaning that equates the word "forensics" with "forensic science".

“Forensic” comes from the Latin word “forensis” meaning forum. During the time of the Romans, a criminal charge meant presenting the case before a group of public individuals. Both the person accused of the crime and the accuser would give speeches based on their side of the story. The individual with the best argumentation and delivery would determine the outcome of the case. Basically, the person with the sharpest forensic skills would win.

HISTORY OF FORENSIC SCIENCE

Industrial revolution changed the way has manifested crime and means of detecting a crime. Communities are linked to commerce, cities are growing and the impact inevitably florished crime in the cities of the world. The increase in crime has nessecitated the countries to organize police institutions aiming at mainteninig order and peace in community guided by the rules and regulations of the government.

The "Eureka" legend of Archimedes (287-212 BC) can be considered an early account of the use of forensic science. In this case, he determined that a crown was not completely made of gold (as it was fraudulently claimed) by determining its density by measuring its displacement and weight, as he was not allowed to damage the crown.

The earliest account of fingerprint used to establish identity was during the 7th century. According to an Arabic merchant, Soleiman, a debtor's fingerprints were affixed to a bill, which would then be given to the lender. This bill was legally recognized as proof of the validity of the debt.

The first written account of using medicine and entomology to solve (separate) criminal cases is attributed to the book Xi Yuan Ji Lu (translated as "Collected Cases of Injustice Rectified"), a death investigator who instructed everyone to bring his

sickle to one location solved the case of a person murdered with a sickle. Flies, attracted by the smell of blood, eventually gathered on a single sickle. In light of this, the murderer confessed. The book also offered advice on how to distinguish between a drowning (water in the lungs) and strangulation (broken neck cartilage), along with other evidence from examining corpses on determining if a death was caused by murder, suicide, or an accident.

In sixteenth century, in Europe, medical practitioners in army and university settings began to gather information on cause and manner of death. Ambroise Paré, a French army surgeon, systematically studied the effects of violent death on internal organs. Two Italian surgeons, Fortunato Fidelis and Paolo Zacchia, laid the foundation of modern pathology by studying changes which occurred in the structure of the body as the result of disease. In the late 1700s, writings on these topics began to appear. These included: "A Treatise on Forensic Medicine and Public Health" by the French physician Fodéré, and "The Complete System of Police Medicine" by the German medical expert Johann Peter Franck.

In 1775, a Swedish chemist, Carl Wilhelm Scheele devised a way of detecting arsenous oxide, simple arsenic, in corpses, although only in large quantities. This investigation was expanded, in 1806, by a German chemist, Valentin Ross, who learned to detect the poison in the walls of a victim's stomach, and by an English chemist, James Marsh, who used chemical processes to confirm arsenic as the cause of death in 1836 murder trial.

Two early examples of English forensic science in individual legal proceedings demonstrate the increasing use of logic and procedure in criminal investigations. In 1784, in Lancaster, England, John Toms was tried and convicted for murdering Edward Culshaw with a pistol. When the dead body of Culshaw was examined, a pistol wad (crushed paper used to secure powder and balls in the muzzle) found in his head wound matched perfectly with a torn newspaper found in Toms' pocket. In Warwick, England, in 1816, a farm labourer was tried and convicted of the murder of a young maidservant. She had been drowned in a shallow pool and bore the marks of violent assault. The police found footprints and an impression from corduroy cloth with a sewn patch in the damp earth near the pool. There were also scattered grains of wheat and chaff. The breeches of a farm labourer who had been threshing wheat

nearby were examined and corresponded exactly to the impression in the earth near the pool. Later in the 20th century, several British pathologists, Bernard Spilsbury, Francis Camps, Sydney Smith and Keith Simpson would pioneer new forensic methods in Britain.

In our country, forensic science service was started in 1946 in the so-called ABADINA police college and was dealing with fingerprint. Document and photographic services were incorporated then after and it was then restructured under the crime investigation department in 1969 with 6 laboratories, which were namely fingerprint, document, firearms and traces, arson, biochemical and photography.

7.2. SUB-FIELDS OF FORENSIC SCIENCE

Criminalistics is the application of various sciences to answer questions relating to examination and comparison of biological evidence, trace evidence, impression evidence (such as fingerprints, footwear impressions, and tire tracks), controlled substances, ballistics (firearm examination), and other evidence in criminal investigations. Typically, evidence is processed in a crime lab.

Digital forensics is the application of proven scientific methods and techniques in order to recover data from electronic digital media. DF specialist work in the field as well as in the lab.

Forensic psychology is the intersection between Psychology and the legal system. It is a division of applied psychology concerned with the collection, examination and presentation of psychological evidence for judicial purposes.

The practice of forensic psychology involves understanding applicable law in the relevant jurisdictions in order to be able to make legal evaluations and interact appropriately with judges, attorneys and other legal professionals. An important aspect of forensic psychology is the ability to testify in court, reformulating psychological findings into the legal language of the courtroom to provide information to legal personnel in a way that can be understood. Further, in order to be a credible witness, for example in the United States, the forensic psychologist must understand the philosophy, rules and standards of the American judicial system, as well as display

competency in psychological practice. Primary is an understanding of the adversarial model under which the system functions. There are also rules about hearsay evidence and importantly the exclusionary rule. Lack of a firm grasp of these procedures will result in the forensic psychologist losing credibility in the courtroom.

Forensic Biology

Forensic biology is the application of biology to law enforcement. It includes the sub disciplines of Forensic anthropology, Forensic botany, Forensic entomology, Forensic odontology and various DNA or protein based techniques**.**

Forensic Anthropology

Forensic anthropology concerns the identification and recovery of remains. In extreme cases where conventional techniques are unable to determine the identity of the remains Anthropologists are sometimes able to deduce certain characteristics based on the skeletal remains. Race, sex, age and stature can often be determined by both measuring the remains and looking for structural clues in the bones.

Forensic botany Forensic botanists look at the plant life in order to gain information regarding possible crimes. Leaves, seeds and pollen found either on a body or at the scene of a crime can offer valuable information regarding the timescales of a crime and also if the body has been moved between two or more different locations.

Forensic Odontology

Odontologists or dentists can be used in order to aid in an identification of degraded remains. Remains that have been buried for a long period or which have undergone fire damage often contain few clues to the identity of the individual. The hardest substance in the human body often endures and such odontologists can in some circumstances compare recovered remains to dental records.

DNA Based Techniques

DNA based evidence is perhaps one of the strongest linking tools that law enforcement investigators have at their disposal. DNA evidence can definitively link a suspect to either a crime scene or victim. Nuclear DNA evidence has been recovered from blood, semen, saliva, skin cells and hair. Furthermore, Mitochondrial DNA can be recovered from both bone and teeth dating back thousands of years. Laboratory

analysis of DNA evidence generally involves Polymerase chain reaction (PCR) amplification of any sample recovered followed by quanitification via Capillary electrophoresis in order to obtain a DNA profile which can be compared to suspect DNA.

Forensic toxicology is the study of the effect of drugs and poisons on/in the human body.

Forensic Document Examination or Questioned Document Examination is the discipline that answers questions about a disputed document using a variety of scientific processes and methods. Many examinations involve a comparison of the questioned document, or components of the document, to a set of known standards. The most common type of examination involves handwriting wherein the examiner tries to address concerns about potential authorship.

Forensic Chemistry

The application of Chemistry to the study of physical materials or theoretical problems, the results of which may be entered into court as technical evidence. Boundaries are not sharply defined for forensic Chemistry, and it includes topics that are not entirely chemical in nature.

Some of the items most often encountered in crime laboratories, and the information sought in regard to them, are: (1) body fluids and viscera to be analyzed for poisons, drugs, or alcohol, quantitation of which may assist in determining the dosage taken or the person's behavior prior to death; (2) licit and illicit pills, vegetable matter, and pipe residues for the presence of controlled substances; (3) blood, saliva, and seminal stains, usually in dried form, to be checked for species, type, and genetic data; (4) hairs, to determine if animal or human; if human, the race, body area of origin, and general characteristics; (5) fibers, to determine type (animal, vegetable, mineral, or synthetic), composition, dyes used, and processing marks; (6) liquor, for alcoholic proof, trace alcohols, sugars, colorants, and other signs of adulteration; (7) paint, glass, plastics, and metals, usually in millimeter-sized chips, to classify and compare to known materials; (8) inks on documents, to determine type, dye content, or possible age; also chemical obliterations and restoration of chaffed papers; (9) swabs from the

hands of suspects, to be checked for the presence of gunshot residue; (10) debris from a fire or explosion scene, for the remains of the accelerant or explosive used.

Forensic Medicine

The noun forensic medicine has one meaning the branch of medicine that interprets and establishes the medical facts in civil or criminal law cases. Also called legal medicine or medical jurisprudence. The branch of medicine that interprets or establishes the facts in civil or criminal law cases also called medical jurisprudence.

Medical jurisprudence is a science of applying medical facts to legal problems. Routine tasks include filling out birth and death certificates, deciding insurance eligibility, and reporting infectious disease. Perhaps more significant is medical testimony in court. When merely relating observations, doctors are ordinary witnesses; interpreting facts based on medical knowledge makes them expert witnesses, required to present their opinions without bias toward the side that called them. Conflicts between medicine and law can occur, usually over medical confidentiality.

Forensic medicine is one of the largest and most important areas of forensic science. Also called legal medicine or medical jurisprudence, it applies medical knowledge to criminal and civil law. Areas of medicine that are commonly involved in forensic medicine are anatomy, pathology, and psychiatry.

Medical jurisprudence or forensic medicine, the application of medical science to legal problems.is typically involved in cases concerning blood relationship, mental illness, injury, or death resulting from violence. Autopsy (see post-mortem examination) is often used to determine the cause of death, particularly in cases where foul play is suspected. Post-mortem examination can determine not only the immediate agent of death (e.g. gunshot wound, poison), but may also yield important contextual information, such as how long the person has been dead, which can help trace the killing. Forensic medicine has also become increasingly important in cases involving rape. Modern techniques use such specimens as semen, blood, and hair samples of the criminal found in the victim's bodies, which can be compared to the defendant's genetic makeup through a technique known as DNA fingerprinting. This technique may also be used to identify the body of a victim. The establishment of serious mental illness by a licensed psychologist can be used in demonstrating incompetency to stand

trial, a technique which may be used in the insanity defense (see insanity), albeit infrequently. The synonym of forensic medicine is forensic pathology.

Forensic Pathology

Forensic pathology is the legal branch of pathology concerned with determining cause of death (such as bullet wound to head, exsanguiation, strangulation, etc.) and manner of death (including murder, accident, natural, or suicide). This includes examination of some wounds and injuries due to crime or negligence, examination of tissue specimens that may be relevant to rape, or other crimes. Forensic pathologists work closely with the coroner (England and Wales) or medical examiner (United States). The examination of dead bodies (autopsy or post mortem) is a subset of anatomical pathology. Often times, a coroner or medical examiner has a background in pathology.

Forensic medicine is often used in civil cases. The cause of death or injury is considered in settling insurance claims or medical malpractice suits, and blood tests often contribute to a court's decision in cases attempting to determine the paternity of a child.

7.3. PROTECTING, INVESTIGATION AND EXAMINATION OF CRIME SCENE

7.3.1. PROTECTING AND INVESTIGATING A CRIME SCENE

The most important aspect of evidence collection and preservation is protecting the crime scene. This is to keep the pertinent evidence uncontaminated until it can be recorded and collected. The successful prosecution of a case can hinge on the state of the physical evidence at the time it is collected. The protection of the scene begins with the arrival of the first police officer at the scene and ends when the scene is released from police custody.

All police department offices should include intensive training for its personnel on how to properly protect crime scenes. Potentially, any police officer can be put into the position of first responding officer to a crime scene. The first officer on the scene of a crime should approach the scene slowly and systematically. In some cases, this is not altogether practical. The first officer may also be involved in arresting an uncooperative suspect or performing life saving measures on an injured victim. In

either case, the officer should make mental or written notes (as is practical in each situation) about the condition of the scene as it was upon the officer's arrival and after the scene has been stabilized. The officer should keep notes on the significant times involved in responding to the crime scene (time dispatched to scene, time left for scene, time arrived at scene, time left scene, etc.). An effort must be made to disturb things as little as possible in assessing the situation. Particular attention should be paid to the floor since this is the most common repository for evidence and it poses the greatest potential for contamination. Notes should also be taken if the officer has to alter something in the investigation. Some things the officer should note include: the condition of the doors, windows, and lighting (both natural and manmade); if there are any odors present; if there are any signs of activity; how fire personnel have altered the scene; anything essential about the suspect (description, statements, physical condition, mental condition, intoxication, etc.); and anything essential about the victim. Once the scene has been stabilized, the scene and any other areas which may yield valuable evidence (driveways, surrounding yards, pathways, etc.) should be roped off to prevent unauthorized people from entering the area and potentially contaminating it. Investigators and other necessary personnel should be contacted and dispatched to the scene; however, under no circumstances should the telephone at the scene be used. Once the officer has secured the scene, he or she could do the following: record witness names and others who may have entered or been at the scene; separate witnesses and suspect(s); do not discuss the events or the crime with witnesses or bystanders or let the witnesses discuss these events; listen attentively but discreetly; and protect evidence which may be in danger of being destroyed. Any actions taken should be reported to the investigators.

Many times the arrival of additional personnel can cause problems in protecting the scene. Only those people responsible for the immediate investigation of the crime, the securing of the crime scene, and the processing of the crime scene should be there. Non-essential police officers, district attorney investigators, federal agents, politicians, etc. should never be allowed into a secured crime scene unless they can add something (other than contamination) to the crime scene investigation. One way to dissuade unnecessary people from entering the crime scene is to have only one entrance/exit into the crime scene. An officer can be placed here with a notebook to take the names

of all of the people entering the crime scene. The officer can then inform them that by entering the crime scene they may pose a problem by adding potential contamination, and the reason that the officer is taking their names is in case the crime scene investigators need to collect fingerprints, shoes, fibers, blood, saliva, pulled head hair, and/or pulled pubic hair from all those entering the crime scene. This will sometimes discourage non-essential personnel from entering the crime scene. The officer can also stop unwanted visitors from entering the restricted areas. If extraneous people do have to enter the scene, then make sure that someone who is working the scene escorts them. This is to make sure that they will not inadvertently destroy any valuable evidence or leave any worthless evidence.

Eating, drinking, or smoking should never be allowed at a crime scene. Not only can this wreck a crime scene but it can also be a health hazard. A command post should be set up for such purposes. The post is to be set up somewhere outside the restricted areas. It could be a vehicle, picnic table, hotel room, tent, etc. It can be used as a gathering place for non-involved personnel, a place for investigators to take breaks, eat, drink, or smoke, a communication center, a place for press conferences, a central intelligence area, etc. The best thing about it is that it is away from the crime scene.

Protection of the crime scene also includes protection of the crime scene investigators. One person, whether a civilian or a police crime scene investigator, should never be left alone while processing the scene. This is especially true if the suspect has not been apprehended. There are many stories of suspects still hiding at or near their area of misdeed. That is why there should always be at least two people working the scene. At least one of these people should have a radio and a firearm.

SETTING AN EXAMPLE

The role of detectives and supervisors in protecting crime scenes cannot be overstressed. These individuals ultimately are responsible for an investigation. Investigators who conscientiously limit the number of visitors to a crime scene ultimately may save themselves a great deal of legwork.

The simplest and most productive way for supervisors and detectives to discourage crime scene contamination is to set a good example by their own behavior. If a lieutenant walks around a crime scene at will, opening drawers and rifling through

closets, what could be the harm in other officers doing the same? If a detective sergeant fails to implement a sign-in log for scene visitors, what is there to limit "drop in" visits by curious patrol officers? It is in the best interests of case investigators to set a good example and to make sure others follow it.

To further enhance the protection of evidence, police administrators should draft and enforce a written policy regarding crime scene protection and preservation. The policy not only must be clear but also must carry the same weight as any other departmental rule. Police administrators should not tolerate curiosity as an excuse for unchecked visits to the scene of a crime. Administrators, perhaps in conjunction with the local prosecutor's office, should write and enforce the rules, and like supervisors and investigators, set an example by their own behavior.

Prosecutors, who have lost cases due to crime scene contamination, and the technical knowledge of laboratory and crime scene specialists, could be an invaluable source of ideas in the formation of the department's policy.

WRITTEN POLICY

The primary responsibilities of initial responders to a crime are to preserve life and to control suspects and witnesses. Then, shifting their focus somewhat, responding officers must take steps to preserve the integrity of the scene's physical boundaries. While this may not be a problem for those officers who were once taught the importance of protecting crime scenes, others--including supervisors, media relations personnel, and administrators--sometimes have trouble leaving well enough alone at a crime scene.

A department's written policy should provide a uniform procedure to restrict unnecessary access to crime scenes. A crime scene policy should contain the following elements:

The officer assigned to the crime scene's main entry must log in all visitors, including name, rank, stated purpose, and arrival and departure times. Absolutely no undocumented visitors should be allowed in the crime scene area.

Every officer at the scene must complete a standard report describing their involvement and their specific actions while at the scene

All visitors must make available any requested exemplar (hair, blood, shoeprints, fingerprints, etc.) for elimination purposes.

The highest-ranking officer entering a crime scene must assume responsibility for all subsequent visitors to the scene.

This final element means that any supervisory officer who visits the scene to "have a look around" must stay at the site until either the crime scene technicians finish their work or a higher-ranking officer arrives. Needless to say, this simple requirement goes a long way to discourage pointless tourism.

An officer attempting to secure a crime scene, who finds the post regularly overrun by curious commanders, must have the means to protect the scene, enforce department rules, and deal with superior officers. This is possible only when a clearly written, well-enforced policy is available to level the playing field, of this often difficult balancing act.

ADDRESSING FUTURE PROBLEMS

In addition to a clearly defined written policy, departments should also address the problem of crime scene contamination by instructing new officers to follow approved practices. This is best accomplished during basic academic instruction by having crime scene specialists discuss the department's policy and the importance of protecting forensic evidence. By training and proper practices, the risk of future crime scene contamination could be reduced.

7.3.2. Examination of the Crime Scene

Before the investigators begin examining the scene of the crime, they should gather as much information as possible about the scene. Once again, a slow and methodical approach is recommended. Information is gathered to prevent destruction of valuable and/or fragile evidence such as shoeprints, trace evidence, etc. Once all of the information is gathered, a mental plan is formulated as to how the crime scene will be analyzed. Copious notes and relevant times should be kept on every aspect of the crime scene investigation. The examination of the scene will usually begin with a walk through of the area along the "trail" of the crime. The trail is that area which all

apparent actions associated with the crime took place. The trail is usually marked by the presence of physical evidence. This may include the point of entry, the location of the crime, areas where a suspect may have cleaned up, and the point of exit. In some cases, a walk through may become secondary if potential evidence is in danger of being destroyed. In that case, this evidence should be preserved, or documented and collected as quickly as possible.

The purpose of the walk through is to note the location of potential evidence and to mentally outline how the scene will be examined. The walk through begins as close to the point of entry as possible. The first place the investigators should examine is the ground on which they are about to tread. If any evidence is observed, then a marker should be placed at the location as a warning to others not to step on the item of interest.

A good technique to use indoors on hard floors is the oblique lighting technique (also known as side lighting). A good flashlight with a strong concentrated beam is the only tool needed. The room should be darkened as much as possible. If a light switch which a suspect may have touched needs to be turned off, then make sure the switch has been dusted for fingerprints first. Do not close any blinds or shades until after all general photographs have been taken. In the side lighting technique, a flashlight is held about one inch from the floor. The beam is then angled so that it just sweeps over the floor surface and is almost parallel to the surface. The light is then fanned back and forth. Any evidence, such as trace evidence and shoeprints, will show up dramatically. Under normal lighting conditions, this evidence may be barely visible or completely invisible.

As the walk through progresses, the investigators should make sure their hands are occupied by carrying notebooks, flashlights, pens, etc. or by keeping them in their pockets. This is to prevent depositing of unwanted fingerprints at the scene. As a final note on the walk through, the investigators should examine whatever is over their heads (ceiling, tree branches, etc.). These areas may yield such valuable evidence as blood spatters and bullet holes. Once the walk through is completed, the scene should be documented with videotape, photographs, and/or sketches.

7. 3.3. DOCUMENTING THE CRIME SCENE

7.3.3.1. VIDEOTAPING THE CRIME SCENE

If available, a video camera is the first step to documenting a crime scene. Videotape can provide a perspective on the crime scene layout which cannot be as easily perceived in photographs and sketches. It is a more natural viewing medium to which people can readily relate, especially in demonstrating the structure of the crime scene and how the evidence relates to the crime. The video camera should have a fully charged battery as well as date and time videotape display functions. A title generator and "shake free" operations are also nice options. If a title generator is not available, then about 15 seconds at the beginning of the tape should be left blank. This will allow the addition of a title card with any pertinent information to the beginning of the crime scene tape. The condition of the scene should remain unaltered with the exception of markers placed by the investigators and any lights turned on during the walk through. These alterations can be noted on the audio portion of the tape. Before taping, the camera range should be cleared of all personnel. Any people in the area should be forewarned that taping is about to commence and they should remain silent for the duration of the tape. This prevents recording any potentially embarrassing statements.

Once the video camera begins recording, it should not be stopped until the taping is complete. The key to good videotaping is slow camera movement. A person can never move too slowly when videotaping, yet it is all too easy to move the camera fast without realizing it. This is why videotaping is not ideal for viewing detail. People have a tendency to pan past objects in a manner that does not allow the camera to properly capture the object. This is why slow panning of an area is necessary and it should be panned twice in order to prevent unnecessary rewinding of the tape when viewing.

The taping should begin with a general overview of the scene and surrounding area. The taping should continue throughout the crime scene using wide angle, close up, and even macro (extreme close up) shots to demonstrate the layout of the evidence and its relevance to the crime scene. If videotaping in a residence, the camera can show how the pertinent rooms are laid out in relation to each other and how they can be accessed. This is sometimes lost in photographs and sketches. After the taping is complete, it is wise to leave about 15 seconds of blank tape to prevent the crime scene tape from

running into anything else previously recorded on the tape. The tape should then be transferred to a high quality master tape. The recording tabs should be removed from the master tape after transferring the crime scene tape and the master should be stored in a safe place. This is to prevent accidental erasure of the crime scene tape. Copies can then be made from the master tape.

7.3.3.2. PHOTOGRAPHY THE CRIME SCENE

Whether a video camera is available or not, it is absolutely essential that still photographs be taken to document the crime scene. If a video camera is available, then photographs will be the second step in recording the crime scene. If video is not available, then still photography will be the first step. Photographs can demonstrate the same type of things that the videotape does, but photographs from the crime scene can also be used in direct comparison situations. For example, actual size photographs (also known as one-to-one photos) can be used to compare fingerprint and shoeprints photographed at the crime scene to known fingerprints or shoes from a suspect. This is the advantage of photographs over videotape.

Almost any type of camera with interchangeable lenses and a format of 35mm or larger will do in crime scene photography. The lenses should include a 28mm wide angle lens, a normal 55mm lens, and a lens with macro capabilities (1:4 or better). The flash unit used with the camera should be one that is not fixed to the camera. It should be able to function at various angles and distances from the camera. This is to allow lighting of certain areas to provide maximum contrast, place the flash in hard to reach areas, and reduce flash wash out which can render the item photographed invisible. Print and/or slide color film (25-400 ISO) should be used. A tripod, a level, and a small ruler should also be available for one-to-one photography. It may be of help to the investigation to have a Polaroid camera handy for instant photographs. For example, an instant photograph of a shoeprint found at a crime scene can be provided to investigators who are running a search warrant on a suspect's residence. The photo will tell them the type of shoe for which they are searching.

The photography of the crime scene should begin with wide angle photos of the crime scene and surrounding areas. When shooting the general overall scene, the photos should show the layout of the crime scene and the overall spatial relationships of the various pieces of evidence to each other. A good technique to use indoors is to shoot

from all four corners of a room to show its overall arrangement. The next set of photos should be medium range to show the relationships of individual pieces of evidence to other pieces of evidence or structures in the crime scene. Finally, close up photos should be taken of key pieces of evidence. A ruler should be photographed with items where relative size is important or on items which need to have one-to-one comparison photographs. The object should first be photographed as is, then photographed with the ruler. It is important that when doing one-to-one photography that the ruler is on the same plane as the object being photographed and the film plane is parallel to the ruler. This is why a level and a tripod are necessary. Notes should also be taken as to what the investigator is photographing or wishes to demonstrate in each photograph. This is to prevent the investigator from getting the picture back at a later date and trying to figure out what he or she was trying to accomplish with the photo. The same areas should be photographed in the same sequence as mentioned above in the paragraphs on videotaping.

7.3.3.3 CRIME SCENE SKETCHING

The final phase in documenting the scene is making a crime scene sketch. The drawback of photographs is that they are two-dimensional representations of three-dimensional objects. As a result, most photographs can distort the spatial relationships of the photographed objects causing items to appear closer together or farther apart than they actually are. If spatial relationships of the evidence are important or if something needs to have proportional measurements included in it for calculations (such as bullet trajectory angles, accident reconstructions, etc.) then a sketch must be made of the crime scene.

A sketch is usually made of the scene as if one is looking straight down (overhead sketch) or straight ahead (elevation sketch) at a crime scene. A rough sketch at the scene is usually made first on graph paper in pencil with so many squares representing so many square feet or inches. Directionality of the overhead view is determined by using a compass. Using a tape measure or other measuring devices, measurements are taken at crime scene of the distances between objects and/or structures at the crime scene. These measurements are proportionally reduced on the rough sketch and the

objects are drawn in. Two measurements taken at right angles to each other or from two reference points will usually suffice in placing the objects where they belong in a sketch. Double measurements should also be taken to make sure they are correct. This is especially true where calculations will later be used. A final sketch can be made later using inks, paper, and ruler, or a computer. The original rough sketch should be retained and preserved in case it is needed at a later date. Once the scene has been thoroughly documented then the evidence collection can commence.

7.4. COLLECTION AND PRESERVATION OF EVIDENCE

Once the crime scene has been thoroughly documented and the locations of the evidence noted, then the collection process can begin. The collection process will usually start with the collection of the most fragile or most easily lost evidence. Special consideration can also be given to any evidence or objects, which need to be moved. Collection can then continue along the crime scene trail or in some other logical manner. Photographs should also continue to be taken if the investigator is revealing layers of evidence, which were not previously documented because they were hidden from sight.

Most items of evidence will be collected in paper containers such as packets, envelopes, and bags. Liquid items can be transported in non-breakable, leak proof containers. Arson evidence is usually collected in airtight, clean metal cans. Only large quantities of dry powder should be collected and stored in plastic bags. Moist or wet evidence (blood, plants, etc.) from a crime scene can be collected in plastic containers at the scene and transported back to an evidence receiving area if the storage time in plastic is two hours or less and this is done to prevent contamination of other evidence. Once in a secure location, wet evidence, whether packaged in plastic or paper, must be removed and allowed to completely air dry. That evidence can then be repackaged in a new, dry paper container. *Under no circumstances should evidence containing moisture be packaged in plastic or paper containers for more than two hours*. Moisture allows the growth of microorganisms, which can destroy or alter evidence.

Any items, which may cross contaminate each other, must be packaged separately. The containers should be closed and secured to prevent the mixture of evidence during

transportation. Each container should have: the collecting person's initials; the date and time it was collected; a complete description of the evidence and where it was found; and the investigating agency's name and their file number.

Each type of evidence has a specific value in an investigation. The value of evidence should be kept in mind by the investigator when doing a crime scene investigation. For example, when investigating a crime he or she should spend more time on collecting good fingerprints than trying to find fibers left by a suspect's clothing. The reason is that fingerprints can positively identify a person as having been at the scene of a crime, whereas fibers could have come from anyone wearing clothes made out of the same material. Of course, if obvious or numerous fibers are found at the point of entry, on a victim's body, etc., then they should be collected in case no fingerprints of value are found. It is also wise to collect more evidence at a crime scene than not to collect enough evidence. An investigator usually only has one shot at a crime scene, so the most should be made of it.

The following is a breakdown of the types of evidence encountered and how the evidence should be handled:

Fingerprints

Fingerprints (also includes palm prints and bare footprints) are the best evidence to place an individual at the scene of a crime. Collecting fingerprints at a crime scene requires very few materials, making it ideal from a cost standpoint. All non-movable items at a crime scene should be processed at the scene using gray powder, black powder, or black magnetic powder. Polaroid 665 black and white film loaded in a Polaroid CU-5 camera with detachable flash should be used to make one-to-one photographs of prints, which do not readily lift. All small transportable items should be packaged in paper bags or envelopes and sent to the crime lab for processing. Because of the "package it up and send it to the lab" mentality, some investigators skim over collecting prints at a crime scene. Collecting prints at the crime scene should be every investigator's top priority. Fingerprints from the suspect as well as elimination fingerprints from the victim will also be needed for comparison (the same holds true for palm and bare footprints).

Bite Marks

Bite marks are found many times in sexual assaults and can be matched back to the individual who did the biting. They should be photographed using an ABFO No. 2 Scale with normal lighting conditions, side lighting, UV light, and alternate light sources. Color slide and print film as well as black and white film should be used. The more photographs under a variety of conditions are the better. Older bite marks, which are no longer visible on the skin, may sometimes be visualized and photographed using UV light and alternate light sources. If the bite mark has left an impression then maybe a cast can be made of it. Casts and photographs of the suspect's teeth and maybe the victim's teeth will be needed for comparison. For more information consult a forensic deontologist.

Broken Fingernails

Much like a bullet that has individualizing striations on it; natural fingernails have individualizing striations on them. A broken fingernail found at a crime scene can be matched to the individual it came from many months after the crime has been committed. Broken fingernails should be placed in a paper packet, which is then placed in a paper envelope. It can then be transported to the crime lab for analysis. Known samples from the suspect and maybe from the victim will be needed for comparison.

Questioned Documents

Handwriting samples can also be matched back to the individual that produced them. Known exemplars of the suspected person's handwriting must be submitted for comparison to the unknown samples. Questioned documents can also be processed for fingerprints. All items should be collected in paper containers. For more information consult a questioned documents examiner.

Blood and Body Fluids

If using the RFLP method of DNA analysis, then blood and seminal fluid can be matched back to an individual with a high degree of probability. Currently, if using the PCR method of DNA analysis or conventional serological techniques then blood and some body fluids can be said to come from a certain population group to which the individual belongs. As PCR technology advances, these population groups will become smaller, eventually giving it the same discriminating power as RFLP analysis

has today. Dried blood and body fluid stains should be collected in the following manner: If the stained object can be transported back to the crime lab, then package it in a paper bag or envelope and send it to the lab; if the object cannot be transported, then either use fingerprint tape and lift it like a fingerprint and place the tape on a lift back; scrape the stain into a paper packet and package it in a paper envelope; or absorb the stain onto 1/2" long threads moistened with distilled water. The threads must be air dried before permanently packaging. For transportation purposes and to prevent cross contamination, the threads may be placed into a plastic container for no more than two hours. Once in a secure location, the threads must be removed from the plastic and allowed to air dry.

They may then be repackaged into a paper packet and placed in a paper envelope. Wet blood and body fluid stains should be collected in the following manner: all items should be packaged separately to prevent cross contamination, if the item can be transported to the crime lab, then package it in a paper bag (or plastic bag if the transportation time is under two hours), bring it to a secure place and allow it to thoroughly air dry, then repackage it in a paper bag. If the item cannot be transported back to the lab, then absorb the stain onto a small (1"x1") square of pre-cleaned 100% cotton sheeting. Package it in paper (or plastic if the transportation time is less than two hours), bring it to a secure place and allow it to thoroughly air dry; then repackage it in a paper envelope. *Under no circumstances should wet or moist items remain in plastic or paper containers for more than two hours.*. Victim and suspect's known whole blood samples will have to be collected in yellow, red, or purple top "Vacationers." Contact the lab to which the samples will be submitted for specific information.

Firearms and Tool marks

Bullets and casings found at the crime scene can be positively matched back to a gun in the possession of a suspect. Bullets and casings can also be examined at the crime lab and sometimes tell an investigator what make and model of weapons may have expended the casing or bullet. A bullet found at the crime scene can sometimes be matched back to the same lot of ammunition found in a suspect's possession. Tool marks can be positively matched to a tool in the suspect's possession. Firearm safety is a must at any crime scene. If a firearm must be moved at a crime scene, never move it

by placing a pencil in the barrel or inside the trigger guard. Not only is this unsafe, but it could damage potential evidence. The gun can be picked up by the textured surface on the grips without fear of placing unnecessary fingerprints on the weapon. Before picking up the gun, make sure that the gun barrel is not pointed at anyone. Keep notes on the condition of the weapon as found and stops taken to render it as safe as possible without damaging potential evidence. The firearm can then be processed for prints and finally rendered completely safe. *Firearms must be rendered safe before submission to the crime lab*. The firearm should be packaged in an envelope or paper bag separately from the ammunition and/or magazine. The ammunition and/or magazine should be placed in a paper envelope or bag. It is important that the ammunition found in the gun be submitted to the crime lab. Any boxes of similar ammunition found in a suspect's possession should also be placed in a paper container and sent to the crime lab. Casings and/or bullets found at the crime scene should be packaged separately and placed in paper envelopes or small cardboard pillboxes. If knives (or other sharp objects) are being submitted to the lab (for tool marks, fingerprints, serology, etc.), then the blade and point should be wrapped in stiff unmovable cardboard and placed in a paper bag or envelope. The container should be labeled to warn that the contents are sharp and precautions should be taken. This is to prevent anyone from being injured.

Shoeprints and Tire Tracks

Shoeprints and tire tracks can be matched positively to a pair of shoes or to tires in a suspect's possession. Shoeprints and tire tracks can sometimes tell investigators what type of shoes or tires to look for when searching a suspect's residence or vehicles. Before any attempt is made at collecting shoeprints or tire tracks, one-to-one photographs should be made using a tripod, ruler, and level. The flash should be held at about 45 degree angles from the surface containing an impression. Casts can be made of impressions using dental stone. Once hardened, the cast can be packaged in paper and submitted to the lab. When photographing prints on hard flat surfaces the flash should be used as side lighting. Shoeprints on hard flat surfaces can also sometimes be lifted like a fingerprint. Dust prints on certain surfaces can be lifted with an electrostatic dust print lifter.

Fracture Matches

Fracture matches can positively link broken pieces at the scene with pieces found in the possession of a suspect. For example, headlight fragments found at the scene of a hit and run could be positively matched to a broken headlight (just like putting together a jigsaw puzzle) on a suspect's vehicle. Larger fragments should be placed in paper bags or envelopes. Smaller fragments should be placed in a paper packet and then placed in an envelope.

Hair

If a root sheath is attached, then DNA analysis using PCR technology can say that this hair came from a certain percentage of the population to which the suspect belongs. If there is no root sheath, then a microscopic analysis can say that the hair has the same characteristics as the suspect's hair and is similar to his or her hair. At this point, no one can say that a hair came from a particular individual. Hair found at the scene should be placed in a paper packet and then placed in an envelope. If a microscopic examination is required, then 15-20 representative hairs from the suspect must be submitted to the lab for comparison. If DNA analysis if going to be used, then a whole blood sample from the suspect must be submitted to the lab in a "Vacutainer." Contact a DNA lab for more information.

Fibers

Fibers can be said that they are the same type and color as those found in a suspect's clothes, residence, vehicle, etc. Fibers should be collected in a paper packet and placed in an envelope. Representative fibers should be collected from a suspect and submitted to the lab for comparison.

Paint

Paint can be said that it is the same type and color as paint found in the possession of a suspect. Paint fragments should be collected in a paper packet and placed in an envelope. Representative paint chips or samples should be collected from the suspect and submitted to the lab for comparison.

Glass

Glass can be said that it has the same characteristics as glass found in the possession of a suspect. Smaller glass fragments should be placed in a paper packet and then in an envelope. Larger pieces should be wrapped securely in paper or cardboard and then

placed in a padded cardboard box to prevent further breakage. Representative samples from the suspect should be submitted to the lab for comparison.

Other Trace Evidence

Sometimes during the commission of a crime, there are other items, which may be transferred to a perpetrator from the scene or from the perpetrator to the scene (sheetrock, safe insulation. etc.). The guidelines for collecting the evidence and obtaining known samples are about the same as for paint and fibers. For specific information, contact your crime lab.

Special Considerations for Sexual Assault Evidence

When dealing with sexual assaults, the investigator usually has a living victim who can provide the investigator with information, which will help in collecting and preserving the pertinent evidence. The investigator should glean as much information as possible, so he or she will know which evidence to collect. For example, if the victim tells the investigator (which in this case may be the examining physician) that no oral penetration occurred, then the investigator knows that no oral swabs will need to be taken. Any information should be passed on to the crime lab, so the forensic scientists will know how to process the evidence submitted. Evidence should never be submitted without communicating relevant information.

When dealing with sex crimes, the victim should be taken to the hospital immediately and the examination started as soon as possible. Photographs should be taken to document any injuries, which the victim received. If necessary, oral, vaginal, and/or anal swabs should be taken from the victim and air dried for one hour in a moving air source as soon as possible. They should be collected as soon as possible because the body begins breaking down the various components in seminal fluid through drainage, enzyme activity, pH, etc. The swabs should be air dried under a fan for at least one hour. The doctor at the hospital can either accomplish this, or, upon collecting the kit from the doctor, the investigator should bring it immediately to a secure place and air-dry it. The reason for this is that the moisture in the swabs allows microorganisms to grow which can destroy the evidentiary value of the swabs. Known saliva samples from the victim must also be air-dried along with any other wet or moist samples (not

including whole blood samples, vaginal washing or any other liquid samples collected).

Usually, the best sample of seminal fluid comes from the swabs, as long as they are preserved properly. The next best place is usually the victim's panties because the seminal fluid will drain into the panties (if the assault was vaginal or anal in nature). The stain will sometimes be better preserved because the seminal fluid tends to dry faster in the panties. If the panties have wet stains, then they should be air dried as soon as possible before packaging. Clothes can be a good source of seminal fluid if the assailant ejaculated on the victim's clothes. The clothes can also be a source for the suspect's blood, hairs, fibers, or other evidence transferred to the victim from the suspect. Clothing should be air-dried before permanent packaging and each article of clothing should be packaged separately.

Bed sheets, comforters, spreads, etc. can also be a source of evidence from the suspect. The investigator should carefully consider the value of this type of evidence before collecting it. If the bed is a "high traffic" area, meaning that numerous people have had access to the bed and the bed sheets haven't been cleaned in a long time, then it won't have as much evidentiary value as a bed where only one person had access to it and the sheets have been cleaned recently. The investigator should use the side lighting technique to look for any loose trace evidence on the sheets, which may be lost during handling and packaging. This evidence should be placed in a paper packet and then placed in an envelope. If the sheets have wet stains and these can be attributed to the rape, then the investigator should circle these stains and inform the crime lab that those are the relevant stains to be examined. The investigator should note that he or she circled the stains and as always, air-dry the evidence before permanently packaging it. The investigator should neatly fold the sheets inward to prevent the loss of any other loose evidence. The sheets can then be packaged separately in paper bags, air-dried if necessary, and submitted to the crime lab.

If a suspect is established in a rape case, then reference samples should be collected from the suspect for comparison. These samples should include: a whole blood sample in a red, yellow, or purple top "Vacutainer"; a saliva sample (air dried); 15-20 pulled head hairs; and 15-20 pulled pubic hairs. If the suspect is captured within 24 hours and it can be established which clothes and/or shoes he wore during the attack, and then

the items should be packaged separately and submitted to the crime lab. Sometimes trace evidence from the victim such as hairs, fibers, blood, etc. can be found on the suspect's clothing.

The key to proper collection, preservation, analysis, and overall usefulness of evidence is open and plentiful communication between investigators, forensic scientists, and prosecutors. This will make the most of the evidence, which can make or break a case. This paper has presented general guidelines on the collection and preservation of evidence. The investigator should remember that each crime scene is different and each crime scene is a learning process. The investigator should also keep in mind that different crime labs might like their evidence collected in different manners. This is why the investigator should not hesitate to call his or her crime lab if he or she has a question or a problem on the collection or preservation of evidence.

CHAPTER EIGHT: FORENSIC SCIENCE AND EVIDENCE

INTRODUCTION

The use of forensic Science is based on the principles of evidence transfer.

A large part of a Forensic Scientist‘s job involves proving contact. This can be contact between people (for example during a fight), contact between persons and objects or environment (for example during breaking and entering offences), or contacts between persons and vehicles in Road Traffic Accident (RTA) cases.

A very simple rule governs this contact is known as Locard’s Law. Much forensic investigation is based on the principle stated above.

Locard’s Law States:

When A and B come into contact, something from A is transferred to B, and vice-versa. The main problem is finding this transferred material ‘the trace evidence ’.

LOCARD’s LAW implies that trace evidence is generated with every area of contact.

We have to consider where we are most likely to find trace evidence and the significance of the presence, or absence, of a crime.

In connection with offences against property, much of the investigative work consists of providing evidence to establish the presence of a suspect at the scene of the crime, or in showing that an object which can be linked with the suspect in some other way was used in the commission of a crime.

Contact trace can be found only at the place visited by the criminal during the commission of the crime. It is necessary therefore, in commencing the investigation of a scene, to reconstruct as exactly as possible the movements of the criminal in approaching the scene, whilst at the scene, and when leaving the scene of the crime. The path of the criminal can supply two types of samples:

Materials removed from the scene by the intruder.

Materials left at the scene by the intruder.

For civil cases it is the provision of information based on fingerprint checks and examination of questioned documents.

OBJECTIVES

On the completion of this chapters: students should be able to:

List evidences and principles applied to the analysis of evidences.

Evaluate the admissibility of evidences

Explain the potential uses of forensic (crime) laboratories in explaining physical evidences

8.1. TYPES OF PHYSICAL EVIDENCES

Physical/technical evidence is any unspoken evidence a thing, an object, a substance, visible or invisible, which has some connection with a crime under investigation.

As the value of physical evidence is concerned, attorneys consider the significance of a piece of evidence its probative value, that is the value of proof the evidence provides either to prove/ disprove a crime has been committed or that the defendant was the one who did the deed. Different types of evidence and varying circumstances influence the eventual probative value. Evidence may also have an associative value i.e. its usefulness in placing a suspect at a location, providing the suspect handled evidence or came in contact with another person. It is necessary to understand the frequency of the occurrence of the characteristics being considered.

Likelihood translates to probability. Probability of an event is calculated by considering all the facts known and applying a value for their frequency of occurrence.

When all the values are considered together the process is described as applying the product rule, which applies to any series of independent characteristics.

To place physical evidence at the appropriate probative value, we will use two terms, "Class characteristics" and " individual characteristics".

A class characteristic is an identifiable quality that is common to group of objects. For example, any kind of button, hair from Niger, blood groups. An individual characteristic is a quality or combination of qualities that establish the uniqueness of one item or one person, allowing the conclusion that it is one of a kind. Individual

sizing item is how you know at in our daily routine and it is how you know at a glance that you are looking at your car/ shoes or your friend. Technically, the number and location of independent random characteristics provides the discriminating examiner with the information to separate one item from a group of similar specimens.

8.2. ROLE OF EVIDENCES IN PROVIDING THE CRIMINAL /SUSPECT/ AND GUILT

The physical evidence may serve to identify the criminal by means of the clue materials, personal property, or the characteristic pattern of procedure deduced from the arrangement of objects at the crime scene the perpetrator may leave some clue at the scene such as weapon, tool marks, garment, fingerprint or foot impression, he may unwillingly carry from the scene a trace in the form of glass, paint, soil, hair, or blood. In offence of personal gain, the fruits of the crime may be in his possession. Crimes of violence will leave evidence of physical struggle. Where the offence involved the application of force against property, contact with certain materials may be discernible.

The Role of Physical Evidence in Proving the Guilt

The final test of physical investigation atron is in the presentation of evidence in the court. The fact of existence of the crime must be established: the defendant must be identified and associated with crime scene; competent and credible witnesses must be available; the physical evidence must be appropriately identified, the chain of its custody established and its connection with case shown; and the whole must be presented in an orderly and logical fashion. The complete process of proofs is described in the phrase 'establishing the elements of the offense'

8.3. THE USE OF FORENSIC LABORATORIES

How can crime labs assist in an investigation and in maintaining justice? The use of crime labs has increased since 1966, when the Miranda agreement/decision moved to protect the accused's right to remain silent when being questioned about a crime and

the right to have an attorney present while being interrogated. Miranda resulted in a decreased reliance on confession for conviction. Instead, relationship must be established between the suspect and the evidence at the crime scene. The physical evidence must be thoroughly examined and attested to before an accused can be found guilty of crime.

The primary goal of a crime lab is to eliminate or at least reduce uncertainty in evaluating evidence by providing factual data based on scientific examination. Factual scientific evidence is now considered more concrete and valuable than eyewitness evidence.

A crime lab must discover, collect, and preserve physical evidence; maintain and establish a chain of evidence possession; provide complete security at all times ensure that all evidence is subjected to all useful examinations, interpret all of the revealed facts consistently and as completely as possible; provide accurate, clear objective and understandable court presentation of findings, their meaning, and interpretation, and furnish counsel and assistance on all technical matters to the official responsible for enforcing the law.

A crime lab plays an important role in the investigation process. It provides this aid by answering or by helping to answer the vital questions of Whether a crime is committed

How it is committed

When it is committed

Who committed it

And just as important as who could have committed it

CHAPTER NINE: FINGERPRINTS AND DNA EVDENCE

INTRODUCTION

In the history of forensic science service there are mainly three developments in the personal identification

1.Anthropometry

2. Fingerprint/Dactilography/

3.DNA typing

The first technique, use the scientific method, anthropometry /1879/, was introduced by Allophones Bertillon /1853-1914/ named Father of criminal identification. Taking exact measurements of body parts up to 11 characteristics, the sum of the measurements yield a characteristics formula for identifying each individuals /like face, ear etc./

They use filing cards to have criminal records.

Then combining full face and profile picture and body measurements ,a portrait Parle was introduced to be used in the criminal records.

In 1902, fingerprint /Dactylography/ was found on personal identification technique and it was used on contracts and official papers. Classifying the fingerprint the potential value for identification was better than the anthropometry. And it is the technique widely applied these days in the world. This time automatic fingerprint technology, which takes the print by scanner and use computer software for recording, searching and reporting is introduced.

A recent development in the forensic science is the DNA typing, which is not as widely used as the fingerprint. Its potential value for identification is very high.

Fingerprint identification effects far more positive identifications of persons worldwide daily than any other human identification procedure. Some of the discontent over fingerprint evidence may be due to the desire to push the conclusiveness of fingerprint examinations to the same level of certitude as that of DNA analysis. DNA is probability-based in asmuch as an individual is genetically half from the mother's contribution and half from the father's contribution. These genetic contributions are passed down from generation to generation. While pattern type (arch,

loops, and whorls) may be inherited, the details of the friction ridges are not. For example, it cannot be concluded that a person inherited a certain bifurcation from their mother and an ending ridge from their father as the development of these features are completely random. Further, fingerprints as an analogy of uniqueness have been widely scientifically accepted. For example, chemists often use the term "fingerprint region" to describe an area of a chemical that can be used to identify it.

Another criticism sometimes leveled at fingerprint practice is that it is a "closed discipline". However, practitioners in the scientific community are generally specialized and may not extend to other areas of science; in this respect, fingerprint scientists are no different from the rest of the scientific community. The fingerprint community asserts that it maintains the need for objectivity and continued research in the area of friction ridge analysis

OBJECTIVES

By the completion of this chapter students should be able to:

Explain the meaning theories and usefulness of fingerprint in identification of an individual .

List types and principles that govern fingerprint identification

Explain about DNA evidence its value in individualization of criminals its application in paternity cases.

Understanding technological developments in fingerprint identification in giving accurate, thorough, timely analysis results for the justice system.

9.1. MEANINGS, PRINCIPLES AND HISTORICAL EVELOPMENTS OF FINGERPRINT

A fingerprint is an impression of the friction ridges of all or any part of the finger. A friction ridge is a raised portion of the epidermis on the palmar (palm and fingers) or plantar (sole and toes) skin, consisting of one or more connected ridge units of friction ridge skin. These ridges are sometimes known as "dermal ridges" or "dermal papillae".

Fingerprints may be deposited in natural secretions from the eccrine glands present in friction ridge skin (secretions consisting primarily of water) or they may be made by

ink or other contaminants transferred from the peaks of friction skin ridges to a relatively smooth surface such as a fingerprint card. The term fingerprint normally refers to impressions transferred from the pad on the last joint of fingers and thumbs, though fingerprint cards also typically record portions of lower joint areas of the fingers (which are also used to make identifications).

Friction Ridges



Finger1: print (friction ridge)

On the palmar surface of the hands and feet are raised surfaces called friction ridges.

There is no clear date at which fingerprinting was first used. However, significant modern dates documenting the use of fingerprints for positive identification are as follows:

In the 14th century, Persia, various official government papers had fingerprints (impressions), and one government official, a doctor, observed that no two fingerprints were exactly alike.

1823: Jan Evangelista Purkyně, a professor of anatomy at the University of Breslau, published his thesis discussing 9 fingerprint patterns, but he did not mention the use of fingerprints to identify persons.[citation needed].

1880: Dr Henry Faulds published his first paper on the subject in the scientific journal Nature in 1880. Returning to the UK in 1886, he offered the concept to the Metropolitan Police in London but it was dismissed.

1892: Sir Francis Galton published a detailed statistical model of fingerprint analysis and identification and encouraged its use in forensic science in his book Finger Prints.

1892: Juan Vucetich, an Argentine police officer who had been studying Galton pattern types for a year, made the first criminal fingerprint identification. He successfully proved Francisca Rojas guilty of murder after showing that the bloody fingerprint found at the crime scene was hers, and could only be hers.

1897: World's first Fingerprint Bureau opens in Calcutta (Kolkata), India after the Council of the Governor General approved a committee report (on 12 June 1897) that fingerprints should be used for classification of criminal records. Working in the Calcutta Anthropometric Bureau (before it became the Fingerprint Bureau) were Azizul Haque and Hem Chandra Bose. Haque and Bose are the Indian fingerprint experts credited with primary development of the fingerprint classification system eventually named after their supervisor, Sir Edward Richard Henry.

1901: The first United Kingdom Fingerprint Bureau was founded in Scotland Yard. The Henry Classification System, devised by Sir Edward Richard Henry with the help of Haque and Bose, was accepted in England and Wales.

1902: Dr. Henry P. DeForrest used fingerprinting in the New York Civil Service.

1906 New York City Police Department Deputy Commissioner Joseph A. Faurot introduced fingerprinting of criminals to the United States.

9.2. TYPES AND INDIVIDUALITY OF FINGERPRINT

Print types

Latent prints

Although the word latent means hidden or invisible, in modern usage for forensic science, the term latent prints means any chance or accidental impression left by friction ridge skin on a surface, regardless of whether it is visible or invisible at the time of deposition. Electronic, chemical and physical processing techniques permit visualization of invisible latent print residue whether they are from natural secretions of the eccrine glands present on friction ridge skin (which produce palmar sweat,

sebum, and various kinds of lipids), or whether the impression is in a contaminant such as motor oil, blood, paint, ink, etc.

Latent prints may exhibit only a small portion of the surface of the finger and may be smudged, distorted, or both, depending on how they were deposited. For these reasons, latent prints are an "inevitable source of error in making comparisons," as they generally "contain less clarity, less content, and less undistorted information than a fingerprint taken under controlled conditions, and much, much less detail compared to the actual patterns of ridges and grooves of a finger."

Patent prints

These are friction ridge impressions of unknown origin which are obvious to the human eye and are caused by a transfer of foreign material on the finger, onto a surface. Because they are already visible they need no enhancement, and are generally photographed instead of being lifted in the same manner as latent prints.[1]

Plastic prints

A plastic print is a friction ridge impression from a finger or palm (or toe/foot) deposited in a material that retains the shape of the ridge detail.[5] Commonly encountered examples are melted candle wax, putty removed from the perimeter of window panes and thick grease deposits on car parts. Such prints are already visible and need no enhancement, but investigators must not overlook the potential that invisible latent prints deposited by accomplices may also be on such surfaces. After photographically recording such prints, attempts should be made to develop other non-plastic impressions deposited at natural finger/palm secretions (eccrine gland secretions) or contaminates.

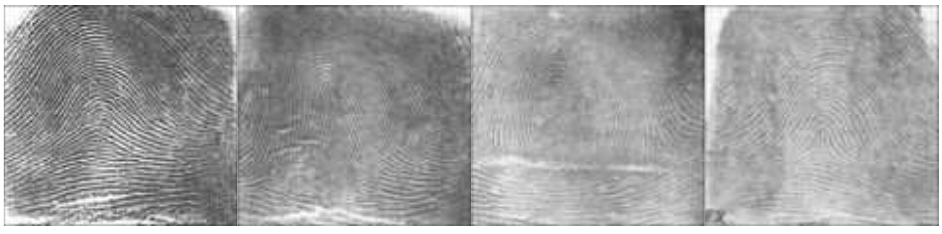
Classifying fingerprints

The scientific basis behind friction ridge analysis is the fact that friction ridges are persistent and unique. Friction ridges are formed during fetal development where their unique characteristics emerge due to genetic and epigenetic factors (maternal diet, pH, temperature, movement of the fetus, etc.). Even identical twins do not have the same fingerprints. Uniqueness among even identical twins is due to random, or stochastic, effects during fetal development. Stochastic effects have widespread scientific acceptance as a source of uniqueness and have been observed in several animal studies

which included fingerprint and other unique traits (hair patterning) between both clones and nuclear transfers. Friction ridges also persist throughout life in their permanent arrangement barring scarring or injury or until decomposition of the skin following death. Scarring occurs due to damage to the basal layer of the epidermis. Like friction ridges, scars are also persistent throughout life and are re-generated in new layers of skin.

In manual filing systems in large fingerprint operations, manual fingerprint classification systems were used to categorize fingerprints based on general ridge formations (such as the presence or absence of circular patterns in various fingers), thus permitting filing and retrieval of paper records in large collections based on friction ridge patterns independent of name, birth date and other biographic data that persons may misrepresent. The most popular ten print classification systems include the Roscher system, the Vucetich system, and the Henry Classification System. Of these systems, the Roscher system was developed in Germany and implemented in both Germany and Japan, the Vucetich system was developed in Argentina and implemented throughout South America, and the Henry system was developed in India and implemented in most English-speaking countries..

In the Henry system of classification, there are three basic fingerprint patterns: Arch, Loop and Whorl. There are also more complex classification systems that further break down patterns to plain arches or tented arches.[6] Loops may be radial or ulnar, depending on the side of the hand the tail points towards. Whorls also have sub-group classifications including plain whorls, accidental whorls, double loop whorls, and central pocket loop whorls.



Arch Right loop Whorl Tented arch

Figer 2: types of finger print

Fingerprint identification (sometimes referred to as *dactyloscopy*) or palmprint identification is the process of comparing questioned and known friction skin ridge impressions from fingers or palms to determine if the impressions are from the same finger or palm. The flexibility of friction ridge skin means that no two finger or palm prints are ever exactly alike (never identical in every detail), even two impressions recorded immediately after each other. Fingerprint identification (also referred to as individualization) occurs when an expert (or an expert computer system operating under threshold scoring rules) determines that two friction ridge impressions originated from the same finger or palm (or toe, sole) to the exclusion of all others.

A known print is the intentional recording of the friction ridges, usually with black printer's ink rolled across a contrasting white background, typically a white card. Friction ridges can also be recorded digitally using a technique called Live-Scan. A latent print is the chance reproduction of the friction ridges deposited on the surface of an item. Latent prints are often fragmentary and may require chemical methods, powder, or alternative light sources in order to be visualized.

When friction ridges come in contact with a surface that is receptive to a print, material on the ridges, such as perspiration, oil, grease, ink, etc. can be transferred to the item. The factors which affect friction ridge impressions are numerous, thereby requiring examiners to undergo extensive and objective study in order to be trained to competency. Pliability of the skin, deposition pressure, slippage, the matrix, the surface, and the development medium are just some of the various factors which can cause a latent print to appear differently from the known recording of the same friction ridges. Indeed, the conditions of friction ridge deposition are unique and never duplicated. This is another reason as to why extensive and objective study is necessary in order to train examiners to be able to reach competent conclusions.

Automated fingerprint identification is the process of automatically matching one or many unknown fingerprints against a database of known and unknown prints. Automated fingerprint identification systems are primarily used by law enforcement agencies for criminal identification initiatives, the most important of which include identifying a person suspected of committing a crime or linking a suspect to other unsolved crimes.

Automated fingerprint verification is a closely-related technique used in applications such as attendance and access control systems. On a technical level, verification systems verify a claimed identity (a user might claim to be John by presenting his PIN or ID card and verify his identity using his fingerprint) whereas an *identification* system determines the identity based solely on fingerprints.

With greater frequency in recent years, automated fingerprint identification systems have been used in large scale civil identification projects. The chief purpose of a civil fingerprint identifications system is to prevent multiple enrollments in an electoral, welfare, driver licensing, or similar system. Another benefit of a civil fingerprint identifications system is its use in background checks for job applicants for highly sensitive posts and educational personnel who have close contact with children.

9.3. DNA AND ITS APPLICATION IN JUSTICE SYSTEM

Blood had been thought to be the means of in heritance. This thought had faced a challenge and finally disproved by the end of the 19th century. The idea "blood carries the hereditary information" was replaced by the idea of gene and nucleic acid. It was the work of on Austrian monk Ggregor Mendel that has laid a foundation for the present science of gene and deoxyribonucleic acid (DNA) based inheritance. The function of gene and DNA is not only inheritance of characters (traits) but also all the biological information about the organism is governed by these factors.

Now DNA is known to be the only determinant of genetic difference between distinct organisms. This made DNA sequence to be the ultimate factor of individualization. The DNA all around the world has the same chemical structure. The difference among individual organisms arises from the difference in the sequence (order) of base pairs of the DNA. Gene, a segment of DNA provides chemical information for the synthesis of a specific polypeptide, which indirectly determines the production of every biochemical's in the organisms. This plays the central role for the expression of characters (traits) by which the organism is identified from other organisms.

DNA fingerprinting is the act of verifying the sequence of base pairs in an individual organisms DNA. However, complete sequencing of one's DNA base pairs is a very cumbersome. Instead of complete sequencing, scientists could use shorter

methods due to the repeating patterns in DNA. Though these patterns do not give an individual fingerprint, they can determine whether two DNA samples are from the same individual, related individual on non-related individuals. DNA fingerprinting uses a specific type of DNA sequence, which repeat many times in a given individual's DNA.

DNA fingerprinting has got a wide variety of applications in its legal and forensic aspects DNA profiting is used for identification of a crime suspect and for establishing relationships (paternity, maternity or kinship) . In medicine, it is used for diagnosis of different diseases and disorders and even it helps in treatment and therapeutic activities. In agriculture and industries, DNA profiling or DNA fingerprinting plays vital roles. DNA profiling is contributing a lot for archeological, paleontological studies. It also helps in evolutionary studies.

There are different ways of studying DNA sequences. Among the different methods the commonly used and widely applicable technique is polymerase chain reaction (PCR).

The main applications and techniques of DNA profiling or DNA fingerprinting will be discussed in the next units.

What is DNA fingerprinting or DNA profiling?

DNA fingerprinting or DNA profiling is a process of identifying an individual organism by the use of its DNA base sequence. Most of the organisms have a very long DNA base sequence.

DNA consists of four nucleotides containing the four bases, Adenine (A) , eytocine (C), Thymne (T) and Guanine (G). This makes DNA molecule of every organism similar in structure. Regardless of the structural similarity of the DNA molecule every individual organism has its own (unique) sequence of the bases. This leads the DNA profile of an individual organism to uniqueness. DNA is a double strand of the chain of nucleotides. The pairing pattern is so specific that always base of one strand pairs only with the T base of the other strand and the C base only with the G base of the other.

DNA is referred to as an information centre of an organism. All the information about the organism is encoded by the base sequence of its DNA. The base sequence CGAT

encodes different information than the sequence ACFT does. The more the variation in the DNA sequences the more varied organisms. Therefore it is possible to differentiate among the DNA from different organisms through its base sequences.

It is a very time consuming task to sequence all the DNA of an organism. For example, human DNA consists of about 3 billion bases. Some sort sequences of bases (2 to 5 bases) are found repeated many times in the DNA sequence. These repeated sequences are said to be short tandem repeats (STRs.) There are also repeated base sequences of more than 5 bases. These are called variable number tandem repeats (VNTR). DNA profiling uses the length of the DNA repeats to differentiate among organisms. STRs are most commonly used, however VNTRs can also be analyzed for DNA profiling .

A technique known as restriction fragment length polymorphism (RFLP) is also used to compare the variable lengths of DNA fragments in DNA profiling. The DNA fragments are produced by digesting a DNA sample with an enzyme called a restriction end nuclease. The enzyme restriction end nuclease cuts the DNA at specific sites. The difference in the position of a restriction end nuclease recognition site generates fragments of DNA with different lengths. These fragments are analyzed for profiling. However, the RFLP technique is not much used these days because of the development of new more efficient DNA analysis techniques RFLP requires large amount of DNA and samples degraded by different factors do not work well .

The sources of DNA Sample for Profiling

The sources of the DNA samples vary depending on the purpose of the profiling. Almost every cell contains DNA. DNA can be extracted from blood, semen, tissue, bone (marrow), hair roots, saliva, crime and tooth (pulp) . DNA also can be derived from fossils. The DNA samples needed for analysis are subject to different levels of contamination. The contamination, the amount, the source itself and the conditions of preservation may affect the ways of analysis and even can affect the results of the analysis.

Theoretically, DNA from a single cell can be analyzed for typing. The samples for DNA analysis should be handled with care so that not to introduce errors due to the different environmental factors such as contamination and degradation.

Techniques of DNA Profiling

There are different techniques of getting different genetic information out of DNA. The different methods vary in their technical simplicity. Informativeness and work on DNA from various sources and in various conditions . A technique that will satisfy all purposes has not yet been found. The currently used techniques have both advantages and disadvantages drawbacks

Restriction Fragment Length Polymorphism (RFLP) Analysis

RELP is a series of different activities. It works on DNA fragments cut at some specific sites determined by the base sequence of the DNA. Specific enzymes called restriction end nucleases recognize the sequences. These sequences that are recognized by the enzymes are called restriction sequences. Restriction end nuclease cut DNA at restriction sequences. Different DNA molecules process such sites (called restriction site) at different lengths (intervals). This results in the formation of DNA fragments of different sizes.

These DNA fragments are called polymorphisms. (Literally meaning many forms). These fragments are important for differentiation among individuals for identification to know whether DNA fragment are from the same source or not .

After the digestion of the DNA by the use of enzymes the next step is separation of DNA fragments of different size by the process of electrophoresis.

Electrophoresis is a process by which the DNA fragments are dived through a gel. The DNA fragment formed by the digestion of the enzymes is placed at one end of the gelatinous sheet. Then it is electrified in such a way that the ends with DNA fragments establish a negative (-) electrical pole and the opposite end establishes a positive

electrical pole. The DNA fragments have a negative charge due to their phosphate group. This makes them to be attracted to the opposite (positively charged) end of the gelatinous sheet. During this electrical attraction, the shorter DNA fragments will migrate faster and farther while the longer ones migrate at a lower rate and a shorter distance through the pores of the gel. This is due to the differences in resistance they face according to their size. This results in the spread of the DNA fragments on the gelatinous sheet according to their size .

The next step is to fire the DNA fragment so that they can not move from the position they are distributed by the electric field. The fragments can diffuse passively in all direction through the get in absence of the electric field. This is done commonly by the technique called “southern blotting” after Edward M. Southern, who developed it in 1970s. Placing a piece of nylon membrane with absorbent paper towel over the top of the get does it so. This draws the water along with the DNA fragments from the gel up on the nylon membrane. Then the DNA will be immobilized by heating forming the exact copy of the gel on the nylon membrane. This fixed pattern of DNA can be stored or used .

After all the above steps the DNA are not visible. A step known as probing follows, which makes the DNA pattern visible. There are short segments of DNA called probes to bind with the DNA fragments on the nylon membrane. Probes have a radioactive tag on are colored so as to produce a visible pattern of the DNA fragments by complimentarily binding to the DNA segments. An image of such a probed nylon sheet can be developed by a photographic or x-ray plates and produce what is known as DNA finger print .

Polymerase Chain Reaction (PCR)

Polymerase chain reaction (PCR) is a very novel technique in DNA finger printing or profiling. It is a very versatile and powerful method which amplifies selectively a specific target DNA sequences from a large heterozygous sources. It so enables analysis of trace DNA samples by photocopying it so many times .

PCR is invented by Kary Mallis in 1984. It is such a powerful and innovative technique that Mallis has been awarded a Nobel Prize for its invention. How does PCR work?

PCR works by mimicking the way cells naturally replicate DNA. It requires four materials to multiply a DNA sequence.

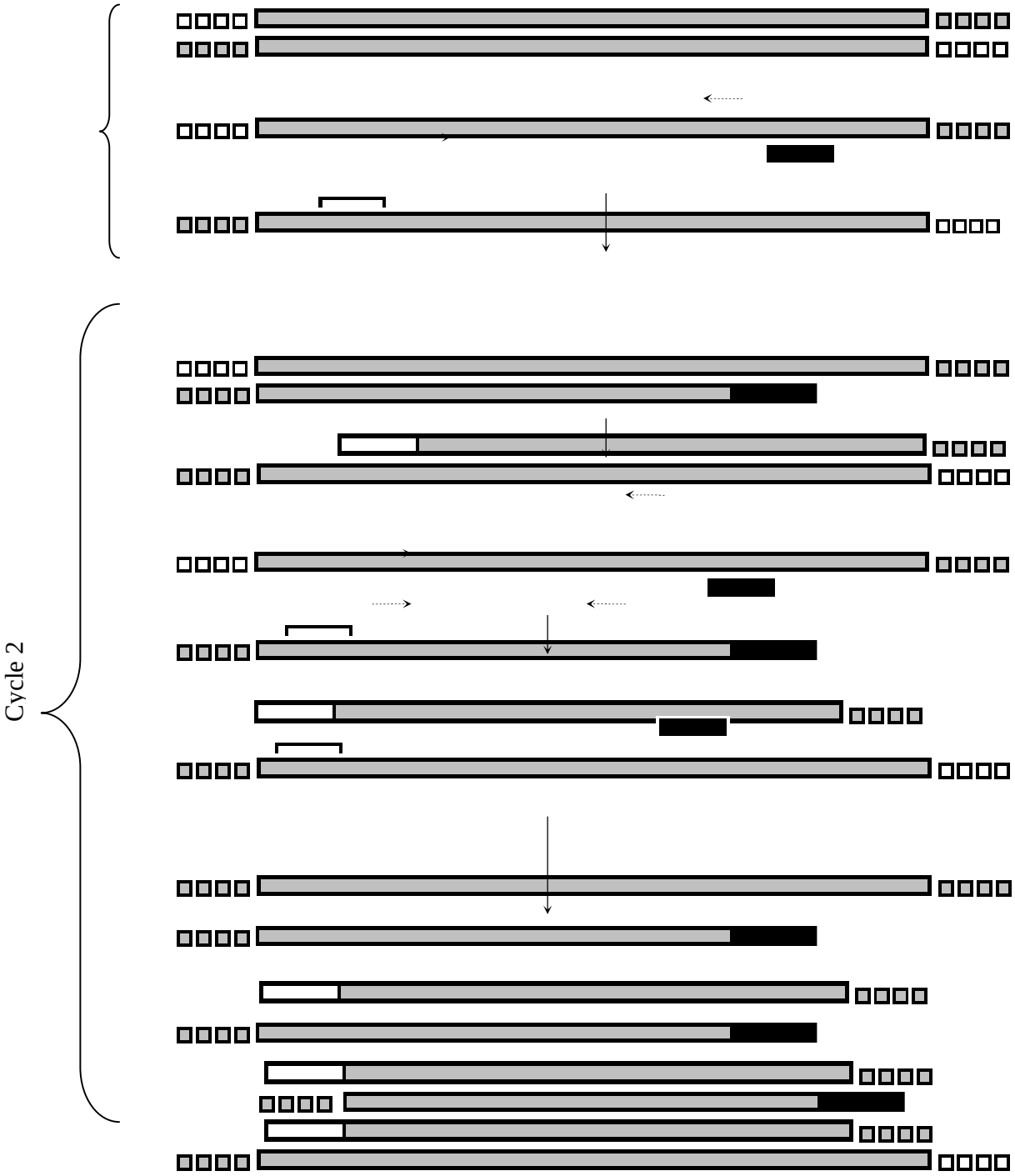
Target DNA molecule (the one to be amplified). The DNA extract contains a great deal of DNA molecules, but only the segment, which is to be amplified, is said to be target DNA molecule. The base sequence of the DNA on both sides of the target segment must be known. This helps in preparing complementary primers.

The DNA primers: Short strands of known sequence which provides foundation for the beginning of the replication process.

DNA Polymerase Enzyme: The enzyme that directs the reaction in the living cell. The reaction is named after this enzyme.

A mixture of the four deoxynucleoside phosphates dATP, dCTP, dTTP and dGTP.is vital. They are the building blocks of the new strands of DNA using the old (target) DNA as a template.

Figer 3:PCR



PCR proceeds in three distinct steps governed by temperature after the DNA is isolated from the sources.

First the template DNA must be in single strand. This is achieved by heat demodulation (melting). Heating the mixture to about 94^0c separates the complementary strands.

Next the mixture is some how cooled to annealing temperature (40-77 ^{0}c) allowing the primers hybridized to the template.

Finally the temperature is raised to the optimal polymerization temperature (about 72 ^{0}c) for the polymerase. At this step, the new strand of complementary DNA is build up by extending on the primers. These three steps make one complete cycle. As many as 25-40 cycles can be used for amplification of target DNA depending on specific applications.

PCR theoretically doubles the amount of target DNA at each cycle. The lengths of products generated from template DNA during the first two cycles are not defined. In cycle 2, the first single-strand products of defined length are produced because of priming on products generated during cycle.

Table 1:

cycle number	Number of single stands of undefined length	Number of single strands of defined length	Number of copies of double strand target
0	2	0	1*
1	4	0	2
2	6	2	4
3	8	8	8
4	10	22	16
5	12	52	32

6	14	114	64
7	16	240	128
8	18	494	256
9	20	1004	512
10	22	2026	1024
11	24	4072	2048
12	26	8164	4096
13	28	16 356	8 192
14	30	32 738	16 384
15	32	65 504	32 768
16	34	131 038	65 536
17	36	262 108	131 072
18	38	524 250	262 144
19	40	1 048 536	524 288
20	42	2 097 110	1 048 576

This copy represents the original target DNA that therefore represents two single strands of undefined length.

PCR Product

PCR amplifies trace amount of DNA geometrically so that it provides millions or bilions of DNA strands to be analyzed rather than two strands originally derived from the source. Once the DNA strands are amplified, DNA probes can be used with ample amount of sample .

The product of PCR can be analyzed in variety of ways depending on the information required, For example, the presence or absence of specific sequence of DNA, the length of the amplified fragment, sequence analysis either by differential hybridization or by direct sequencing .

Short tandem repeats (STR) and variable number tandem repeats (VNTRs)

In human genetics, only some of the DNA base sequences (genes) have codes for the proteins. Most of the sequence of the DNA base is non-coding. These segments are of no known function. These non-coding DNA sequences consist of repeated DNA sequences. DNA repeats of 2 to 5 base sequences are said to be sort tandem repeats or STRS those repeats of more than 5 base sequence are known as variable number tandem repeats or VNTRs. The number of repeats of STRs and VNTRs vary from individual to individual. The pattern of STRs and VNTRs is analyzed by the help of PCR and gel electrophoresis.

Applications of DNA Profiling or DNA Fingerprinting

Genetics in general and DNA technology in particular has very wide areas of application. Among the many applications of DNA profiling, human health care and the justice system are the main. However, it is playing a vital role in the study of the evolutionary line and the archaeological studies.

Kinship and Parentage Testing

Since DNA is the means of inheritance, it has a strong link with the hereditary information. This made it an excellent method of resolving genealogical problems . In the United States of America, more than 130,000.00 patenting tests are performed . The establishment of paternity is most of the time done in custody and child support litigation. DNA finger printing brings nearly perfect accuracy to the determination .

Criminal Identification

Unlike in the paternity testing, the problems to be solved (the question to be answered) in the case of criminal identification is whether the DNA is from the same source (person) rather than whether it is from related source or not. After DNA evidence is collected from the seen of crime it will be analyzed and compared with the DNA fingerprint of the suspect. The match between the two proves the suspect quality and the mismatch proves the innocence of the suspect).

Diagnosis of Hereditary and Infectious Diseases

The conventional laboratory practices used to detect some specific enzymes and antibodies for some disease related proteins. This can result in false positive because the enzymes and antibodies could be detected even in the absence of the pathogens due to the past inflection or false negative because or their appearance may be delayed after inflection.

For example, the human immunodeficiency virus (HIV) was traditionally detected by antibody-based the help of DNA probes and PCR. HIV exists normally as a segment of DNA integrated to the chromosome of the host cells (T-lymphocytes). The DNA from T-lymphocytes are amplified by PCR and probes with sequences complementary to the viral DNA are added. If the viral DNA is presented, the probes locate it .

Human papilloma virus and bacterial inflections such as Tuberculosis and Lyme disease are among diseases examined by DNA probing and PCR technology. In addition to diagnosing inflections, the routes of transmission out breaks and disease dynamics can be followed by the means of DNA profiling. This is a field of study known as molecular epidemiology.

Formerly genetic diseases cannot be diagnosed until the symptoms start to appear. However, by the means of DNA technology, it is possible to detect provided with counseling and treatments. Disorders such as cystic fibrosis, hemophilia, huntington's disease, familial alzheimer's sickle cell anemia and many others are disorders that are diagnosed by DNA profiling. Early detection of such disorders alerts prospective parents to know the risk of having affected child and it helps in their decision on affected pregnancies.

GENE THERAPY

It is a therapy for genetic disorders. Gene therapy is a process of altering the chromosomes of the patient trough a DNA sequences. It also uses the methods of inserting a DNA sequence, which is lacking in the patient. This therapy is performed after the problem is identified through DNA profiling and the care is also prepared by DNA profiling.

Paleontological Study

The genotypes of some extinct species are identified by the use of profiling ancient DNA from museum and archaeological specimens. This also helps in the study of the links between the extinct species and their living relatives. The evolutionary lines can also be constructed by the help of this information from DNA profiling . DNA could be extracted and analyzed from arctic human burials DNA from plant fossils have also great importance in elucidating the evolutionary processes and the relationship between plants extricated and living ones .

OTHER APPLICATIONS OF DNA PROFILING

DNA profiling is revolutionizing the agricultural production. Through DNA sequencing, it is possible to identify genes coding for undesirable character in plant and animal breeding DNA profiling helps to avoid undesirable and add desirable traits to the animal and plant. Plants having genes that are inserted artificially are known as transgenic plants and animals .

DNA profiling is also applied in veterinary medicine. It is being used to solve genetic related problems in farm animals. There are a number of hormonal and protein based pharmaceuticals, which are sequences.

Behavioral ecology that focuses on the evolution and maintenance of different behaviors in all kind of animal uses the DNA fingerprints for a variety of applications.

CHAPTER TEN: BALLISTICS AND TRACE EVIDENCE

INTRODUCTION

The first firearms evidence identification can be traced back to England in 1835 when the unique markings on a bullet taken from a victim were matched with a bullet mold belonging to the suspect. When confronted with the damning evidence, the suspect confessed to the crime.

The first court case involving firearms evidence took place in 1902 when a specific gun was proven to be the murder weapon. The expert in the case, Oliver Wendell Holmes, had read about firearm identification, and had a gunsmith test-fire the alleged murder weapon into a wad of cotton wool. A magnifying glass was used to match the bullet from the victim with the test bullet.

Calvin Goddard, physician and ex-army officer, acquired data from all known gun manufacturers in order to develop a comprehensive database. With his partner, Charles Waite, he catalogued the results of test-firings from every type of handgun made by 12 manufacturers. Waite also invented the comparison microscope. With this instrument, two bullets could be laid adjacent to one another for comparative examination.

In 1925, Goddard wrote an article for the Army Ordnance titled "Forensic Ballistics" in which he described the use of the comparison microscope regarding firearms investigations. He is generally credited with the conception of the term "forensic ballistics," though he later admitted it to be an inadequate name for the science.

In 1929, the St. Valentine's Day Massacre led to the opening of the first independent scientific crime detection laboratory in the United States.

OBJECTIVES

By the end of this chapter; students should be able to:

Explain the meanings, theories and usefulness of ballistics in identification of criminal.

List ballistic evidence and their analysis

Explain the meanings, theories and usefulness of traceology in identification of criminal.

List ballistic evidence and their analysis

10.1. BALLISTICS EVIDENCES AND THEIR APPLICATION IN CRIMINAL IDENTIFICATION

Ballistics involves analysis of bullets and bullet impacts to determine the type. Separately from ballistics information, firearm and tool mark examinations involve analyzing firearm, ammunition, and tool mark evidence in order to establish whether a certain firearm or tool was used in the commission of a crime.

Rifling, which first made an appearance in the 15th century, is the process of making grooves in gun barrels that imparts a spin to the projectile for increased accuracy and range. Bullets fired from rifled weapons acquire a distinct signature of grooves, scratches, and indentations which are somewhat unique to the weapon used.

Ballistic fingerprinting, a sub-category of firearms examination, is a forensic method that is intended to help find the gun that was used in a crime by matching the bullet's striations (or *striae*) with the rifled barrel through which it was fired, or by matching marks on the cartridge case to marks in the chamber and breech. The technique is part of the science of forensic ballistics, and it is an application of tool mark identification. The term *ballistic fingerprinting*, a comparison to the use of fingerprints in forensics, is more commonly encountered by the public.

The most common current use of computer-based ballistic fingerprinting is to match cases or bullets found at various crime scenes to one another, to provide connections for police to use in investigations. A human firearms examiner must examine the actual evidence for a conclusive match, but even a probable match can help police look for additional evidence in areas they would not otherwise have considered.

Bullet is a solid projectile propelled by a firearm or air gun and is normally made from metal (usually lead). A bullet does not contain explosives, but damages the intended target by tissue disruption and impact. The word "bullet" is sometimes erroneously used to refer to a cartridge, which is the combination of bullet, casing (case or shell),

gunpowder and primer. See "ammunition". Definition of a bullet is "a projectile of lead ... for firing from a rifle, revolver etc." However, bullets for air guns are not part of a cartridge.

The history of bullets parallels the history of firearms. It's no surprise that advances in one resulted from or precipitated advances in the other. Originally, bullets were metallic or stone balls placed in front of an explosive charge of gun powder at the end of a closed tube. As firearms became more technologically advanced, from 1500 to 1800, bullets changed very little. They remained simple *round* lead balls, called *rounds*, differing only in their diameter.

The development of the hand culverin and matchlock harquebus brought about the use of cast lead balls as projectiles. "Bullet" is derived from the French word "boulette" which roughly means "little ball". The original musket bullet was a spherical lead ball two sizes smaller than the bore, wrapped in a loosely-fitted paper patch which served to hold the bullet in the barrel firmly upon the powder. (Bullets that were not firmly upon the powder upon firing risked causing the barrel to explode, with the condition known as a "short start".) The loading of muskets was, therefore, easy with the old smooth-bore Brown Bess and similar military muskets. The original muzzle-loading rifle, on the other hand, with a more closely fitting ball to take the rifling grooves, was loaded with difficulty, particularly when the bore of the barrel was dirty from previous firings ("fouled"). For this reason, early rifle bullets required cloth or leather patches to grip the rifling grooves, and to hold the bullet securely against the powder.

The first half of the nineteenth century saw a distinct change in the shape and function of the bullet. In 1826, Delirque, a French infantry officer, invented a breech with abrupt shoulders on which a spherical bullet was rammed down until it caught the rifling grooves. Delirque's method, however, deformed the bullet and was inaccurate.

The term "gun" is often used synonymously with "firearm", but this is common only for civilian usage. In military usage, the term refers only to artillery that fires projectiles at high velocity, such as naval guns (which are never referred to as cannon) or tank guns. A gunner is a member of the team charged with the task of operating and firing a gun. By military terms, mortars and all hand-held firearms are excluded from the definition of guns. Two exceptions to this are the shotgun, which is hand-held, has a smooth bore and fires a load of shot or a single projectile known as a slug; and the

machine gun, which is a fully-automatic weapon mounted on a tripod or bipod and almost always operated by a crew.

The basic application of the technique is for forensic firearms examiners to examine the bullet or cartridge case evidence and reach a conclusion about common origin (typically restricted to "yes," "no" or "maybe"). The simplest considerations, class characteristics, are the gross differences; a 10 mm bullet, for example, could not have been fired from a 9 mm barrel, nor could a .357 Magnum cartridge have been fired from a .38 Special revolver (although a .38 Special could be fired from a .357 Magnum revolver). The rifling in the barrel also varies among manufacturers and models, in number and shape of the grooves, twist rate, and direction. Colt, for example, traditionally uses a left-hand twist, while Smith and Wesson uses a right hand twist; a current production M16 rifle uses a 1 in 7 inch twist, while most civilian AR-15s and the current Mini-14 uses a 1 in 9 inch twist. Marlin Firearms use a distinctive 16-groove *Micro-Groove* rifling in many of their firearms, while the M1903 Springfield rifle had , four, or six grooves depending on the manufacturer. Examiners can often quickly narrow down the make and model based on these variations; while they cannot say with a high degree of certainty that "gun A" fired a given bullet or case based on this information alone, they may be able to say that "gun A" did not fire a given bullet or case.

As all manufactured items have inevitable variations, it is often possible for a forensic firearms examiner to match a bullet or cartridge case to a particular firearm based on these variations. Most often these are due to marks left by a machining process, which can leave shallow impressions in the metal which are rarely completely polished out. Wear due to use will also cause each firearm to acquire distinct characteristics over time, though this same process will also alter the "fingerprint" of the firearm. If recovered, cartridge cases are often easier to identify than bullets. First, the parts of a firearm that produce marks on cartridge cases are less subject to long-term wear, and second, bullets are often severely deformed on impact, destroying much of the markings they acquire.

Firearms Evidence

One of the most common types of physical evidence with which the forensic scientists are concerned is the gun, bullet or cartridge case used in the commission of crime.

The term firearms include the familiar hand weapon which includes the revolver, pistol, rifle and shot gun and also the so infrequent as to be neglected to be used to committee crime, machine gun and other military weapons.

The fundamentals of firearm examinations are:

Most examinations involved in firearm investigation are directed

Bullets

Cartridge cases

The firearms

Other materials left at the scene of shooting

Uses of Firearm Analysis

To identify

The make, caliber, model and condition of a firearm or

to test to know whether it is working or not

From the bullet recovered

Identify the caliber

What make model/ type of weapon fired the bullet

Do the land and groove marks match a bullet fired from a known weapon/bullet from other investigation

Cartridge/ Shell casing

Caliber, brand and model

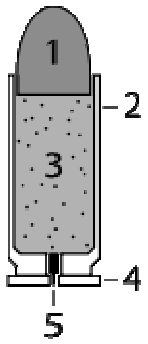
Type of ammunition, was it by revolver or an automatic

Do the marks match with marks by known weapon?

To determine distance from which shot was fired i.e., to confirm the contact shoot

To identify damages caused by gun shoot

To determine the direction of shot; entry & points of damage caused by gun shot



A modern cartridge consists of the following:
1. the bullet itself, which serves as the projectile;
2. the case, which holds all parts together;
3. the propellant, for example gunpowder or cordite;
4. the rim, part of the casing used for loading;
5. the primer, which ignites the propellant

TRACES OF EVIDENCES IDENTIFICATION AND ANALYSIS

Many forms of trace evidence are not readily visible to the naked eye, especially those on highly textured background such as the surfaces of some types of clothing and other fabric. This has led to the development of a range of techniques designed to recover tiny particles from a variety of surfaces quickly, efficiently, and in a suitable form for subsequent microscopic searching and individual recovery. The techniques most commonly used are described briefly in this chapter.

In any event, trace material that is likely to be eye-catching against the background of the recipient item itself, or amongst the superficial debris which is not. For example, more deeply dyed and unusually coloured textile fibres are easier to look for than pale coloured ones amongst a background of numerous assorted fibres, as tend to be collected from the surface of garments. By the same token, glass fragments are readily spotted on the surface of a black leather jacket, but difficult to search for in a bowl of sugar. Thus, much depends upon the specific items and materials in question and the contrasts between them.

Evidential Value of Trace Material

The evidential value of trace material in a case is related to its likely commonness. This is because the more commonly occurring it is likely to be, perhaps in a particular setting, the less strong the like it is capable of providing with one nominated potential source, to the points where it is sometimes simply not worth looking for the material at all. In the case of blue denim (cotton) fibres, for example, these are used so widely in the manufacture of popular clothing that their value as associative evidence tends to be very limited indeed. In consequence, blue denim jeans, jackets and the like are not normally considered as a potentially useful source of fibres in a fibre transfer examination and, because of the special circumstances, there would be little to be gained in looking for glass fragments on the clothing of a glazier. At the other end of the scale, where a relatively small batch of an unusual type of yarn was produced, the finding of individual fibre fragments that could have come from it might potentially be highly significant.

The alternative (inceptive) approach targeting potential traces from known sources of them is to examine the material recovered from the surfaces of an item, selecting that which is eye-catching and appears foreign, and then testing and screening possible potential sources of it emerging from a wider investigation, intrinsically this is much more difficult than reactive searching, because there is often no way of knowing whether what is conspicuous and captures the interest is necessarily related to the crime, as opposed to any one of a plethora of other, innocent recent contracts.

Nonetheless, in one notable case, the forensic scientist's eye was drawn to some unusual short, cut lengths of man-made textile fibres that were widely distributed over the body of a murder victim. These were eventually traced to the manufactures of a particular sort of carpeting, who revealed that some off-cuts from this main consignment had been used to fit out certain cars. This led the police to focus their attention of one particular man who, amongst a large number of other potential suspects, had owned such a car at the material time. He was later convicted of the murder.

On the other hand, much time and effort was wasted in a case in which some tufts of unusual blue-black fibres were observed on the body of another murder victim. It was eventually discovered that these had originated from the decaying spine of the pathologist's own note pad, falling unnoticed onto the body as he recorded his observations at the scene. Some distinctive silver and brown paint flakes on the clothing of yet another murder victim turned from being significant inceptive evidence into a similar source of embarrassment. They had come from the Scene of Crime officer's stepladder over which he had hung the garments to dry before sending them to the laboratory.

RECOVER OF TRACE MATERIALS

There is no single technique for recovering trace material; rather there are various options from which one or more can be selected to suit a particular material and the surface (s) from which it is to be recovered. The procedures described here are among the most routinely employed. Nonetheless, the range of potential combinations of trances and the locations from which they have to be recovered is almost infinite, and it is not unusual for the forensic scientist to have to devise a novel approach to suit a particular set of circumstances. Clear adhesive tape, e.g. Sellotape, has been around for a long time, but it was not until the early 1970s that someone used it to good effect to recover debris form garments. Similarly, it was discovered that the practice of combing a suspect's hair to remove trapped fibrous material could be enhanced by inserting cotton wool or lint-like material between the teeth of the comb.

Shaking

One of the simplest and most suitable methods for recovering loose particulate material such as glass fragments and paint flakes involves gently shaking a garment over, say, a sheet of paper or into a specially designed, inverted, metal cone and collecting the debris that falls off it. Such debris can then be placed in a convenient container, e.g a clean piece of paper, folded 'Beecham Power' fashion, or a small covered glass dish, where it can remain safely protected from contamination by other items with which a link might eventually be sought. The issue of contamination, which is of paramount importance in relation to trace evidence, is dealt with in greater detail later in this chapter.

Brushing

Shaking is not particularly effective in removing particles from surfaces such as shoes and pocket linings. In these circumstances, it is common for debris to be collected by brushing the surface with a (new/clean) tooth or paint brush, again collecting the debris on a piece of paper or in a suitable container.

Taping

Tapings are used principally to recover clothing fibres and hairs. Essentially, they are strips of clear sticky tape, e.g. Sellotape, applied sequentially to and then pulled off surfaces of garments, car seats, window ledges, the edges of broken glass at a point of entry – in short, almost any dry surface one cares to mention-in order to pick up superficial debris which may be resting there. The strips of tape are then stuck down onto clear plastic sheets and in this form the debris on them is amenable to searching at a later stage, with the aid of a microscope, for any fibres/hairs which seem to be relevant. After they have been taken, tapings are stored in sealed polythene bags as a precaution against contamination.

Vacuuming

In addition to tapings, vacuuming has also been used to recover minute particulate material in firearm discharge residues (FDR), for example, from the surface of clothing, etc. (FDR are microscopic particles arising form the primer an propellant in a cartridge when a gun is fired). The vacuum appliances used have nozzles which focus the debris onto small filters which can then be removed and searched directly. Drug residues on bundles of cash acquired in the course of drug-dealing are also routinely recovered in this way.

Swabbing

Swabbing is an alternative technique for the collection of FDRs, although it is more commonly used to recover small mounts of smeared material especially of blood and other body fluids, preparatory to traditional grouping or DNA profiling tests. Depending upon the material concerned, the forms of swabs encountered range from

cotton wool buds on the end of a wooden or plastic stick to single lengths of clean white cotton yarn.

Hand Picking

In cases where debris of interest is firmly lodged in place, where taping might be inappropriate because it could conflict with other examination coming later e.g. for fingerprints, and/or where it is important to observe and record its precise location on an item, material can be picked off by hand, usually with the aid of a low power microscope and precision forces. Material recovered in this way is immediately transferred to a suitable and safe form of storage, sometime directly onto glass microscope slides, until it can be examined in detail.

INTRODUCTION

Everything we do leaves a mark on the world. It happens as we are walking, driving, working, or sitting in the chair. While we carry out these tasks our shoes, clothes, hands, and even the tools we use can leave unique tell-tale signs to the expert eye. A car will leave tyre tracks, the shoes on our feet will leave footwear impressions, and even the screwdriver used to take the lid off the paint tin will leave its mark. The simple principle the Locard proposed was ‘every contact leaves a trace’ and in the field of marks and impressions put two items together and they are likely to leave a mark on one another.

Sherlock Holmes said in ‘A Study in Scarlet’ that ‘there is no branch of detective science which is so important and so much neglected as the art of tracing footsteps’. The examination of tyre tracks and the comparison of plastic bags or instrument and glove marks are likewise important. In all these cases, there are features present that can be used to form a unique connection between suspect and scene or stolen property. The following chapter gives an insight into the methods used to recover and present evidence at court in some of these areas.

This evidence can be divided into two distinct groups, damage based evidence and non-damage based evidence. In the first group, which includes evidence from footwear and instruments, and item has to acquire damage in order to leave behind a unique impression. In the second group, as with fingerprints, a combination of inherent features provides the unique link. Any damage to the features of the fingerprint, such as a scar, are not used in its classification as it may fade with time. Just as it is true that no two fingerprints have been found to be the same, even in identical twins, so in the examination of damage features no two items. No matter how similar they are initially, are likely to acquire the same random damage features during use.

In the first part of this chapter, the evidence provided by damage and wear will be addressed, specifically evidence that can be obtained from footwear, instruments, and mass-produced items. In the second part, fingerprints and the evidence they provide will be discussed.

DAMAGE BASED EVIDENCE

FOOTWEAR IMPRESSIONS

Introduction

Every time a person takes a step, whatever the surface they are walking on, they will leave behind a footwear impression. An impression could be defined as the retention of the characteristics of anatomy of another object. Thus, shoes sink into soft ground and leave behind their characteristic impression. The impression left behind is not always so obvious and can be difficult to find without the aid of a specialist technique. It is vital that as many impressions as possible are recovered from the scene of a crime as this will increase the chance of finding an area corresponding to the area where the damage features are located on the undersole of a shoe. It is possible that the undersole has only one or two of these damage features and they may all need to be found to provide a significant like between a suspect's shoe and the scene of a crime.

Recovery of Impressions form the Scene of Crime

There are several mechanisms by which a shoe can leave an imporesin behind. On a two-dimensional (flat) surface, such as a tiled floor or a piece of paper, material from the undersole can be deposited and remains for a considerable length of time. Sometimes, this is due to a static electrical charge produced on the undersole transferring particles to a surface, or the wet deposits on an undersole being left behind on the surface. A three-dimensional impression is formed because the surface over which the shoe passed was soft and the undersole sank into it before moving on. The different types o fimporession require a variety of techniques to recover them as no single method can cover all eventualities. Recovery may be achieved simply, by casting with plaster of Paris or by applying fingerprinting powder, but often the impressions are fragile or transient in nature and these methods will not be successful.

Recently, a number of new and novel techniques have been applied to the problem with startling results. Some of these techniques were developed to aid fingerprint enhancement and recovery, others specifically for the enhancement and recovery of footwear impressions.

Impressions in Two Dimensions

In all cases where an impression of this type has been left behind on a flat surface, it will be visible only when there is contrast between the background and the material of the impression itself. To use simple example, if a footwear impression is made on plain white paper with talcum powder it would be almost invisible. Treating this with a black powder, say finely powdered charcoal, that adheres preferentially to the white talc and the impression will become visible because of the black and white contrast created. To enhance most impressions so that they are fully visible requires the production of this contrast. The impression found can be photographed successfully, with a scale alongside them, to provide permanent record for court purposes. Often it is possible to seize the item on which the impression has been made and submit it to the laboratory for examination. On other occasions the enhancement has to take place in situ and a suitable method has to be used at the scene of crime to improve the visibility of the impression. The detail produced has to be of such a quality that it can be photographed.

Porous surfaces such as paper, cardboard and carpet cannot be treated in the same manner as non-porous surfaces such as glass, linoleum, and tile. On most of the latter surfaces, dyes or chemicals can be applied, but on the former these would be absorbed into the surface an obliterate the impression.

Impressions in dust need to be treated with special card because any contact with a brush or spray would destroy them. The recent development of methods involving electrostatic treatment have allowed the full recovery of even the most delicate impressions of this type on the most unlikely surfaces.

Impressions made in blood are likely to be the most important of all those found at a scene of crime because they can be relevant to a particular offence. Often a person has legitimate access to the premises where the crime was committed and therefore any dust or dirt impressions are of little relevance as they have been there for some time. If, however, during the crime someone has bled, the suspect's presence at the relevant time can be proven if they have stepped in that blood and left a subsequent footwear impression. Heavy impressions left to be and under sole that has made contact with a pool of blood contain little for the forensic scientist other than the possibility to determine the size and pattern of the shoe concerned. They contain none of the fine damage detail that is required to make a significant comparison. It is now possible to enhance the detail of even the faintest of impressions left in blood by using some of the new techniques available.

Methods for Enhancing Two-dimensional Footwear Impressions

The search at the scene of crime of footwear impressions is a systematic business. Apply only one technique and the chances are that just a few impressions made by one particular mechanism will be found. The more techniques used the greater the chance of recovering a large range of different types of impression that may be present at the scene. It is usual to start the search with techniques that will cause little or no damage to the impressions present and then progress to those that are likely to cause irreversible change to them.

The simplest, and in some cases the most effective, starting point is to shine a light obliquely across the surface of interest, i.e. the light source is positioned close to the surface giving a low angle of incident light. This will produce shadows from the deposits adhering to the surface, and in turn these shadows provide the vital contrast. The method will show an array of impressions formed by a number of different mechanisms without any disruption occurring to them.

It is possible to illuminate the surface with a number of different light sources some of these are certainly more practical for use in the laboratory than at the scene of crime. Now, however, it is possible to take a portable low powered argon ion laser to a scene and use it, with great care, to illuminate surfaces of interest. Light from a laser is intense, monochromatic, coherent and polarized. The intensity of the radiation and the fact that it is monochromatic may give rise to fluorescence and phosphorescence of some materials either present in an impression or in the background on which the impression has been made. In addition to this, impressions can be stained with a suitable dye to make them fluoresce under the effects of laser light. The monochromatic properties of the radiation also enable considerable enhancement to be made of faint impressions. In effect, an argon ion laser acts like an extremely powerful light source that can be tuned to give out light at a few specific wavelengths. The main drawback is the amount of energy it produces: place a piece of paper in front of the light beam and you could soon have a fire on your hands. Therefore a method is required to dissipate this energy and this can be achieved by using a fibre or a liquid optical light guide. This has the added advantage that the direction and spread of the light can be controlled.

If a difference in fluorescence is created between the deposit and the surface then the impression becomes visible and a photographic record can be produced. UV and IR light sources can be used in a similar way and again the results can be photographed.

Dust Impressions

The most fragile impressions present at a scene are likely to be those in dust. Therefore it is important that the scene is examined for these next. In 1981 research was instigated to determine if it was possible to recover impression electrostatically.

This prove successful and a portable device, an electrostatic lifter, was produced that could be used at the scene of a crime.

The device contains only a small 12 volt battery but is capable of producing a variable high voltage. The voltage, which could be anything up to about 15,000 volts, is then applied to a thin conductive film. The film comprises a sandwich that includes an upper layer of thin aluminium foil and a lower layer of black insulating plastic. When the high voltage source is turned on, an electrostatic charge is produced in the aluminium layer of the lifting film. This charge causes the dust or other particles of the footwear impression to jump onto the black underside of the lifting film. When carefully removed an turned over, the film can hold a complete dust impression as it was on the originally examined surface, Enhancement is achieved because most of the dust impression contain large amounts of dead skin that drops from our bodies, so the impressions are light in colour and on the black background of the lifting film a colour contrast is obtained. The technique has been used successfully on a variety of surfaces including linoleum, carpet, and even car body panels.

Other Deposits

Most of the impressions that would remain after this treatment are resilient and require more vigorous methods to recover them. These methods of enhancement include the application of aluminium powder with a brush, as in the treatment of fingerprints, or treatment with chemicals such as ammonium thiocyanate to detect any iron present in the soil deposits, or gentian violet that reacts with grease.

INFORMATION AVAILABIE FROM A SHOE

What information can we obtain from a suspect’s shoe that will be of significance when we come to compare it to a footwear impression recovered from the scene of a crime?

There are four main aspects of the undersole of a shoe that the forensic scientist will consider when giving their final opinion:

the pattern;

the size;

the degree of wear present;

the random damage present.

The Pattern

A pattern match between the undersole of the shoe and the impression at the scene is imperative because without it the comparison needs to go no further. Today there are a myriad of different undersole patterns present on shoes because they are not just something to keep your feet warm and dry but are a major fashion accessory. Only a small proportion of shoes today have plain leather undersoles. By far, the largest section of the footwear market is dominated by training shoes that have increasingly complex undersole patterns. Each of the major manufacture tries to make the pattern of the undersole specific to them and each new upper style manufactured may have a new undersole to go with it.

Collections of the different undersole patterns encountered are kept as a database by laboratories. These have been established in an effort to answer two vital questions.

What make of shoe could have made the impression at the scene of a crime?

How common are these undersoles and how do their pattern components vary?

The collection allows the forensic scientist to give vital early evidence to the police about the style of shoe a suspect may be wearing. It also provides assistance to the scientist to gauge the strength of their evidence by showing how common a particular undersole pattern is and how this pattern may vary with size. With the large number of impression in the collections the scientist may even be able to determine small differences in the design of the items used to produce different undersoles within a particular size.

The methods employed to manufacture an undersole can impart some degree of individuality to the pattern present. There are tow methods commonly used to make undersoles. One is to cut a number of units from a large piece of per-moulded rubber; the other is to inject molten material into a per-formed metal mould.

Variation can occur with the ‘cut outs’ as each unit is individually cut from a large piece of rubber using an undersole shaped cutter. The operator has some latitude in the

positioning of the cutter on the sheet and therefore variations can occur in the pattern present, particularly around the edge of the undersole.

With the injection moulding process, all undersole units produced by a single mould should be identical. However, because of the large quantities of shoes that will be produced in a particular size, the manufacturer can often have a number of moulds to make any one given size of shoe. This allows the manufacturer to produce several undersoles at the same time in an automated process. There can be considerable variation in the fine pattern detail from one mould to another, even within the same size, as the moulds are often handmade.

The Size

Size is felt to be an important feature of a shoe. However, to the scientist determining this, it is a tow-edged sword. The investigating officer always wants to know 'What size shoe am I looking for?' And the scientist finds this a very difficult question to answer. Why? Well it is not the size of the undersole that determines the size of the shoe printed on the label but the space inside the uppers that accommodates the foot. There can be a large variation in undersole size amongst the shoes worn even by one person. Look at the variation in your own shoes. The other problem is knowing how the shoe undersole varies with size if only a partial impression of the complete undersole pattern has been recovered.

The length of an undersole is however one of the factors to be taken into account when judging if a significant connection is present. Some sizes are much more common that others: for adult males in the United Kingdom the average shoe size is eight or nine but only a few per cent of that population wear size six or size or size twelve shoes.

The Degree of Wear

As a shoe wears, the pattern on its undersole changes. These changes are only small, but if an unworn undersole is compared with one that has been worn for a few months a distinct difference will be noted in the pattern features. Some bars or blocks may have become wider and some detail may even have disappeared altogether. This is often seen with the fine surface stippling present on the undersoles of some new shoes such as Dr. Martens boots.

People walk in different ways, placing their weight on different parts of the undersole. Some have deformities of the foot, or maybe a limp, and all these peculiarities will show up in the wear pattern on the undersoles of their shoes. More rapid wear usually occurs in the areas where the weight upon or scuffing of the undersole has been greatest and this causes a moiré rapid change in the pattern. Some of these wear features can be specific to a person's shoe undersole but more often they can provide a further significant connection between a shoe and a scene of crime.

The Damage Detail

Continual contact between shoe and the ground causes the undersole to acquire cuts, scratches, and other damage features that happen completely at random. As a consequence, two shoes that start with identical undersole patterns will, over a period of time, start to gain damage features in different places and so obtain a degree of individuality. Each impression they leave can now be unique to that particular shoe. As time passes this damage record will continue to change, with some marks being removed and others added. By examining this unique set of fine damage features the forensic scientist can, even from some small fragment of an impression, tell if a particular shoe did not make a given footwear impression.

Using the knowledge gained, we can now look at how the forensic scientists carry out their comparison between a shoe's undersole and the impression recovered from the scene of a crime.

COMPARING AN IMPRESSION WITH A SHOE

To compare the undersole of a shoe with an impression made at the scene of a crime the scientist has to produce a new impression form that shoe's undersole in the laboratory. Without these test impressions, the contract points of the shoe may not be clear and the same can be true of any damage or wear features.

Making a Test Impression

There are several methods available for the scientist to make these impressions. One of the simplest, quickest, and most commonly used ways is to apply a film of light oil uniformly to the undersole by stepping onto a sheet of oil-impregnated foam rubber. The undersole is then pressed onto plain white paper and the oil-impregnated foam rubber. The undersole is then pressed onto plain white paper and the oily mark

produced dusted with a powder mix of fine black powder and magnetic iron filings, using a magnetic brush. Because the brush is magnetic, it does not have to come into contact with the paper. The impression produced will show all the wear and damage features present on the undersole and, if required, other test impressions can easily be made to try to reproduce accurately the manner in which the impression was made at the scene of crime.

If a three-dimensional impression has to be compared with a suspect shoe then it may be necessary to produce the test impression in a comparable way. Perhaps, for example, the impression at the scene was made in soil. This effect can easily be achieved using a tray filled with fine damp sand. The resulting impression of the shoe in the sand can then be cast and used to carry out the comparison.

As a general rule the scientist should try to reproduce as accurately as possible the mechanism used to make the 'scene impression' when making their own test impression. This can sometimes be difficult as there are numerous variables that may cause slight variations in the impressions left at the scene.

Comparing Impressions

INSTRUMENT MARKS

As with footwear, the presence of damage on any instrument used in the commission of a crime can serve to form a connection between that instrument and the mark it has left behind. The instruments normally encountered fall into two main categories: those that cut and those that act as levers. The first category includes bolt croppers, drills, and knives; the latter, jimmies, screwdrivers, and chisels. One or other of these tools is often used to gain access to a scene of crime, be it to carry out a burglary or a murder. The following sections will deal with each group of instruments and the special requirements for their examination and comparison to marks left behind at the scene.

Cutting Instruments

The commonest cutting instruments examined by the forensic scientist are bolt croppers and drills. The latter are usually auger bits used to drill doors or window frames. However, with the recent production of battery operated power drills the use of high speed drills is not uncommon. No matter what the cutting instrument

encountered the method of comparison is normally the same. A test cutting is produced with the item in question and any damage features it contains are compared with those on the mark recovered from the scene. The final examination is usually carried out with a comparison microscope.

Construction.

It is important to know how the particular instrument has been constructed as this knowledge can be invaluable when carrying out a comparison. It is not always necessary to know how the whole item is constructed but it is important to know how the final cutting edges are formed during manufacture.

AS pair of bolt croppers has two long metal handles that are joined at a fulcrum, and these then connect to the cutting blades. This form of construction allows the blades to be adjusted to give the best action and for the blades to be replaced as they become damaged or worn. Bolt croppers can vary in length. The smallest that can easily be hidden in an inside pocket are about twelve inches long, the largest up to four feet long. The length of the handles determines.

ERASED NUMBERS

The identification of stolen property and its recovery is an important aspect of the police's investigation of crime. When personal identification by the owner is not possible, it may be necessary to resort to the restoration of an object's obliterated serial number to prove its identity. This happens most frequently with stolen cars, when engine numbers are erased by the thieves and substituted with new ones to give them a new identity. On most items, the manufacturer's serial number is stamped into the metal but now serial numbers can also be stamped into the plastic of such items as video recorders and mobile phones.

We shall discuss briefly the aims of the investigating scientist and current areas of interest. We will also look at how punches and stamps can be linked to the restored numbers.

The Erasure

When marks punched into metal have been erased their restoration can usually be achieved by etching the surface with acid. The strength of acid used depends on the chemical reactivity of the metal involved.

All metals are crystalline and when an indentation is punched into the metal's surface a large localized stress is produced that alters the crystal structure immediately around and below the mark. There is a plastically deformed area around the mark and an elastically deformed area surrounding that. Therefore, even if the surface has been removed by filing or grinding in order to obliterate the mark, it is likely that the plastically deformed area will still exist. With the application

Fittings i.e., fittings of paper, glass, pieces of cloth is also dealt in trace lab. The fitting back of things together may be taken as a jigsaw puzzle match and is used to confirm whether things come from the same source/ criminal things.

Footwear databases

Forensic investigators can use computerized footwear databases to quickly compare the class characteristics between footwear impression and outsole profile of footwear outsoles stored in the database. This greatly reduced the time required to match shoeprint to.

The largest footwear database currently available is held by UK forensic equipment manufacturers Foster and Freeman. The database, known as Solemate, contains over 18,000 footwear records and is available worldwide.

Searches against the Solemate database can be conducted via the crimeshoe.com website as of 2006

CHAPTER ELEVEN: BLOOD AND OTHER BODY FLUID EVIDENCES

INTRODUCTION

Violent crimes often leave victims unable to assist investigators, and lacking other witnesses, there only verbal explanation of what occurred must come from the suspects. Their stories may be true or partially true, or completely fabricated. However, the proper interpretation of blood typing information and blood spatter analysis goes a long way in providing an understanding of what happened at a crime scene. Because blood, semen, and saliva are fluids, their nature is to splash, to absorb in to, to blot onto, or to flow from one surface to another. The location and distribution of blood, its patterns, shapes and direction of travel can be used immediately by a trained observer to substantiate or challenge the suspect's version of what took place. In some situation, the patterns made are so informative those they are as convincing as if someone had made videotape of the crime as it was committed. The laboratory analysis of whose blood was cast about at the scene completes the accurate detection of bloodstains must be performed at the crime scene on the garments and body of the victim; on the floor, walls, doors, windows, Staircase, furniture, sticks, knives, cloths, automobiles, etc,on the body of the a suspect especially the hands, nails, nose, mouth, and on weapons and other objects pertaining to him. Important information concerning reconstruction of the crime, the circumstances of death or of wounds, the phases of a struggle, and finally the identity of the criminal can in fat be obtained from bloodstains.

The identification of bloodstains is a problem of forensic science for which many solutions have been proposed up to the present time. The results have been unsatisfactory because of the lack, in most of the suggested methods, of all the requirements actually needed in such a type of analysis.

The identification of bloodstain is in fact only the first step in a series of analytical procedure concerning the age of the stain, the animal species, the sex, the age (newborn or adult) and the blood group of the subject.

The methods for identification of bloodstains are based on the evidence of cells or compounds, which are characteristics of blood; (a) red cells and leukocytes and (b) hemoglobin and its derivative.

The forensic science methods of identification must finally give easily documentable data, which can be enclosed in reports to permit other experts to compare the result obtained.

OBJECTIVES

By the end of this chapter, students should be able to:

Discuss the medico legal aspects of blood evidence.

Familiarize themselves with analysis paternity of blood evidence

Explain the meanings, theories and usefulness of traceology in identification of criminal.

Discuss medico legal aspects of semen and other body fluids.

Familiarize themselves with the semen analysis

11.1. BLOOD AS A PHYSICAL EVIDENCE

Blood consists of the cells and fluid contained in the closed circulatory system that flow in a regular unidirectional movement, propelled mainly by the rhythmic contractions of the heart. An adult human male has about 5.5 L. of blood.

The presence of a blood vascular system, whose chief function is to carry, dissolved food and gases about the body, is therefore readily understandable in animals built on the collimate plan. In its simplest form, the blood vascular system may be regarded as a system of tubes containing a fluid, the blood, which carry food in a solution to all parts of the body and nitrogenous excretory matter to the excretory organs.

If blood is removed from the circulatory system, it will clot. These clot contents formed elements and a clear yellow liquid called serum, which separates from the coagulum during the phenomenon of coagulation.

Composition of Blood

Blood is made up of two parts: formed elements (blood cells) and plasma, the liquid phase in which the former are suspended.

Plasma is an aqueous solution containing substances of small or large molecular weight that make up 10% of its volume. The plasma proteins account for 7% of the volume and the inorganic salts for 0.9%; the remainder of the 10% consists of several organic compounds of different origin – amino acids, vitamins, hormones, lipoproteins, etc.

The formed elements are three types: red blood cells (erythrocytes), platelets (thrombocyte), and white blood cell (leukocytes).

The blood cells in blood smear makes up 45% by volume of the blood, other 55% is plasma.

In human red blood cells are small cells that lack nuclei when nature. Red blood cells are packed with hemoglobin the oxygen- carrying protein pigment which gives blood in its red color. The lack of nucleus makes move room for hemoglobin. Hemoglobin combines reversibly with oxygen to form oxy-hemoglobin in areas of high oxygen concentration and releases the oxygen in region of low oxygen concentration. RBC also contains the enzyme carbonic anhydrous which plays a role in Co_2 transport.

The size and shape of mammals RBC are round, slightly biconcave discs, there is one exception: all members of the camel family have oval red cells. The diameter of the RBC is characteristics of each species, the range for mammals being from about 5% - 10% µm. There is no particular relationship between the size of the red cell and the size of the animals; the smallest mammalian red cell Asiatic deer, but a mouse and an elephant have RBC of approximately the same size.

Interaction of Antibody with Antigen

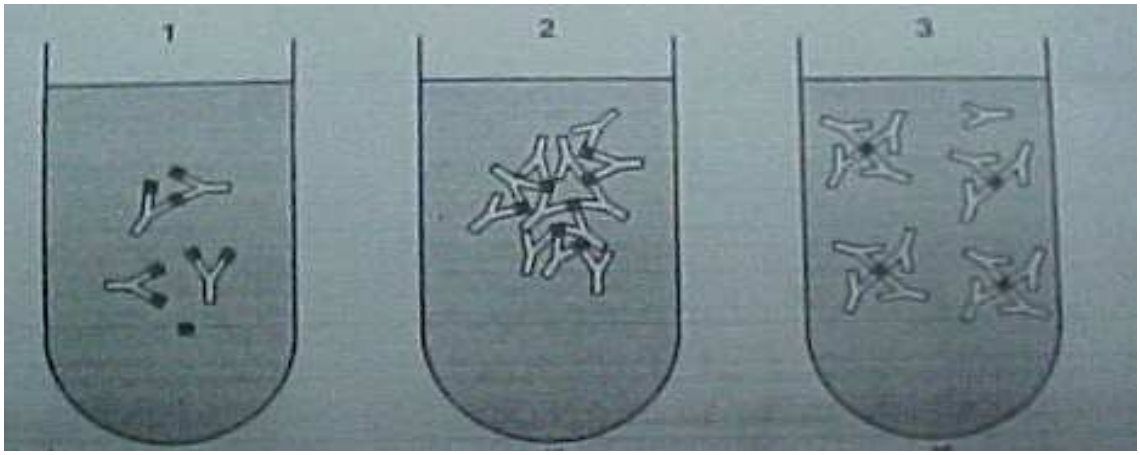
An antibody is an immunoglobulin molecule secreted in to the tissue fluids from lymphoid cells, which have been exposed to a foreign substance-an antigen. An-antigen may be potentially harmful, such as bacterium or virus or it may be harmless bland substance such as foreign serum protein. The antibody can combined only with

antigen, which is identical or nearly identical with inducing antigen, and not with unrelated anti-genes. When molecules of antibody and antigen are brought together in solution, they interact with each other by the formation of link between an antigen-binding site on the immunoglobulin molecule-part of the fat. Fragment-and the particular chemical grouping which make up what is termed the antigenic determinate of the antigen molecule. The molecules are help together by covalent intermolecular force which are effective only when the antigen-binding site and the antigenic determinant group are able to make close contact, the better the fit the closer the contact and the stronger the antigen-antibody bond. These factors determine what is often called the affinity of the antibody molecule. Anti-bodies of varying combining quality exist and the overall tendency to combine with antigen is the average ability of the antibodies to combine with antigen or the average intrinsic association constant, this can be calculated experimentally by application of the concepts of chemical equlibria to antigen-antibody interactions. Studies of this type have need to that the affinity of antibodies increase as immunization proceeds and that the dose of antigen can influence the quality of antibody.

11.1.1. SPECIES IDENTIFICATION

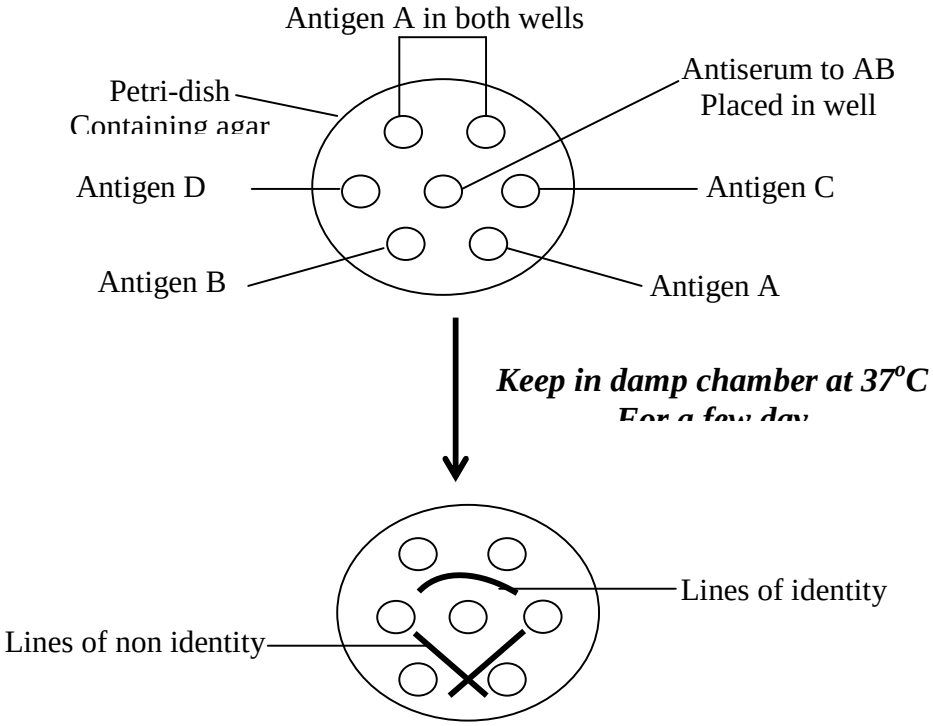
As a result of the interaction of antibody and antigen, molecules in solution complexes of the tow types of molecule will form and precipitation may occur depending on the relative concentration of the two reactants. As can be seen from the figure bellow, on the antigen excess side of optimal proportions less precipitate appears. This is due to inability of the antigen-antibody complexes formed to link up to other complexes and so make a large aggregate or lattice which will appears as a visible precipitate (tube 1). Large aggregates of antibody and antigen can be formed best under condition of optimal proportions where the antibody and antigen proportions, are such that after initial combination of the molecules, free antigen-binding sites and antigen determinant groups remain, enabling the complexes to link up into a large lattice formation (as in tube 2). In antibody excess, all the free determinant of the antigen molecule is soon taken up with antibody, so that very little linking can take place between the complexes (as in tube 3).

Figer 5: precipitation reaction of blood



Antigen /Antibody Ratio	4/8 1:2	12/18 1:1.5	16/4 4:1
	Antigen excess. Small aggregates minimal precipitate	Optimal Proportion Large aggregates Heavy precipitate	Antibody excess Small aggregates minimal precipitate

The technique is also used in forensic studies and in detecting adulteration of foodstuffs. A modification of the test in which precipitation is allowed to occur in agar gel is very widely used for detecting the presence of antibody in serum or antigen in unknown preparation and is visible for showing the identity of different antigen preparation. A concentration gradient form in the gel, the concentration of a substance decreasing as the molecules diffuse away from the well in which they ware placed. Precipitin bands from in the gel in the position where the antigen and antibody molecule optima proportions after diffusion.



Antiserum and antigen solutions are placed opposite each other in the wells and after allowing a few days from diffusion to take place perception bands will form where antibody and antigen meet in suitable proportions (optimal proportion). No reaction takes place with antigen C and D as the antiserum in the central well contains antibodies only for antigen A and B, lines of identity as formed between the two A wells enable the technique to be used for identifying unknown antigen.

Blood grouping

Body fluid samples have also been found to contain information which can help to identify an individual. The progress made in this area has been dramatic, and major advances have occurred within the past decade. Up until 1900, it had been impossible to determine if a blood sample or stain was of human or animal; origin; nor was it known that human blood could be classified into four main groups: A, B, AB, and O. Even when tests devised by Paul Uhlenhuth (blood origin) and Karl landSteiner (blood groups) were used, discrimination between individuals was still poor. The inclusion of

the more recent Rhesus test and several different enzyme systems improved discrimination, but it has only been through recent studies of the deoxyribonucleic acid (DNA) in human chromosomes that there have been dramatic improvements in the confidence with which an individual can be identified.

Agglutination:

In this reaction, the antigen is part of the surface of some particulate material such as a red cell, bacterium or perhaps an inorganic particle which has been coated with antigen. Antibody added to a suspension of such particles combines with the surface antigen and links them together to form clearly visible aggregates or agglutinates. In this simplest form an agglutination test is set up in round –bottomed test tube or perspex plates with round-bottomed well and doubling dilutions of the antiserum are made up in the tubes. The particulate antigen is then added and after incubation at 37ºC agglutination is seen in the bottom of the tubes.

Agglutination is the basic technique used in blood grouping, the A, B, or O group of the red cell under test being determined by agglutination with a specific anti-serum, anti-A serum for example will agglutinate A cells but not B or O cells.

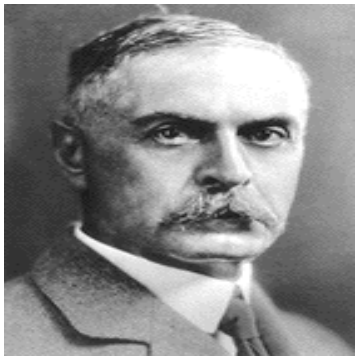
Red cells coated with hormone are agglutinable by anti-hormone antibody. The additions to the antiserum of test sample containing free hormone will block the antigen-binding sites and prevent agglutination. The test can be carried out quantitatively by comparing the activity of a known standard hormone preparation with the test sample.

11.1.2. The Discovery of ABO Blood Groups

Transfusion success was a very hit and miss affair even when humans were used as blood donors. This was directly due to the major barrier posed by the ABO blood group system.

The consequences of an ABO incompatible blood donation are acute and potentially lethal intravascular destruction of the transfused red cells.

The ABO blood group system was discovered by Karl Landsteiner who was born in Vienna on the 14 / 06 / 1868. He studied medicine at the University of Vienna, graduating in 1891.



In 1896 he became an assistant to Max von Gruber in the Hygiene Institute of Vienna and became interested in the mechanisms of immunity and the nature of antibodies.

In 1898, he became an assistant in the university Department of Pathological Anatomy in Vienna. It was during this time he started to investigate whether differences existed between different peoples' red cells.

This was inspired by the work done by Landois and Ponfick who, in 1874, discovered that transfused red cells from one species to another and some humans to other human's lyses in the circulation. Death was attributed to the organ damage and hyperkalemia from the rapid release of potassium from the lysed red cells. To investigate for any potential differences between human red blood cells, in 1901, Landsteiner chose a simple experiment. He mixed the serum and red cells of different people and observed the reaction.

As a result, of observing the agglutination patterns, he described three distinct groups whose serum possessed naturally occurring antibodies, which could react with some other peoples red cells.

As a result Landsteiner divided these individuals into three groups called groups A, group B and group C.

The group C was later changed to group O. In 1902, the fourth group of the ABO system was defined by Decastello and Sturli who identified people whose serum did not naturally produce antibodies that agglutinated other human red cells. This group was called AB.

Summary Of Early Experiments on the nature of the ABO blood Groups

Group A - Possessed A antigen on their red cells and had naturally occurring antibodies (anti-B) that reacted with group B and AB people. Their red cells were agglutinated by group O and B people.

Group B - Possessed B antigen on their red cells and had naturally occurring antibodies (anti-A) that reacted with group A and AB people. Their red cells were agglutinated by group O and A people.

Group AB - Possessed both A and B antigens on their red cells and produced no naturally occurring antibodies. Their serum reacted with no other ABO group individuals. Their cells agglutinated with the sera from all other groups.

Group O - Had neither A or B antigens on their red cells and had naturally occurring antibodies (anti- A and anti - B) that agglutinated all red cells from group A, B and AB people. Their red cells were not agglutinated by serum from any ABO group.

The Rhesus Blood Group System:

This system is the next most important system to the ABO groups. The Rh blood groups antigens are presented in the red cells of 85% of Caucasians and 94% of Negroes. The most common of the Rhesus antigens are C, c, D, d, E, e, and the table below shows some of the various combinations which can exist and their frequency in Caucasians.

Genotype	Frequency	
CDe / cde	31.7%	Rh-positive
CDe / Cde	16.6%	
CDe / cDe	11.5%	
CDE / cde	10.9%	Rh-negative
Cde / cde	15.1%	

Table 2**:**The Rhesus

The rhesus group of an individual must be taken into account for transfusion purpose, of these antigens D is the most potent although immunization by D and at the same time by the C or E antigens can occur. A variant of D named D^u has been described and cells carrying this antigen are not agglutinated by routine anti D sera. For

transfusion purposes, recipients carrying the D^u antigen are considered to be Rh-negative, whilst donors in this category are regarded as Rh-positive.

MN Blood Group Systems:

In 1927, Landsteiner described two human antigens M and N. The use of anti sera against these antigens can divide individuals in to three types, half having the MN genotype and 28% and 22% respectively having MM and NN genotypes.

In the production of anti-M and anti-N sera for routine forensic determination, it is recommended to use a pool of erythrocytes from many donors as the antigenic stimulus. It is still important to use several different sera for the determination, and all parties involved should be tested with the same sera.

Lewis Blood Group System:

Lewis system mentioned that naturally occurring antibodies to Lewis anti-genes are frequently found in human serum. They sometimes act as cold agglutinations and have been found occasionally to be the cause of haemolytic transfusion reactions. These antigens are unique in that they are not part of the red cell structure but are soluble antigens found in body fluids, which absorb on to the red cell surface.

11.1.3. PATERNITY

Blood grouping unlike that of criminal, in its perfect innocence proving capacity, can also prove to some extent in answering paternity cases. The table below shows all the possible probabilities of paternity relationships of mother, father and child.

Suspected Father	known mother	possible child	impossible child
O	O	O	A, B.AB
O	A	O, A	B, AB
O	B	O, B	A, AB

O	AB	A, B	O, AB
A	O	O, A	B, AB
A	A	O, A	B, AB
A	B	O, A, B, AB,	
A	AB	A, B, AB	O
B	O	O, B	A, AB
B	A	O, A, B, AB	
B	B	O, B	A, AB
B	AB	B, A, AB	O
AB	O	A, B	O, AB
AB	A	A, B, AB	O
AB	B	A, B, AB	O
AB	AB	A, B, AB	O

Sample Collection and methods of identification .

sample collection

Hemoglobin and its derivatives must be extracted from bloodstains to allow the application of chemical and physical method.

Wiener and Gordon in their survey entitled medicolegal examination of bloodstains were right to dwell on the way to handle bloodstains objects and carry them about. Different cases may be encountered:

The stain is large, still wet in as much as blood clot can be separated from the substrate. It is then advisable to but it in a well- stopped dry test tube, which is deposited in a Dewar flask, filled with ice.

The dry stain is presented on a smooth substrate crusts can be liberated and put in an envelope.

If the exhibit is of small size, it can be sent straight away to the laboratory but, in the latter case, care must be taken to avoid blood crusts falling off on the way. This applies to knives, daggers etc., on the blades of which blood adheres only slightly.

If, on the contrary, the substrate is of large size, a door, a floor, a table, etc., it is advisable to ask a carpenter to cut out a sufficiently large piece not to risk damaging the stain.

If the stain is presented on some dry substrate, which absorbs readily, it will suffice to send the latter well packed (in cellophane, paper, etc.).

One must never forget that such exhibits must be keep well during the transport, so as to avoid coming in to contact by accident. If these were to happen, and the blood was still wet, it might stain surrounding objects. When a bloodstain is presented on a wet fabric, one must contrive to dry the latter before transportation; this procedure is also advisable. When a fabric remains a moist bacterium prone to multiply quickly, especially at room temperature, it will further complicate the investigation. Stains have preferable to be dry and must be kept in a refrigerator. Moisture and excessive heat are prejudice to the preservation of group elements.

Methods for Identification of Bloodstains

Benzidine Test

In the presence of peroxide, like H_2O_2, hemoglobin catalyzes the oxidation of leukobases, such as benzidine, with formation of colored compounds. Hemoglobin has a real peroxides activity (optimum at pH 4.4 – 4.6) which is inhibited by cyanide at the ratio of 40 moles KCN/1mole Hb. Hematin on the other hand, is considered a pseudo-peroxides, ten times less active and activated by cyanide.

The sensitivity of the reaction is approximately 1:200.000 (Cozzari, 36; Nicolesco; 161) either in acetic acid alcoholic solution.

The test is unspecific, since it is also passive with direct oxidizing compounds, such as potassium permanganate, potassium dichromate and copper sulfate and with garlic, potatoes, carrot, dried vegetables, flour extracts, formal and dust, fly excrements also give positive reactions.

Phenolphthalein Test

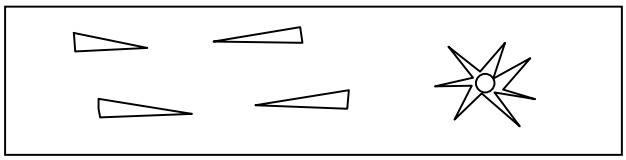
The sensitivity of the test is greater than that of the Benzidine test: 1:1000.000. The sensitivity is higher in solutions that spot tests, maintain that this reaction can not be employed for spot tests.

The test is unspecific since direct oxidizing compounds, such as copper, potassium ferricyanide, and nikel, give it. It can therefore be employed only as a preliminary reaction, which does not consume much of the sample owing to its grate sensitivity.

Nevertheless, people believe that the simultaneous application of both the Benzedrine and phenolphthalein test could eliminate the sources of error due to each method. Control must however, be carried out with out hydrogen peroxide to avoid the action of direct oxidants, by heating at 80–90°C, with a glycerol-acetic acid mixture that destroys vegetable peroxides but not those of blood.

Crystal Test

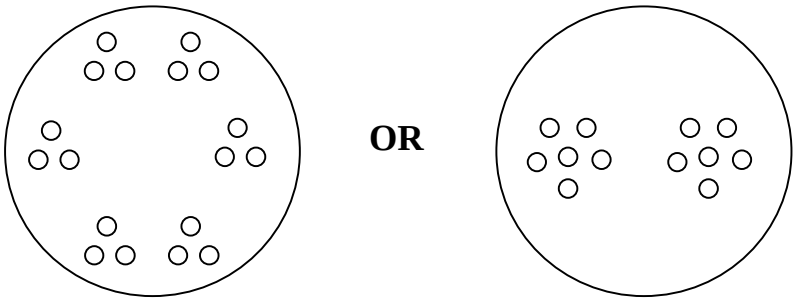
The preparation and microscopic examination of crystals of some hemoglobin derivatives, such as hemin, hematin and hemochromogen, is considered by most authors as a method of certainty in the identification of bloodstains.

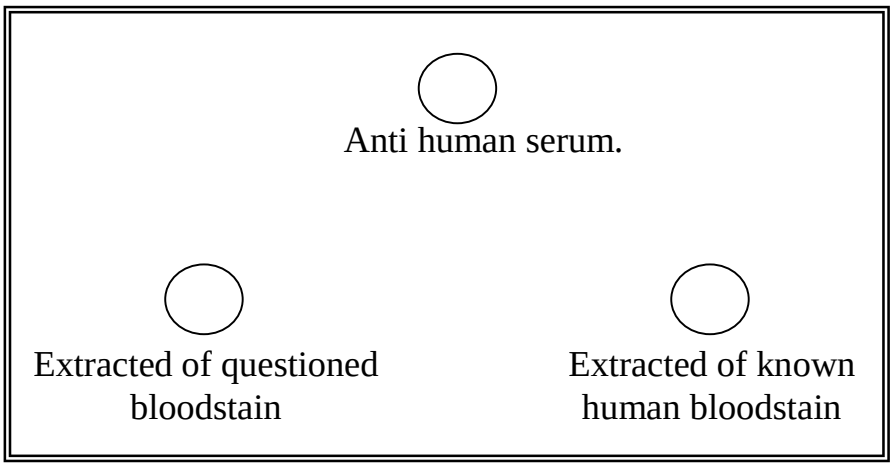


Investigation of Blood stain with regard to species origin

Ouchterlony double immunodiffusion method

Double immunodiffusion is a method, which allows the immuniologiocal identification of a protein. The identification is made by simultaneously comparing the reaction of the unknown protein with the reaction of a known protein against a known antiserum.





Determination of Blood Groups in Bloodstains

Holzer Method

Blood group determinations are used to extensively in case of disputed paternity, and the examinations are centralized to a single or a few laboratories in each country.

Study of the development of blood group antibodies in serum has thrown light on the mechanisms underlying the formation of natural antibodies. Apart from these contributions to the understanding of immunological problems, information on blood groups has important implications is genetics and in forensic studies.

This method (Holzer) is important to forensic biology to determine the group of human blood from dried bloodstain.

Standards and controls

1.ABO known positive controls; A, B,or AB) &O dried stains

2.known negative controls (unstained cotton threads or other appropriate known negative Controls).

Result Interpretation:

The interpretation of serologic test results is highly dependent on whether antigen (Ag) or antibody (Ab) is detected by the test. For serologic tests that are reported as titers, the magnitude of the titer is important in the interpretation of the test.

Forensic Biology is the study of biological information and its application with in the legal system. Therefore, all areas of biological sciences can and applied to forensic biology depending up on the particular question to answer.

Blood is important forensically, and can yield a great deal of information to the investigator. The shape and pattern of liquid blood-splashes can help in reconstructing the murder; bloody fingerprints and palm-prints tell their own story; dried blood on a suspect's clothing can be related to the victim, the crime scene and the murder weapon; blood and tissue forced under the fingernails of the victim during a violent struggle can be linked to the assailant.

Bloodstain pattern analysis from a crime scene my provide investigative leads as well as supportive or non-supportive evidence for victim's suspect's, and witness's statements. If you are using the bloodstain pattern analysis to assist in a crime scene reconstruction, it is critical that complete documentation of the blood takes place. A person, who was not present at the scene, should be able to reconstruct from your documentation what occurred. Without adequate documentation, later reconstruction may not be able to be done and your analysis not be verified.

The forensic biology section, formally serology / DNA, provides scientific analysis of biological evidence that has the potential to supply unbiased information to:

Substantiate case circumstances.

Corroborate or refute an alibi.

Identify a weapon used in a crime.

Determine the sequence of events.

Link or eliminate a suspect.

Establish a crime scene.

The forensic serologist begins by evaluating the investigative information and available evidence to understand the nature of the case and the problem to be solved. Initially, items of physical evidences are examined for blood, semen or saliva. The isolated samples are identified and tested for human origin as required. Further analysis is guided by the investigating officer's request, case circumstances, sample

size and condition, available technology and / or the conformance to case acceptance policy.

Forensic laboratories have researched sophisticated techniques for analyzing protein in blood, and have been able to produce blood profiles with the prospect of establishing unique blood “Fingerprints”. While this remains for the moment a serologist’s dream, blood continues to give up its secrets, and has described it as a treasure trove of hidden clues.

Classification of biological evidence by conventional serology method (ABO and polymorphic enzyme groupings) is no longer performed. DNA technology is used for individualization of biological evidence in forensic casework.

11.2. SEMEN AS A PHYSICAL EVIDENCE

Examination of seminal fluid is very important in medico legal investigations, for instance, in cases of rape, sexual homicide, or even adultery. Most absolute proof that the material under investigation is seminal .Fluid is the finding of living and dead bodies of spermatozoa. In order to find living protozoa, the material should be relatively fresh and preferably in a fluid state. This is seldom possible in actual practice, because some times elapse between the commission of alleged crime and laboratory examinations. In cases attempted rape, if the victim is taken very quickly to a hospital and there the proper examination made, one may find living spermatozoa in vaginal material, on the vulva, or in pubic hair. The victim should be examined as soon as possible. With a small rubber syringe containing sterile saline the vaginal vault, vulva, and external portion should washed with saline solution. Specimen should then be collected with a pipette, placed on glass slide and examined microscopically.

In certain cases, rape has been followed by murder of the victim. In these cases, usually some time has elapsed between the commission of the crime and medico legal investigation. In all cases, very careful survey of the public region and vaginal vault should be made.

These examinations of fresh specimens are successful if ejaculation has occurred.

CHAPTER TWELVE: ARSON AND EXPLOSIVE

INTRODUCTION

In this chapter, we will learn about the difference between arson and fire, how forensic investigation indicate the origin fire and prove whether the fire arson or not. In addition, the chapter will also touch some aspects of explosives

OBJECTIVES

By the end of this chapter: students should be able to:

Define arson and explain steps in arson analysis.

Discuss arson evidence in legal cases

Define explosive and its potential value as evidence.

Arson evidence

INTRODUCTION

The investigation of causes of fires is one of the most difficult studies undertaken routinely by the forensic scientist. Not only are flammable items in the vicinity destroyed by the fire, but materials and surfaces at some distance from the seat of a fire are either affected by the heat or coated with deposits of soot.

Fire fighting techniques must necessarily be intrepid and enterprised, and as a result items at the scene may have been damaged, displaced, or removed by fire fighters. However, the greatest loss of evidence may occur after the fire, during the cleaning up and salvaging procedures. At this time, too, unscientific preliminary investigations into the fire cause can result in the loss of irreplaceable evidence.

Despite all these problems, it can be demonstrated that significant evidence remains after even the most destructive of fires. Evidence of directional heating effects, smoke records, temperature indications, debris layer sequences and implicative trace evidence may remain. Such evidence may not be immediately recognized and it is essential

therefore that evidence should be preserved after even the simplest fire. Identification of the cause, whether accidental or deliberate, is recognized as being increasingly significant in the prevention of further fires and in the bringing of offenders to justice.

THE NATURE OF FIRE

The three main requirements for a fire to occur are heat, oxygen, and fuel. These, for no very logical reason, are normally represented in the form of a triangle. It is self-evident that methods of fire fighting normally depend upon the removal of one or more of the three components in order to extinguish the fire.

For a fire to start, an appropriate fuel must be heated in the presence of oxygen to a temperature sufficient to initiate chemical reaction. Most commonly encountered fuels contain carbon and hydrogen and in most cases the oxygen is supplied from the air. Once the reaction has been initiated, sufficient heat must be produced for the fire to continue.

The Burning of Methane

When methane (the major component of natural gas) burns, its reaction with the oxygen in the air is as follows:

$CH_4 + 20_2 \rightarrow CO_2 + 2H_2O + \text{Heat}$

One molecule of methane reacts with two molecules of oxygen forming one molecule of carbon dioxide and two molecules of water. Since the volume of a gas is proportional to the number of molecules, it follows that the perfect mixture for an explosion of methane in oxygen would be one volume of methane mixed with two volumes of oxygen.

Mixtures of chemicals and their exact reaction ratios are known as ‘stoichiometric’. However, oxygen comprises only 21% of air, and for this reason the stoichiometric mixture of methane in air is approximately 9.5% methane in 90.5% air. The most

destructive methane explosions occur when the mixture is at approximately this composition.

Flammability Limits

It is self-evident that there must be a concentration below which a flammable gas cannot burn in air. In the case of methane, this concentration is 5.3%. There is also an upper limit above which methane cannot burn in air. This concentration is approximately 14%. These two concentrations are known as the lower and upper flammability limits for methane (abbreviated to FLI and FLu).

As a general approximation, I kilogram of a hydrocarbon will react with approximately 15 kilograms of air, and the lower flammability limit for a gaseous hydrocarbon is likely to be very approximately half of the stoichiometric concentration. The lower an upper flammability limits for a number of commonly encountered fuels are listed in Table 6.1.

It can be seen that there is a wide variation in the flammability ranges of different fuels. Fuel gases having a wide flammability range, such as hydrogen and acetylene, pose a significantly greater threat to safety than those having a narrow range.

Table 3: *The stoichiometric concentrations and lower and upper flammability limits for some common fuels:*

Fuel	*stoichiometric Concentration (%)*	*Lower Flammability limit (%)*	*Upper flammability limit (%)*
Methane	9.5	5.3	14.0
Butane	3.1	1.5	8.5

Kerosene	0.9	0.7	6.0
Ethanol	6.5	3.3	19.0
Petrol	1.7	1.4	5.9
Hydrogen	29.6	4.9	75.0
Acetylene	8.4	2.5	82.0

Pyrolysis Products

Most solid materials become involved in accidental fires are either natural products such as wood, paper and cotton, or synthetic polymers such as plastics, rubber and paint. When any of these materials become involved in fire, the mechanism is likely to be roughly the same. Radiant heat from the flames causes the material to decompose (pyrolyse), forming flammable low molecular weight, volatile compounds known as pyrolysis products. These compounds will not at first be produced in sufficiently high concentrations for them to reach their lower flammability limits and they cannot therefore burn at this stage. If the material is subjected to higher temperatures, then the volatile compounds are produced in sufficient quantities to exceed the lower flammability limit. In effect, a plume of flammable gas is being produced by the solid material. If this is ignited, then it will burn as a flame, which will itself continue to heat the solid material, resulting in the production of more flammable pyrolysis products. It can be seen that most solid materials do not themselves burn but act as generators of fuel gases. For a normal solid fuel material to burn, it must therefore be subjected to sufficient heat to cause the evolution of pyrolyis products in concentrations within their flammability limits before a flame can result.

Flash Points

The burning of a flammable liquid is in many ways analogous to the pyrolysis of solid fuels. The ‘flash point’ of a liquid is defined as ‘the lowest temperature at which the vapour produced by the liquid can be momentarily ignited by the application of a small flame’. The flash point of a liquid is therefore the temperature at which the

vapour being produced by the liquid reaches the lower flammability limit. Sufficient vapour will be produced so that continuous burning of the vapour will result after ignition. Flash and fire points are measured in specially designed apparatus, and there may be slight variations in the results depending upon the type of equipment used.

Certain volatile liquids such as petrol have flash points well below ambient temperatures and as such present significant fire and explosion hazards. Liquids such as kerosene, which have flash points significantly above normal temperatures, cannot normally be ignited in bulk unless they have been heated to a temperature above their fire point. The presence of an absorbent material which can act as a wick serves to immobilize the liquid in the vicinity of the flame so that it can be heated locally to a high temperature.

Smouldering Combustion

Smouldering is a form of flameless combustion which can occur in cellulosic material or substances that can form a solid char. The reaction takes place at the surfaces within the material and can occur at very low oxygen concentrations. The rate of propagation of shouldering can vary depending upon the oxygen concentration and the materials involved. Although temperatures of approximately 650%C are typical, smouldering can also occur at temperatures significantly below this.

It is possible for smouldering combustion to develop into flames, particularly if greater quantities of oxygen become available For example, if there is a draught or if structural components fail allowing greater quantities of oxygen into the vicinity. Flaming combustion can revert to smouldering combustion, a widely observed example being when most of the wood on a fire is consumed leaving just glowing embers. During the smouldering of normal organic materials, large quantities of flammable pyrolysis products may be produced which can ignite explosively if a door or window is opened. This phenomenon, known as ‘ventilation induced flashover’ or ‘backdraft’, has been the cause of loss of life in a number of cases.

FACTORS AFFECTING FLAME PROPAGATION

The rate of flame propagation depends primarily upon the availability of fuel in the gaseous form. Flames can propagate with explosive violence through mixtures of flammable gases with air. The vapours of low flash point liquids such as petrol behave in a similar manner.

In the normal situation where solid fuels are involved, the rate of flame propagation depends largely upon the rate at which flammable pyrolysis products can be released. It is easy to understand that solid materials, whose chemical instability allows them to decompose at relatively low temperatures, can cause rapid spread of flames. However, the physical properties of the material are equally significant. Materials that are good thermal insulators tend to heat up more rapidly in fires and therefore quickly attain sufficiently high surface temperatures for decomposition to take place. For this reason, flammable materials having a low thermal conductivity, low density, and low specific heat are inherently by far the most likely to ignite when subjected to radiant heat.

Foamed plastics present a greater fire hazard than solid blocks of the same material. Thin sheets of material are more easily heated to a temperature at which they can decompose than thick blocks. It is common experience that wood shavings are more easily ignited by a match than thick pieces of wood. Even the shape of the material is likely to have an effect. Sharp corners allow heat to penetrate the intervening portion of material from both sides, increasing the opportunity for it to reach its decomposition temperature.

Ignition Temperatures

The ‘ignition temperatures’ of commonly encountered materials are widely quoted in the literature. They normally represent the lowest temperatures at which a sample of the material has been found to ignite when heated under experimental conditions. These quoted temperatures should be treated with caution and should not be interpreted literally. They may, however, provide guidance and may assist in the interpretation of hypotheses. A more significant temperature is the ‘spontaneous ignition temperature’ (SIT) which can be measured by heating a sample of the material in an oven, raising its temperature gradually and measuring the temperature within the bulk of the sample. At the SIT, the temperature of the sample will rise above the

temperature of the surrounding oven. However, variations will occur in the measurement of the SIT depending upon the bulk of the sample, the amount of air

Spontaneous Combustion

It is well known that such materials as hay, sawdust and oil-soaked rags can spontaneously ignite under certain circumstances. The mechanism for this phenomenon is fairly simple.

Many chemical reactions, particularly oxidation reactions, are exothermic, that is they generate heat during the process of the reaction. Normally, most of this heat is lost to the surroundings and as a result a reacting system tends to settle down at a temperature slightly above the ambient temperature and reacts slightly more rapidly than it would have other wise done at the lower temperature.

When large quantities of materials react, the total mass of reacting material is greater in proportion to the surface area than when small quantities react. Since the heat can only be lost from the external surface, greater quantities of heat may be produced than can be lost and the temperature rises' this causes the rate of reaction to accelerate and the rate of heat production to increase accordingly. At the higher temperature, the heat losses are considerably greater, and the system may equilibrate at this particular temperature. However, above a critical mass for the particular system, more heat is generated that can be lost and the temperature rises until ignition occurs.

Since heat losses occur from the outer surfaces of the bulk of the material, the highest temperatures are attained in the centre. One characteristic of fires that have started as a result of spontaneous combustion is that the fire may be seen to have originated within the bulk of the material.

Spontaneous combustion can occur in reactive porous material such as sawdust, coal, hay, and oil-soaked rags. When spontaneous combustion occurs in an industrial process, it is normally as a result of a change in procedure or circumstances. Fires can be triggered by an increase in the quantity of reacting materials, an increase in the ambient temperatures, improved insulation of a reacting mass or an improvement in the formulation of the reactants.

THE INVESTIGATION

Fires are investigated in order to detect deliberate ignition, to identify dangerous appliances or materials, to establish liability, and to provide data for future policy decisions. Some of the processes used in the investigation are likely to be destructive and it is important that anything of evidential significance should be recorded and preserved or recovered. Unscientific investigations into the causes of fires can result in the loss of irreplaceable evidence. Significant evidence remains even after the most destructive of fires, and it is important that this evidence should be preserved and recognized.

Sequence of Investigation

Because of the wide diversity of situations likely to be encountered in fire scene investigations, it is not possible to formulate one single procedure for the approach. However, a general pattern for the investigation may be as follows:

Establish Objectives. A common requirement is to establish the cause of the fire. However, the investigator may be called upon for some other reason, such as to explain an unusual mode of fire spread, to offer an opinion regarding whether life was placed at risk, or to comment upon the accuracy of statements mad by the owner or suspect.

Investigate Background: If documentary evidence, witness statements, and photographs are available before the scene investigation, then it may be possible for the investigator to direct enquiries more effectively.

Consider Safely: Certain destructive fires in the past have caused so much damage to the building that they could only be investigated safely after demolition of the majority of the structure.

Locate Seat: Many techniques exist for the location of seats of fire. The accuracy with which this can be achieved depends to a large extent upon the rate of development and size of the fire.

Consider possible Ignitions Sources: In most fire investigations there are normally several possible accidental ignition sources, together with the ever present possibility

that the fire had been deliberately ignited. All ignition processes, even those that are remotely possible, must be considered.

Excavate Seat: The seat of the fire should be excavated with archaeological care, seeking possible accidental or deliberate ignition sources and noting the relative positions of items as they are recovered.

Take Samples: Samples of debris may be taken for analysis for volatile fire accelerants. Items of possible evidential significances may be tested to establish whether they could have caused the fire.

Formulate Hypotheses: Throughout the investigation the investigator will have been formulating hypotheses, rejecting some of them as impracticable. By this stage, it is probable that only a limited number of plausible hypotheses remain; it may be possible to devise ways of testing the likelihood of each.

Report Conclusion. The results of the examination should be reported fully, accurately and objectively. Adequate information should be given. If recognized as an expert, the investigator may offer opinions, but these must be distinguished from factual information in the report.

Witness Evidence

It is normally possible to acquire some background information prior to the physical examination of the fire scene. Such information may be available from the fire brigade, eye witnesses and from the last legitimate visitor to the premises. Whilst not all of this information may be available initially, the investigator should take steps to obtain and record the evidence as it becomes available.

Fire fighters may provide information regarding the security of the building, the apparent position of the seat of fire, any unusual circumstances, the time of the initial call an the time that the fire was brought under control.

Other eye witnesses may provide information regarding the position of the seat of the fire at an earlier stage, the colour of smoke, and the incidence of explosions. Eye witnesses are notoriously unreliable and it is likely that the most reliable accounts will be obtained if the witnesses are questioned objectively by personnel experienced in interviewing techniques.

Background Information

It is important at some stage to acquire information from the owner of the premises or the last legitimate occupant. Enquiries should be made into the security of the premises, the positions of items prior to the fire, the presence of stored flammable liquids, the status of electrical and other appliances and the history of previous fires. In addition, it may be possible to acquire plans of the building, photographs taken prior to or during the fire and video recordings. In the case of industrial premises it may be possible to examine undamaged equipment similar to that which has been destroyed in the fire and to take samples of unreacted process chemicals and solvents.

Recording of Information

The information obtained during the investigation should be recorded either in writing or on audio tape. One convenient method of recording the information is the use of pre-prepared forms that list the information required in the investigation of a typical fire scene. One advantage of this approach is that the form itself acts as an aide-memoire, reducing the possibility that the investigator may inadvertently neglect to obtain important relevant information. It is often the case, however, that the information volunteered by witnesses and others does not follow the sequence of questions dictated by the form. It may be more convenient to make longhand notes on writing paper and to transfer the information, where appropriate, to the form if required. A tape recorder can be used in the same way, provided that a transcript can be produced for perusal shortly after the scene visit.

It is normally desirable to produce a plan of the whole premises, or at least that part of the premises where the fire is believed to have started. Whilst it is preferable that the plan should be to scale, practical difficulties, the fire-damaged buildings may compromise accuracy. It must be recognized that the positions of items at the time of the examination may not be those occupied by the items at the time of the fire because of disturbances caused during fire fighting. In addition, in the case of deliberate fires, items may have been moved from their legitimate positions by the fire setter. It may therefore be necessary to draw more than one plan to illustrate the positions of items at various stages during the incident.

Photography, too, is a valuable method of recording information at fire scenes, and it is desirable to take photographs not only of items and areas considered relevant, but also of other parts of the building. After the investigator has left the scene, questions may arise which has not previously been considered. Examination of relevant photographs may provide information which would not otherwise have been available. One of the greatest difficulties experienced at a fire scene is in seeing sufficient detail with the limited illumination available. Automatic cameras with electronic flash often produce high quality images, which may allow features that had hitherto been unobserved to be identified in the photographs.

Camcorders may also be used to record information at fire scenes. They have particular value as a training medium and with the increasing light sensitivity of video cameras reasonable quality recordings can be obtained. It is possible also for the investigator to provide some sort of commentary during the filming, although there is a danger that unexpected comments and noises from other sources may be recorded.

With all methods of information recording, it is necessary to preserve the original notes, even if fresh notes and plans are made from the originals. In the case of tape recordings and video recording, the original tapes should be retained. Where there is a possibility that criminal prosecution may result, all the paperwork relating to the case must be preserved for disclosure to the defence.

External Examination

It is desirable to examine the outside of the building before entering in and carrying out a detailed examination. The external examination may provide evidence of points of entry and may give indications as to the location of the seat of the fire. It is also important to consider the safety of the building before entering.

Point of Entry

It is normal for fire fighters to effect entry by forcing doors. Criminals may also force doors but commonly enter buildings by breaking windows, reaching through, and releasing a window catch. The point of forcible criminal entry to a building need not necessarily be at the place where the criminal has started the fire, and it may be possible that evidence at the point of entry has not been destroyed by the fire. This evidence should be preserved, bearing in mind that there may be fingerprints,

footprints, instrument marks, fibres, or even blood from the criminal at the point of entry.

Windows may also be broken by fire and during fire fighting activities. It is also feasible that the breakage of a window at an early stage in the fire may have allowed the deposition of dense plumes of unsooted broken glass in the vicinity may also be an indication that a particular window had been broken prior to, or during, the early stages of a fire.

Analogous effects may assist in the interpretation of instrument marks. Deep damage caused during fire fighting may result in the removal of soot-coated paint, whilst instrument marks caused prior to the fire are likely to be coated uniformly with soot.

The examination of locks found in the debris or attached to doors may indicate whether they had been in the secured or in the unlocked position and may demonstrate whether they had been forced prior to the fire.

Safety

It is important that investigators should take precautions to minimize risk to themselves and to others at the scene. During the external examination of the building, it may become apparent that certain walls or parts of the roof are unsafe.

Walls may be seriously cracked or distorted. The destruction of interior structural members may leave large areas of wall unsupported. Roof components may be manifestly in secured and there may be evidence that tiles or slates have recently fallen. The investigator should wear adequate protective clothing including a helmet, armoured boots, strong gloves, and, where appropriate, a respirator. Advice and opinion should be sought from all relevant authorities including the fire fighters. Whilst structural dangers may be readily apparent, there is also the possibility of the presence of hazardous materials such as asbestos, beryllium oxide and toxic pyrolysis products. It may be necessary for the investigator to regard certain parts of the structure as unsafe, and confine the investigations to those regions of the building that can be entered in relative safety.

LOCATION OF THE SEAT OF FIRE

To establish the cause of the fire and the circumstances relating to its development, it is normally essential to locate the seat of the fire with as much precision as possible. At least 40 different techniques have been employed in the location of seats of fire, although some of these are of questionable value. There is no infallible technique for the accurate location of the seat of a fire.

Many methods employed depend on the principle that the fire is likely to have burned longer and to have developed higher temperatures at the point of ignition. Clearly, this assumption is not always valid. Techniques based upon this principle are known as 'Time Temperature Dependent'.

Time Temperature Dependent Techniques

Measurement of Depth of Char: Exposed wood chars at a rate which is dependent upon the amount of radiant heat flux incident, upon the surface and upon the time that the wood was subjected to this heat. Structural woodwork that has been subjected to high temperatures for a long period of time will have suffered greater charring than woodwork in other regions. The widespread belief that wood in fires chars at a constant rate of 1/40 inch per minute is, however, a myth. There is a steep thermal gradient in most rooms involved in fires. For this reason woodwork at a higher level is likely to char more rapidly than that at a low level. Comparison should be made between similar types of wood at the same level.

Spalling of Plaster: When subjected to heat, plaster may spall from the underlying brickwork. Regions where this has occurred may be supposed to have been subjected to high temperatures or a sudden rise in temperature. However, there is variations in the quality of plaster in a particular anomalous results. Plaster that has been removed by heat may be indicated by the presence of smoke staining on the underlying brick work. Brickwork exposed by the removal of plaster during fire fighting is unlikely to show smoke staining evidence because smoke does not normally deposit on wet surfaces.

6.5.1.3 Distortion of Rolled Steel Joists. Rolled steel joists (RSJs) used in the construction of some industrial buildings may become distorted as a result of the fire.

The amount of distortion will depend upon a number of factors, including the temperatures to which they have.

EXCAVATION

In most fires of any magnitude, it is possible that the original region where the fire was ignited will be buried under layers of debris. Meticulous removal of successive layers of debris may provide evidence not only of the ignition source but also of the sequence of events that occurred during the development of the fire.

It is by no means certain that any physical evidence of the ignition source will be found, because it may have been destroyed by the fire and, if the fire was ignited deliberately, the ignition source may have been removed by the fire setter. In important cases, it is necessary to remove layers with the care of an archaeological excavation, recording the relative positions and orientation of items as they are removed. In many cases, however, limited resources dictate that the excavation must be brief.

Sampling

In most investigations of suspicious fires, samples are taken for subsequent analysis for liquid for accelerants, such as petrol or paraffin. Analyses of samples from the vicinity of the seat of fire are likely to provide evidence as to whether such accelerants have been used, even after severe and prolonged burning. Certain fire accelerants can diffuse through normal polyethylene bags and for this reason samples must be taken in nylon bags, glass jars, or metal containers. When nylon bags are the chosen packaging material, the sample, typically one to two kilograms, should be placed in a large bag should be twisted tightly, swan necked and secured, preferably by tying with string, and labeled. If control samples of debris are taken they should be packaged and transported in an identical manner to the questioned samples.

Stringent precautions should be taken to avoid contamination when obtaining, transporting, and storing samples. Gloves and sampling tools that have come into contact with high concentrations of volatile fire accelerants are likely to cause

contamination of samples taken from the seat of the fire. Sharp items, such as fragments of glass, nails, and lengths of wire, should preferably be removed from the sample before it is placed in the bag. Samples smelling strongly of fire accelerant and containers of liquid fire accelerant should be kept separate from fire seat samples at all times. When samples are taken they should be labeled, recording their original location, the name of the person first taking possession, and the date. Each sample should be given a unique alphanumeric reference.

Suspected Accidental Ignition Sources

During the excavation, the investigator may encounter item legitimately presented on the premises, which could have accidentally caused the fire. Lighting, cooking and heating appliances, materials capable of self heating, electrical equipment and residue of smoking materials may be found. In some cases it may be necessary to sample these items or materials for laboratory examinations and tests. Unless volatile fire accelerants are suspected, it will not be necessary to use nylon bags to package such materials. Any form of packaging that protects and contains the item or sample will be adequate. In common with samples for analysis, adequate labeling is essential.

Incendiary Devices

The investigator may, on rare occasions, encounter devices that have caused delayed ignition. These devices will incorporate some form of timing mechanism, such as a clock, together with a form of igniter, often electrical. The laboratory examination of such items may provide evidence to like the device with known terrorist organizations, and it may be possible to establish the period of delay and likely effectiveness of the device.

It is possible for a fire setter to construct incendiary devices that are likely to be totally consumed by the fire. A number of unsuccessful devices may be found in the vicinity of a small fire that had been caused by a successful device. Recovered incendiary devices should not be handled or approached by individuals unaccustomed to the correct procedures involved in their investigation.

LABORATORY EXAMINATION

Analysis of Debris

Samples of debris taken from the fire scene can be analyzed by a number of techniques, the most common of which is gas chromatography. Gas chromatography techniques can be devised to separate and identify any volatile material. The most commonly encountered fire accelerants are readily available fuels such as petrol and premium paraffin. The common techniques of analysis have been devised with the objective of detecting these accelerants effectively. However, it is also important that other fire accelerants such as diesel fuel, turpentine substitute, methylated spirits and various organic solvents should also be detected by the standard technique.

Most hydrocarbon fuels consist of a mixture of flammable compounds produced from crude oil by distillation and other processes. The gas chromatography technique separates the individual components of a fuel such as petrol, detecting and estimating their quantities and showing the results graphically in the form of a chromatogram.

The analysis of debris samples is carried out by taking head space samples from the container of debris and in some way introducing the incident.

INTRODUCTION

The investigation of accidental or illegal explosions and the scientific analysis of their causes has a long history, which in the United Kingdom started formally in 1871. An explosion at a factory in Stowmarket making guncotton led the then Home Secretary to instigate an inquiry. A Royal Engineer, Captain Vivian Majendie, who was an expert on explosives, led the investigation. He recruited a chemist, Dr A Dupre, to assist. The arrangement proved so successful that the Home Office decided to continue it, leading to the present day Forensic Explosives Laboratory. One of the first fruits of their collaboration was the1875 Explosives Act, which embraces various aspects of explosives including their manufacturing storage. Subsequent bombing outrages led parliament to enact the 1883 Explosive Substances Act, which deals with the criminal use of explosives and devices; this Act was intended specifically to deal only with the

most serious offences, hence the special provision made requiring the fiat of the Attorney General for any prosecution under it.

Many of the questions that Captain Majendie and Dr Cupre were asked to address are still relevant to today's forensic explosives investigators, including the following:

Was it an explosion?

Was it an accident or a bomb?

Is this an explosive?

Was this a viable device or a hoax?

Are these items or materials intended for making explosives or bombs?

Has this person been in contact with explosives?

Have explosives been stored in this place?

Are there similarities between these items or incidents that link them together?

Could the items have an innocent use?

Actual cases involve a variety of circumstances and the questions that are appropriate will vary accordingly.

In order to address the above points, the forensic explosives scientist requires a sound grounding in the requirements of the judicial system and the ethical principles underlying it, together with a detailed knowledge of the science and technology of explosives, practical experience in the construction of the all types of explosive devices, and a clear understanding of their effects.

Explosive as physical evidence

EXPLOSIVES TECHNOLOGY

What is an Explosion?

A convenient working definition is 'a sudden and violent release of physical or chemical energy, often accompanied by the emission or light, heat, and sound'.

To the human observer, an explosion seems instantaneous; however, the chemical reaction actually process at a finite, albeit high, speed, progressing through the material as a definite 'front' or 'wave'. Two types of event may be defined: a 'deflagration' being an event where the decomposition within the explosive occurs at a speed greater than the velocity of sound within the material. Sometimes deflagrations are referred to as 'low-order explosion', and there is a mistaken tendency to assume that they are in some way less serious than detonations. This is an error: many of the most devastating accidents with explosives have involved deflagrations rather than detonations.

Typically, deflagrations occur with velocities of less than 2000 ms-1 while detonations may reach velocities of 6000 to 8000 ms-1 for certain high performance military explosives.

Types of Explosion

Explosions may be characterized by the source of their energy, i.e. physical or chemical, and also by their locus, i.e. whether dispersed or condensed phase.

Examples of the various classes are:

physical – an exploding pressure vessel, for example an overheated gas cylinder;

chemical – explosion of a mass of blackpowder, or as it is more commonly known, gunpowder;

dispersed – detonation of a cloud of flour in air;

condensed – detonation of a stick of dynamite.

Each of these types can be further classified according to the speed and duration of the explosive even, and this can be linked to the type of practical effect observed, enabling the skilled investigator to draw some meaningful conclusions from the examination of the types of macroscopic and microscopic damage found at the scene of an explosion. Thus, high velocity detonations cause shattering and cutting of metal, whilst low velocity events result in tearing and heaving.

Types of Explosive

Although dispersed phase, explosions can be of great power, as can physical explosions, the vast majority of practical explosives used for either commercial or military purposes are condensed phase chemical explosive. These energetic materials are best considered according to their function. Thus, we have:

Pyrotechnics – used for the production of heat, light, sound, or smoke, for instance in fireworks or signaling flares.

Blasting explosives – for example to break up rock in quarrying operations.

Initiatories – used to transform a small mechanical or thermal impetus into a violent shock wave capable of causing detonation of less sensitive energetic materials such as blasting explosives.

Initiatories are also referred to as primary explosives indicating their role at the start of a chain of explosive event. Analogously, the less sensitive explosives used for the main charge are referred to as secondary explosives.

Propellants – energetic materials which deflagrate in a controlled fashion to allow their energy to be used, for example, in propelling rockets or projectiles from guns.

Apart from the above scientific definitions, the forensic scientist needs also to be familiar with the legal definitions: for example the United Kingdom's 1875 Explosives Act sections 3 states:

Means of gunpowder, nitro-glycerine, dynamite, guncotton, blasting powders, fulminate of mercury or of other metals, coloured fires, an every other substance, whether similar to those above mentioned or not, used or manufactured with a view to produce a practical effect by explosion or a pyrotechnic effect; and

includes for-signals, fireworks, fuses, rockets, percussion caps, detonators, cartridges, ammunition of all descriptions, and every adaptation or preparation of an explosive as above defined.

Other countries have their own legal definitions.

Chemistry of Explosives

The requirements are simple: the ingredients of the explosive, an oxidant, and a fuel, need to undergo some very rapid chemical reaction liberating large amounts of energy. In practice, the most difficult part is achieving control of this process so that the explosive reacts only when required, and not otherwise.

The earliest know explosive was gunpowder, more correctly known as a blackpowder, first developed by the Chinese and being an intimate mixture of charcoal and sulphur (the fuel), and potassium nitrate (the oxidant). The chemical reactions that occur are in fact highly complex, resulting in the formation of oxides of carbon, sulphur, and potassium, together with potassium/ sulphur compounds, all in a range of oxidation states. Blackpowder illustrates the way in which manner our of explosives can be tailored to a particular application. Thus, if spread out in a thin layer in the open air, it will merely burn violently, while if confined in a pressure-tight container, it will readily detonate if ignited. Under light or partial confinement, black powder deflagrates and can be usefully employed as a propellant, for example in the guns of Lord Nelson's HMS Victory at Trafalgar, or in modern day display rockets on Guy Fawkes night. This versatile material is also very widely used in current military munitions as an igniter powder: the fiery particles of molten inorganic slag that form on its decomposition make it particularly suitable for this purpose.

In broad chemical term, black powder is an intimate mixture of fuels and oxidants. Other inorganic and organic materials can also be combined to produce explosive mixtures, the commonest example being the use of ammonium nitrate/fuel oil mixtures (ANFO) in quarrying. Inorganic compounds are also used widely in pyrotechnic mixtures, for example chlorates, perchlorates, and nitrates of alkali metals are common oxidants.

The other approach, which can yield even higher explosive performance, is to combine the fuel and oxidant in the same molecule. Although some organo-fluorine explosives are knows, these have not been generally adopted, and the majority of organic explosives are organic nitro compounds. The earliest example was nitroglycerine (glyceryl trinitrate), commercialized by Nobel as 'Dynamite' or

‘Gelignite; others include the nitro-aromatics such as 2,4,6-trinitrotoluene (TNT), or the nitramines, fro example RDX.

Table A lists a number of organic compounds that are commonly used explosives.

Initiation and Detonation of Explosives

As mentioned above, the most important practical problem in explosives technology is the safe control of initiation. This has led to the widespread use of he concept of the ‘explosives train; a small quantity of a very sensitive explosive is used to receive an initial stimulus in the form of thermal, mechanical, or electrical energy and to amplify this so as to start a reaction in a larger mass of less sensitive material.

This leads on to the concept of the ’detonator’ invented by Nobel. Commercially, two main types are produced: ‘plain detonators’ and ‘electric detonators’.

Table 4: the common and chemical names of organic explosive with their properties

Common name	Chemical name	Properties
TNT	2,4,6-trinitrotoluene	Low melting solid; can be conveniently cast into bombs and shells; dissolves in organic solvents
Nitroglycerine	Glyceryl trinitrate	Viscous liquid; toxic vapour; Neat liquid is sensitive and unstable
PETN	Pentaerythritol tetranitrate	White crystalline solid
RDX	Cyclotrimethylenetrinitramine	White crystalline solid; high density; high detonation velocity; moderately soluble in acetone
HMX	Cyclotrimethylenetrinitramine	White crystalline solid; high density; high detonation velocity; high melting point (275oC); very stable; moderately soluble in acetone

Tetryl	2,4,6-Trinitrophenylmethylitramine	Yellow solid

Table 4 shows the essentials of the latter type, together with some examples of the wide variety available. A sealed pencil-shaped metal tube contains a metal wire filament embedded in a heat sensitive match composition (the 'fuse head') when an electric current is passed through the wire filament the resulting heat ignites the match composition. This in turn ignites the next element in the detonator. In practice this may be a delay composition(the 'delay element') used to provide greater control in the sequencing of industrial blasting operations, or the ignition may pass directly to the mall charge of primary (initiatory) explosive (the 'priming charge), which, one ignited, burns to detonation. The detonation, of the primary explosive in turn causes detonation of a slightly larger quantity of a secondary explosive (the 'base charge'), which acts as a 'booster' amplifying the effect several-fold. In a plain detonator the wire filament is replaced by an igniferous fuse.

Table 5 gives some examples of the energetic materials used in detonators for each of the functions shown above.

Essential Elements of an Improvised Explosive Device

Great ingenuity has been displayed in the creation of improvised explosive devices. However, common element can be identified in:

Table 5: Some explosive materials used in detonator

Common name	Function
Mercury Fulminate	Primary explosive
Lead azide	primary explosive
Lead styphnate	Primary explosive
Potassium chlorate / lead thiocyanate	Match composition
Barium peroxide/Selenium	Delay element

PETN	Secondary explosive
Tetryl	Secondary explosive

FACILITIES REQUIRED FOR FORENSIC EXPLOSIVE EXAMINATIONS

In the United Kingdom, strict regulations apply to the keeping and use of explosives, and no laboratory or individual may possess explosives without appropriate licences. Similar regulations exist in many other countries. Apart from these legal aspects, safety considerations also need to be taken into account and explosives should not be handled without adequate training and facilities for the purpose.

Safety

Explosives explode. This simple rule needs to be borne in mind at all times when handling energetic materials of any kind; all processes and equipment should be designed on the basis that at some time an unintended explosion will, in fact, occur and therefore the safety procedures must be such as to minimize the harmful effects. Most nations have detailed explosives regulations covering the safe storage, transport and use of commercial and military explosives. However, these often cannot be applied to the case of illegal materials, and scientists investigating such matters must be careful to minimize hazards both to themselves and others. In particular, the possibility that improvised explosive devices may incorporate concealed anti-handling features should always be addressed.

Explosive devices should always be examined at the scene by properly qualified bomb disposal personnel before being disturbed in any way whatsoever; the bomb disposal personnel will also be able to provide the necessary advice on safe packaging and transport arrangements. Practical experience shows that the most dangerous devices are often those made by amateur experimenters, for example schoolchildren.

The specialist facilities must allow for four activities: (i) receipt, (ii) storage, (iii) examination, and (iv) disposal.

Receipt

The arrangements for receipt of items have some features in common with those general in forensic work, for example the possibility of cross contamination between submitted items must be rigorously and demonstrable precluded. The general requirements for preserving the integrity of trace and contact evidence are discussed in Chapter 3. In addition, the system has always to preserve the chain of custody of evidence. Explosive laboratories also need preplanned procedures for dealing with devices that may deteriorate into an unsafe condition or are suspected of incorporating anti-handling features. Thus, immediate access to bomb disposal equipment and personnel is essential, together with radiographic facilities designed to allow safe examination of explosive devices and provide details of the internal construction of such items before disassembly.

The mechanics of receipt have to cater for a range of items, which can cover anything from a small sealed package of hand swabs for trace examination to a blown-up motor vehicle or several tones of bomb scene debris. In practice, it is convenient to have different physical arrangements for the various streams of evidence type whether bulk or trace, explosive or non-explosive, clean or dirty.

Storage

Detailed safety guidelines and regulations cover the design of explosives storehouses (magazines). These require, for example, separation of detonators and bulk explosives; they also include limits on the mass of explosives that may be kept in particular designs of store, and also specify security features to prevent unauthorized access.

A typical laboratory magazine is strongly constructed of reinforced concrete, provided with spark proof electrical lighting and lightning protection, and fitted with high-security doors and locks. The whole is enclosed within a substantial barricade intended (i) to protect the magazine from an explosion in any other adjacent building, and (ii) to deflect upwards the blast wave that would occur if the contents of the magazine itself were to explode.

The laboratory will also need to store non-explosive exhibits ranging from items for explosives trace analysis to bulk debris in a way that meets al the requirements for preservation of the chain of custody and protection of exhibit integrity.

Examination

Examination of Bulk Explosive. The design of facilities for bulk explosives is governed by both the type and mass of explosive being handled. In general, different work areas need to be provided for examination of detonators and primary explosives, pyrotechnics and incendiaries, and secondary explosives. Where practicable it is also wise to segregate activities involving large and small quantities.

For example, it is often convenient to break down devices containing large explosive masses in a separate building, take small samples, and then examine these in more detail in the main laboratory. Buildings for explosives work require appropriate electrical fittings to prevent spark and dust hazards, together with lightning protection and antistatic precautions. Particular attention needs to be paid to fire prevention and escape in the building design.

In a laboratory for examining detonators and primary explosive the floor and benches are normally covered in conduction rubber sheet, which is earthed to reduce hazards from sparks due to static electricity, as is all the laboratory equipment. All personnel entering the laboratory have to check themselves on a special meter to ensure that they are properly earthed. In dry climates, it is wise to humidify the laboratory atmosphere to reduce hazards from static electricity. The detonators and primary explosives are manipulated behind stout armoured screens which need to be of a design that has actually been type-tested to prove that they really do withstand the effects of an explosion of the quantity likely to be involved. It is not sufficient to rely on normal laboratory safety screens, which are most unlikely to contain the explosive effects of a typical commercial detonator. Similarly, fume cupboards used for chemical treatment of primary explosives (which are generally toxic) should be suitably armoured, with arrangements to vent blast pressure waves due to any detonation.

Special machinery is essential if detonators are to be opened to allow examination: lathes, cutters, manipulators and screens must all be type-tested to prove their suitability and safety before use. The superficial simplicity of the process conceals many potential hazards and it most definitely should not be attempted without proper facilities and training.

Examination of Samples for Traces of Explosives. These can include swabs or other samples taken from people's hands or property, or samples obtained from items that have been involved in an explosion.

As with all other contact trace evidence, where the objective is to detect very small quantities of the analytical species, it is essential to carry out the examination in a controlled environment where it can be demonstrated by objective measurement that the results obtained are meaningful and not the consequence of contamination either from the general environment or from the items at the laboratory.

In general, this will require precautions such as the use of clean disposable overclothing, separate work areas for different trace operations, regular monitoring and cleaning, and control of access to ensure that people and items that enter the trace area are free from explosives.

Examination of Non-explosive Items of Bomb components. Live explosives will often be accompanied by non-explosive items either as part of a device or in a collection of suspected bomb-making equipment. These may include containers, timing devices, power supplies, arming mechanisms, and switchgear. Facilities for mechanical examination and disassembly, measurement, photography, and microscopy will be needed.

Post explosion debris. These include the remains of an exploded fire work, or more generally an exploded device, a bomb-damaged motorcar, or tones of debris from a bombed building. Each of these evidence types requires a different approach and different facilities. Conventional well lit, clean laboratory benches covered with fresh disposable paper will suffice for examination of the remains of a small exploded device. Handling bomb-damaged motor vehicles requires special trolleys and lifting

gear, particularly since such vehicles are likely to be structurally unsafe and may easily collages on nearby people if lifted without properly designed equipment operated by trained personnel. Examination of bulk debris from bombed buildings requires a system for the mechanical handling of the material, together with facilities for drying, sieving, and searching.

Debris from bomb scenes can present a range of hazards: there may be material such as asbestos present in building debris, which is also liable to be contaminated with sewage, damaged vehicles may contain flammable liquids. And all are liable to be contaminated with biohazard materials, particularly form events where people have been injured or killed. Thus, laboratory facilities for this type of work need appropriate mechanical ventilation for dust and vapour extraction, supplemented as necessary by personal breathing apparatus. Vaccination of staff against a range of diseases is also advisable.

Disposal

A major consideration in explosives work of any kind is the need to provide for the safe and environmentally acceptable disposal of all waste and unwanted material. It is not permissible simply to mix explosives waste with normal garage, and most particularly not with what chemicals. Waste explosives and explosives removed from improvised devices are likely to be less stable than newly manufactured material as a result of rough handling, inadequate storage, and contamination and should therefore be treated with especial care. Materials may be destroy chemically or more commonly by burning at an appropriately licensed area.

Reference Collections and Databases

Reference collections are commonly used in forensic science; they are of great value in explosives work. Thus, samples of compositions and examples of packaging and labeling are all most useful in the identification of individual commercial explosives. Whilst the identification of an intact cartridge of explosive bearing the manufacturer's label may appear to be a trivial task, identification of the same item from a few small damaged fragments of wrapper and a milligram of undetonated composition is a more

challenging problem. Likewise, specimens of items such as detonators and blasting accessories are useful for physical comparison. Such collections of physical hardware can advantageously be supplemented with a library of commercial literature, which can prove especially helpful in identifying unusual or old items.

A set of well characterized samples of known explosives are essential as comparison and calibration standards for chemical analysis by techniques such as GC or HPLC. Collections of reference spectra are also helpful, but the possibility of errors in commercially published spectral libraries must be borne in mind, and it is wise to establish the authenticity of spectra used in critical work.

A carefully indexed database of devices should be maintained to facilitate correlation between incidents, yielding pointers to individuals and organizations involved in series of outrages.

FORENSIC QUESTIONS

Was it an Explosion?

This can involve examining the damage at the scene either at first hand or, less satisfactorily, by viewing photographs, reviewing witnesses' accounts of the event, an examining debris from the scene in the laboratory. The occurrence of sudden loud reports, flashes, violent projection of deris, smashing, tearing, or rupturing of structural materials, and the formation of craters at the seat of supposed explosion are all useful indicators.

Was it an Accident or a Bomb?

This has to be a combined process, both of elimination of possible accidental causes such as leaks of flammable gases or the presence of flammable dust clouds and, wherever possible, the positive identification of physical or chemical evidence resulting from the bomb.

Physical evidence can involve recovering fragments of the bomb from the debris: contrary to popular misconception explosions which do not always vaporize everything in the immediate vicinity. Rather it is more accurate to say that 'bombs

shatter and scatter'. Thus, teams of trained and diligent searchers were able to recover evidentially significant fragments of the device in many of the cases that occurred in Great Britain between 1990 and1996. Such fragments may include pieces of the bomb container, the waterproof plug from the detonator, and parts of any timing mechanism such as clockwork, electronic circuitry, batteries. and wires. Fragments of the device are likely to be found lodged in comparatively soft objects near the seat of the explosion, for example in vehicle tyres and seats in the case of under-car booby traps. The bodies of victims are also potentially good receptors for bomb fragments. Medical staff should routinely be asked to X-ray victims and pass on any fragments recovered for scientific examination.

A small victim-actuated bomb in a book is shown in together with the accompanying bag in which it was transported. Such an item would be intended to explode when the book was opened.

Although only containing some 25 g of plastic explosive, such a device would be likely to main or kill anyone opening it. The fragments recovered after explosion can be seen in information of considerable investigational and evidential value might potentially be obtained from such material. The metal fragments, for example, might yield chemical residues of the explosive, the battery fragments type and batch numbers; the watch might have toolmarks or manufacturer's marks, and it might be possible to link the wires with similar wires from a suspect's premises. Likewise, the fragments of the book and the bag might provide links to a suspect.

Incendiary devices that have partially functioned often produced a fused mass of charred and burnt material, particularly if the device was in a plastic container. In such cases, radiography can often be used to reveal details of the construction of the device from otherwise intractable evidence.

Nuclear

Main article: Effects of nuclear explosions

A nuclear weapon is a type of explosive weapon that derives its destructive force from the nuclear reaction of fission or from a combination of fission and fusion. As a result, even a nuclear weapon with a small yield is significantly more powerful than the

largest conventional explosives available, with a single weapon capable of destroying an entire city.

Electrical

A high current electrical fault can create an electrical explosion by forming a high energy electrical arc which rapidly vaporizes metal and insulation material. Also, excessive magnetic pressure within an ultra-strong electromagnet can cause a magnetic explosion.

Vapour

Boiling liquid expanding vapour explosions are a type of explosion that can occur when a vessel containing a pressurized liquid is ruptured, causing a rapid increase in volume as the liquid evaporates.

Astronomical

Solar flares are an example of explosion common on the Sun, and presumably on most other stars as well. The energy source for solar flare activity comes from the tangling of magnetic field lines resulting from the rotation of the Sun's conductive plasma.

Mechanical

Strictly, a physical process, as opposed to chemical or nuclear, eg, the bursting of a sealed or partially-sealed container under internal pressure is often referred to as a 'mechanical explosion'. Examples include an overheated boiler or a simple tin can of beans tossed into a fire. A BLEVE (see above) is one type of mechanical explosion, but depending on the contents of the container, the effects can be dramatically more serious - consider a propane tank in the midst of a fire. In such a case, to the limited effects of the simple mechanical explosion when the tank fails are added the chemical explosion resulting from the released (initially liquid and then almost instanteaously gaseous) propane in the presence of an ignition source. For this reason, emergency workers often differentiate between the two events.

Among the largest known explosions in the universe are supernovae, which result from stars exploding, and gamma ray bursts, whose nature is still in some dispute.

CHAPTER THIRTEEN: MEDICOLEGAL ASPECTS OF DEATH AND TOXICOLOGY

INTRODUCTION

The origins of forensic science can be traced back to the 6th century with legal medicine being practiced by the Chinese. Within the next ten centuries, advances in both medical and scientific knowledge were to contribute to a considerable increase in the use of medical evidence in courts. Other types of scientific evidence did not start to evolve until the 18th and 19th centuries, a period during which much of our modern-day chemistry knowledge was just starting to be developed. Toxicology, the study of poisons, emerged as one of the new forensic disciplines, highlighted by the work of Orfila in 1840 with his investigation into the death of a Frenchman, Monsieur Lafarge. Following examination of the internal organs from the exhumed body, orfila testified on the basis of chemical tests that these contained arsenic, which was not a contamination from his laboratory or the cemetery earth. This evidence resulted subsequently in Madame Lafarge being charged with the murder of her husband, but more importantly raised the problem of contamination, a constant concern for any forensic scientist.

Of all major crimes, death investigation requires the greatest effort on the part of the police. The investigator is responsible for collecting a vast amount of evidences and coordinating information from varity of sources and the investigation always require team effort and only effective through cooperation.

Medical jurisprudence or forensic medicine, the application of medical science to legal problems is important in this regard. It is typically involved in cases concerning blood relationship, mental illness, injury, or death resulting from violence. Autopsy (see post-mortem examination) is often used to determine the cause of death, particularly in cases where foul play is suspected. Post-mortem examination can determine not only the immediate agent of death (e.g. gunshot wound, poison), but may also yield important contextual information, such as how long the person has been dead, which can help trace the killing. Forensic medicine has also become increasingly important in cases involving rape. Modern techniques use such specimens as semen, blood, and hair samples of the criminal found in the victim's bodies, which can be compared to

the defendant's genetic makeup through a technique known as DNA fingerprinting; this technique may also be used to identify the body of a victim. The establishment of serious mental illness by a licensed psychologist can be used in demonstrating incompetency to stand trial, a technique which may be used in the insanity defense (see insanity), albeit infrequently. The synonym of forensic medicine is forensic pathology.

Forensic Pathology

Forensic pathology is the legal branch of pathology concerned with determining cause of death (such as bullet wound to head, exsanguiation, strangulation, etc.) and manner of death (including murder, accident, natural, or suicide). Examination of some wounds and injuries due to crime or negligence Examination of tissue specimens that may be relevant to rape, or other crimes. Forensic pathologists work closely with the coroner (England and Wales) or medical examiner (United States). The examination of dead bodies (autopsy or post mortem) is a subset of anatomical pathology. Often times, a coroner or medical examiner has a background in pathology.

Forensic medicine is often used in civil cases. The cause of death or injury is considered in settling insurance claims or medical malpractice suits, and blood tests often contribute to a court's decision in cases attempting to determine the paternity of a child.

Protecting, Investigation and examination of crime scene

OBJECTIVES

By the end of this chapter students should be able to:

Discuss on medico legal aspects of death.

Explain about forensic identification of death.

Define poisoning and its analysis, results in medico legal .

Medico legal aspects of death

Medico legal team for death identification and investigation will include:forensic pathologists and death investigators. Toxicologists have access to forensic dentists, forensic entomologists (who can determine time of death by the types of fauna on the corpse), and a forensic anthropologist for skeletal remains and it has sexual-assault

response nurses for homicide victims who have been or are suspected of having been sexually assaulted. After each homicide or suspected homicide, the medical examiner and an investigator go to the scene. Their tasks are to examine the body and to survey the scene for vegetation. The medical examiner directs the death investigator and assumes responsibility for transporting the body from the scene to the medical examiner's office. Photographs of the scene are taken by the medical examiner and the police. At autopsy, a second medical examiner signs off on the report; this is a critical backup system in case the original medical examiner is not available for testimony. A prosecutor looks to the medical examiner's office for accuracy, promptness, and the ability to state opinions clearly in court. Accuracy must prevail as to the manner of death, the cause of death, and the time of death. Because of legal requirements for a quick preliminary hearing, requires its medical examiner's office to perform the autopsy within 24 hours of finding the body. The autopsy report must be generated within the 10-day period after someone has been charged and before his or her preliminary hearing. allows a defense medical examiner to participate in or watch an autopsy. The latter rarely occurs because of the timing; the defendant is usually unable to identify and retain a medical examiner within 24 hours. The prosecutor's advice to the medical examiner is to simplify the investigation for the jury, make it understandable, and make it persuasive. Visual aids and diagrams

Forensic identification of death

Autopsy

(Post mortem examination or abduction)

How is an autopsy performed? The extent of an autopsy can vary from a single organ such as the heart or brain to a very extensive examination. Examination of the chest, abdomen, and brain is probably considered by most as the standard autopsy and one technique is briefly described below. The autopsy begins with a complete external examination. The body weight and height are recorded, and identifying marks such as scars and tattoos are documented.

The internal examination begins with the creation of a Y or U-shaped incision from both shoulders joining over the sternum and continuing down to the pubic bone. The skin and underlying tissues are then separated to expose the rib cage and abdominal

cavity. The front of the rib cage is removed to expose the neck and chest organs. This opening allows the trachea (windpipe), thyroid gland, parathyroid glands, esophagus, heart, thoracic aorta and lungs to be removed. Following removal of the neck and chest organs, the abdominal organs are cut (dissected) free. These include the intestines, liver, gallbladder and bile duct system, pancreas, spleen, adrenal glands, kidneys, ureters, urinary bladder, abdominal aorta, and reproductive organs. To remove the brain, an incision is made in the back of the skull from one ear to the other. The scalp is cut and separated from the underlying skull and pulled forward. The top of the skull is removed using a vibrating saw. The entire brain is then gently lifted out of the cranial vault. The spinal cord may also be taken by removing the anterior or posterior portion of the spinal column. In general, pieces of all of the major organs mentioned above are converted into thin sections of tissue that can be placed on slides and studied under a microscope. The organs may be returned to the body or may be retained for teaching, research, and diagnostic purposes.

Dissection and examination of a dead body is made to determine cause of death and learn about disease processes in ways that are not possible with the living. Autopsies have contributed to the development of medicine since at least the Middle Ages. Beyond revealing causes of individual deaths, autopsy is crucial to the accuracy of disease and death statistics, the education of medical students, the understanding of new and changing diseases, and the advancement of medical science.

Forensic anthropology is the application of physical anthropology in a legal setting, usually for the recovery and identification of skeletonized human remains. Pathological and other evidences: Pathological samples that are skull, bone ruminants, or corpse is sent and investigated to respond to the following information

If it is human or not

The sex

Age

Cause of death

Forensic archaeology is the application of a combination of archaeological techniques and forensic science, typically in law enforcement.

Forensic entomology deals with the examination of insects in, on, and around human remains to assist in determination of time or location of death. It is also possible to determine if the body was moved after death.

Poisoning and toxicology

Forensic toxicology is the study of the effect of drugs and poisons on/in the human body. Forensic toxicology is the use of toxicology and other disciplines such as Analytical Chemistry, Pharmacology and Clinical Chemistry to aid medico legal investigation of death, poisoning, and drug use. The primary concern for forensic toxicology is not the legal outcome of the toxicological investigation, but rather the technology and techniques for obtaining and interpreting the results. A toxicological analysis can be done to various kinds of samples.

A forensic toxicologist must consider the context of an investigation, in particular any physical symptoms recorded, and any evidence collected at a crime scene that may narrow the search, such as pill bottles, powders, trace residue, and any available chemicals. Provided with this information and samples with which to work, the forensic toxicologist must determine which toxic substances are present, in what concentrations, and the probable effect of those chemicals on the person.

Determining the substance ingested is often complicated by the body's natural processes , as it is rare for a chemical to remain in its original form once in the body. For example: heroin is almost immediately metabolised into another substance and further to morphine, making detailed investigation into factors such as injection marks and chemical purity necessary to confirm diagnosis. The substance may also have been diluted by its dispersal through the body; while a pill or other regulated dose of a drug may have grams or milligrams of the active constituent, an individual sample under investigation may only contain micrograms or nanograms.

Samples

Urine

A urine sample is quick and easy for a live subject, and is common among drug testing for employees and athletes. Urine samples do not necessarily reflect the toxic substance(s) the subject was influenced by at the time of the sample collection. An example of this is THC from cannabinoid (for example, marijuana) use, which in

heavy users can be detected in urine for up to 14 days following use. Note also that it can take as long as 8 hours until a given substance can be detected. Specific to workplace drug testing, urine collection must be directly observed due to the prevalence of substance abusers "beating the test" via sample substitution or adulteration.

Blood

A blood sample of approximately 10 cm^3 is usually sufficient to screen and confirm most common toxic substances. A blood sample provides the toxicologist with a profile of the substance that the subject was influenced by at the time of collection; for this reason, it is the sample of choice for measuring blood alcohol content in drunk driving cases.

Hair sample

Hair is capable of recording medium to long-term or high dosage substance abuse. Chemicals in the bloodstream may be transferred to the growing hair and stored in the follicle, providing a rough timeline of drug intake events. Head hair grows at rate of approximately 1 to 1.5 cm a month, and so cross sections from different sections of the follicle can give estimates as to when a substance was ingested. Testing for drugs in hair is not standard throughout the population. The darker and coarser the hair the more drug that will be found in the hair. If two people consumed the same amount of drugs, the person with the darker and coarser hair will have more drug in their hair than the lighter haired person when tested. This raises issues of possible racial bias in substance tests with hair samples.

Oral fluid

Oral fluid is the proper term, however Saliva is used commonly. Saliva is a component of oral fluid. Oral fluid is composed of many components and concentrations of drugs typically parallel to those found in blood. Sometimes referred to as ultra filtrate of blood, it is thought that drugs pass into oral fluid predominantly through a process known as passive diffusion. Drugs and pharmaceuticals that are highly protein bound in blood will have a lower concentration in oral fluid. The use of oral fluid is gaining importance in forensic toxicology for showing recent drug use, e.g in clinical settings or investigation of driving under influence of substances.

Other

Other bodily fluids and organs may provide samples, particularly samples collected during an autopsy. A common autopsy sample is the gastric contents of the deceased, which can be useful for detecting undigested pills or liquids that were ingested prior to death. In highly decomposed bodies, traditional samples may no longer be available. The vitreous humour from the eye may be used, as the fibrous layer of the eyeball and the eye socket of the skull protects the sample from trauma and adulteration. Other common organs used for toxicology are the brain, liver, spleen and stomach contents.

The inspection of the contents of the stomach must be part of every postmortem examination if possible because it may provide qualitative information concerning the nature of the last meal and the presence of abnormal constituents. Using it as a guide to the time of death, however, is theoretically unsound and presents many practical difficulties, although it may have limited applicability in some exceptional instances. Generally, using stomach contents as a guide to time of death involves an unacceptable degree of imprecision and is thus liable to mislead the investigator and the court. Characteristic cell types from food plants can be used to identify a victim's last meal; knowledge about which can be useful in determining the victim's whereabouts or actions prior to death . Some of these cell types include:

sclereids (pears)

starch grains (potatoes and other tubers)

raphide crystals (pineapple)

druse crystals (citrus, beets, spinach)

silica bodies (cereal grasses and bamboos)

In a case where a young woman had been stabbed to death, witnesses reported that she had eaten her last meal at a particular fast food restaurant. However, her stomach contents did not match the limited menu of the restaurant, leading investigators to conclude that she had eaten at some point after being seen in the restaurant. The investigation led to the apprehension of a man whom the victim knew, and with whom she had shared her actual final meal. Time since death can be approximated by the state of digestion of the stomach contents. It normally takes at least a couple of hours for food to pass from the stomach to the small intestine; a meal still largely in the

stomach implies death shortly after eating, while an empty or nearly-empty stomach suggests a longer time period between eating and death. However, there are numerous mitigating factors to take into account: the extent to which the food had been chewed, the amount of fat and protein present, physical activity undertaken by the victim prior to death, mood of the victim, physiological variation from person to person. All these factors affect the rate at which food passes through the digestive tract. Pathologists are generally hesitant to base a precise time of death on the evidence of stomach contents alone.

Other organisms

Bacteria, maggots and other organisms that may have ingested some of the subject matter may have also ingested any toxic substance within it.

Detection and Classification

Detection of drugs and pharmaceuticals in biological samples is usually done by an initial screening and then a confirmation of the compound(s), which may include a quantitation of the compound(s). The screening and confirmation are usually, but not necessarily, done with different analytical methods. Every analytical method used in forensic toxicology should be carefully tested by preforming a validation of the method to ensure correct and indisputable results at all times. A testing laboratory involved in forensic toxicology should adhere to a quality programme to ensure the best possible results and safety of any individual.

The choice of method for testing is highly dependent on what kind of substance one expects to find and the material on which the testing is performed. Biological samples are more complex to analyze because of factors such as the matrix effect and the metabolism and conjugation of the target compounds.

Gas chromatography

Gas-liquid chromatography is of particular use in examining volatile organic compounds.

Detection of Metals

The compounds suspected of containing a metal are traditionally analyzed by the destruction of the organic matrix by chemical or thermal oxidation. This leaves the

metal to be identified and quantified in the inorganic residue, and it can be detected using such methods as the Reinsch test, emission spectroscopy or X-ray diffraction. Unfortunately, while this identifies the metals presence it removes the original compound, and so hinders efforts to determine what may have been ingested. The toxic effects of various metallic compounds can vary considerably.

Nonvolatile organic substances

Drugs, both prescribed and illicit, pesticides, natural products, pollutants and industrial compounds are some of the most common nonvolatile compounds encountered. Screening methods include thin-layer chromatography, gas-liquid chromatography and immunoassay. For complete legal identification, a second confirmatory test is usually also required. The trend today is to use liquid chromatography tandem mass spectrometry, produced with sample workup as liqiud-liquid extraction or solid phase extraction. Older methods include: spot test, typically the Marquis Reagent, Mecke Reagent, and Froehde's Reagent for opiates, Marquis Reagent and Simon's reagent for amphetamine, methamphetamine and the other analogs, the Scott's test for cocaine, and the modified Duquenois reagent for marijuana and other cannabinoids. For compounds that don't have a common spot test, like benzodiazepines, another test may be used, typically mass spectroscopy, or spectrophotometry.

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