BPCC-131

FOUNDATIONS OF PSYCHOLOGY

School of Social Sciences
Indira Gandhi National Open University

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Course Contents

FOUNDATIONS OF PSYCHOLOGY: HOW TO PROCEED IN THE COURSE?

The course on FOUNDATIONS OF PSYCHOLOGY (BPCC 131) is the first core course offered in Ist Semester of BA General Programme, under Bachelors Degree Programme of IGNOU. The course is of 06 Credits, comprising Theory (04 Credits) and Practical (02 Credits). The course is divided into five blocks. Each of these blocks represents a specific theme which is discussed in one to three units. The units are arranged in a logical sequence so as to cover the main aspects of each theme. Each unit contains a brief introduction in the beginning and a list of references and further readings, as well as, online resources at the end. The list of online resources has been mentioned especially, since many of you must be having internet access. For additional information on various topics, the web-links provided, will be useful. You are advised to read the course introduction carefully, in order to know about the rationale and content of the course you have offered to read.

You have in your hands, all the five blocks and eight units of this course. Before proceeding to read the units, you are advised to go through the instructions about how to read the course material. Given below is the explanation of the organization and sequencing of the unit. We will tell you what is contained in various sections of a unit, and you should go about completing different tasks involved while reading the course material.

Organization and Sequencing of a Unit

The unit starts with,

1.0 Learning Objectives

1.1 Introduction

1.2 Section (Theme of the section)

1.2.1 Subsection of 1

…….

Check your progress

1.3 Section (Theme of the section)

1.3.1 Subsection of 2

…….

Check your progress

The numbering and length of each section and subsections may vary from one unit to the other unit, depending upon the depth of information in each unit. The last four sections in each unit with the following headings are also numbered. They are as follows,

- Review Questions
- References & Further Readings
- References for Figure
- Online Resources

As the scheme suggests, each unit is divided into sections for easy reading and better comprehension. Each section is indicated by **BOLD CAPITALS** and each sub-section by a **relatively smaller but bold typeface**. Divisions within the sub-sections are in **relatively smaller bold typeface** so as to make it easy for you to understand.

Let us now discuss each section of a unit.

Learning Objectives

We begin each unit with the section Learning Objectives. It tells you briefly what we expect from you once you complete working on the unit.

Introduction

In the section Introduction, we specify,

a) The relationship of the present unit to the previous unit (from Unit 2 onwards).

b) The theme of the present unit

c) The order of presentation of all the sections in the unit from Introduction to Summary

Summary

This section of each unit under the heading Summary, summarises the whole unit for the purpose of ready reference and recapitulation.

Box

Sometimes certain topics may deal with abstract ideas and related concepts, as well as some case studies. Thus, it becomes necessary to explain these related concepts in a separate enclosure, which is called Box, in our units. This is added information which is necessary to comprehend the main text. These boxes may include (i) explanatory notes regarding concepts, (ii) information about main works of scientists/psychologists who have contributed to a particular topic, (iii) certain case-studies that are related to the concepts being discussed, etc.

Illustration

There are several illustrations in each unit in the form of pictures, figures, diagrams and images. The main purpose of these illustrations is to make the study comprehensive and interesting.

Check Your Progress

We have given self-check exercises under the caption Check Your Progress at the end of main sections. To answer the Check Your Progress questions, you should,

a) Write your answers using the space given below each question

b) Label the diagrams in the space provided.

You will be tempted to have a glance of the main text as soon as you come across an exercise. But we do hope that you will resist this temptation and turn to the main text only after completing the answers.

You should read each unit and note the important points in the margin provided in the course material. This will help in your study. It will also help you to answer the self-check exercises and the assignment questions, as well as help in revising the course before appearing for Term End Examination.

Key Words

Each unit has key words at the end of the unit, to explain the basic ideas, technical terms and difficult words.

Review Questions

Besides Check Your Progress, we have given Review Questions after summary section in each unit. You may practice these questions which will help you in answering assignments and Term End Examination Question Paper, though the pattern and style of questions asked may not be similar.

References & Further Readings

We have given a list of references at the end of each unit. This is a list of books and articles used by the course writers to prepare the units. This reflects that your course material is based on a wide spectrum of literature available on a particular theme, related to your course. This also informs you of the wide literature available in the particular area of study. If interested in widening your knowledge, you may look for the mentioned references. Each reference mentions the name of the author, year of publication, title of the book/article, name of publisher and place of publication.

Further readings help you to increase your level of understanding of a particular theme in each unit, though it is not a compulsory reading.

References for Figure

We have provided a list of references for the sources of images and pictures, in each unit, after the References & Further Readings section. The images and pictures in the units have been retrieved from online sources and hence, the URL for the figures has been mentioned. If interested, you may also look for the mentioned references.

Online Resources

We have given a list of online references, on various topics, in each unit after References for Figure section. Apart from the text material, if you are interested in learning more about the topic, then you may access the website as mentioned, for a particular topic.

Audio and Video Aids

Some Units have been selected for the audio and video programmes to supplement the printed material. This will help you to understand the units with greater clarity.

Apart from this, you may also access IGNOU's FM radio channel, Gyanvani (105.6 FM)which is available across many cities in India, for regular programmes, related to themes on Psychology. You can listen to the live discussions by faculty and experts on the topic of the day and interact with them through telephone, email, and through chat mode.

You may also watch Gyandarshan TV channel (free to air educational channel), for programmes related to topics on Psychology. The schedule of Gyanvani and Gyandarshan is displayed on www.ignou.ac.in. The radio and TV channels may also be accessed on Gyandhara, webcast facility for Gyanvani and Gyandarshan, provided by the University.

Practical

The course will include practical. This component is compulsory and is of 02 Credits. It will be in form of lab activities and evaluated by your academic counsellor. You should carefully read Block-5 and apply the information. There will be a separate Term End Examination for practical, which also includes viva-voce. The examination centre for

practical will be the study centre alloted to you.

Assignments

You will receive assignment for the whole course. This is a Tutor Marked Assignment, which is submitted to the respective Study Centre after completion. The assignment will be evaluated by the academic counsellor from your Study Centre. Ensure that you complete the assignment because 30 percent weightage is given to the grades that you get in the assignment and is included in the final evaluation of your course. Before answering the assignment, read all the units and additional material (if available). While working on the assignment, kindly ensure the following points,

1) Clearly write your enrollment number
2) Answer them in your handwriting and in your own words
3) Write clearly and neatly so that it is easy to read your answers
4) Leave margins on one side of your answer-sheets so that evaluator may write his/her comments on your performance
5) You will submit the assignments at your Study Centre on or before the date mentioned as per the admission cycle. Kindly check the dates from www.ignou.ac.in or your Regional Centre website.

Term End Examination

After reading and understanding the course material, as well as referring to the audio and video programmes, you will be writing the Term End Examination (TEE) for the course. Kindly consider the following points while answering for the TEE.

1) Questions should be replied in one's own words and should be focused.
2) Answer questions keeping in mind the word limit.

Preparation of Course Material

The syllabus of course material BPCC 131 is designed by an Expert Committee (see page 2 of this course) and prepared by Course Preparation Team which comprises the author(s) of units, content editor(s), language editor, and the course coordinator. The expert committee selected the themes and sub-themes of the blocks and units, keeping in view the prescribed syllabi of UGC (Choice Based Credit Scheme).The authors of units have provided their expertise in elaborating them in the form of the main text of each unit. The content editor has carefully examined the course contents and has made an attempt to make the material clear and comprehendible.

For any query or feedback related to the course, you may kindly contact the course coordinator at,

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COURSE INTRODUCTION

The discipline of Psychology has received a lot of interest from the students. Psychology, which is over 100 years old, is an important discipline within the realm of Social Sciences. From the *study of soul* to its modern scientific approach to understand and explain the nuances of human behavior, it has been able to add immense knowledge. The discipline has witnessed a tremendous growth in India. With the opening of first Department of Psychology in University of Calcutta in 1915, Psychology is well established as a separate Department in most of the major Universities across India.

For an introduction, Psychology is the scientific study of mental functioning and behavior. The scientific study is carried out from both pure and applied perspectives. It tries to explore and answer questions related to various aspects of human behavior, like for instance perception, learning, memory, motivation, emotions, personality, intelligence, etc. The scientific rigor has contributed to the growth of the discipline and at present, psychology is being applied in various domains like, sports, forensic, environment, health, to name just a few. Psychology plays an important role in understanding the self and others and has become a part of everyday life.

Foundations of Psychology, is the first Core Course in BA Programme. It will introduce you to the field of Psychology, its genesis , methods and approaches to study human behavior. It will also cover the overt and covert processes responsible for human behavior.

BLOCK INTRODUCTION

There are five blocks in this course. Block 1 tells you about the field of Psychology, its emergence as a separate discipline, the approaches and methods to study behavior. Block 2 deals with the basic mental processes, namely perception, learning and memory. Block 3 explains about motivation and emotion and personality and intelligence are discussed in Block 4. Block 5 explains lab work and the manner in which it is to be carried out. It is based on theory component.

Block 1 introduces you to the field of Psychology. This block will give you an idea about what will follow in other blocks as well. It comprises of one Unit. Unit 1 thus, describes about the emergence of Psychology, as a separate discipline. It will further discuss the nature, scope and subfields of Psychology. Studying and conducting research in the area is highly scientific. Therefore, major methods employed to study behavior, will be discussed.

Block 2 introduces you to the mental processes of perception, learning and memory. This block constitutes of three units (Unit 2, Unit 3, and Unit 4). Unit 2 covers sensation and perception and will focus on its nature, scope and theoretical approaches. Laws of perceptual organization and factors affecting perception will be discussed. It will also explain the processes related to depth and distance perception, movement perception and size perception. The second unit (Unit 3) will describe the process of learning. Learning will further be explained with the help of types of learning, and theories related to learning. Finally, strategies in learning, like imagery, rehearsal and organization will be discussed. Unit 4 gives a description about the process of memory. It will focus on nature, scope, types and theories of memory. It will introduce you to the concept of forgetting and present an overview of techniques to improve memory.

Block 3 consists of two units (Unit 5 & Unit 6). Unit 5 introduces you to an important aspect of behavior,that is motivation. It will focus on nature, types and theories of

motivation. The unit will also explain the role of frustration and conflict in motivation. Unit 6 gives a description about nature, types and theories of emotion. Differences between emotions, mood and feelings will be explained. Lastly, major methods to measure emotions will be discussed.

Block 4 consists of two units (Unit 7 & 8). Unit 7 gives a description of the nature and theories of personality. Assessment of personality will also be explained in this unit. The last Unit will introduce you to Intelligence. It will explain the concept, and major theories related to intelligence. It will present an overview of important tests to measure intelligence.

As you are aware, the course has Practicum component. At the end of Unit 8, guidelines to carry out Practicum component and a brief description of the Practical (test and experiment) are presented in **Block 5**.

BLOCK 1

PSYCHOLOGY : WHAT IT IS?

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UNIT 1 INTRODUCTION TO PSYCHOLOGY*

Structure

1.0 LEARNING OBJECTIVES

After studying this unit, you will be able to:

- define psychology;
- appreciate psychology as a science;
- know the origin and development of psychology;
- explain the subfields of psychology;
- discuss different methods to study psychology; and
- know the development of psychology in India.

1.1 INTRODUCTION

Do you know that the word psychology is derived from two Greek words "psyche" and "logos"? *Psyche* means soul (life) and *logos* means knowledge (explanation)

* Dr. Meetu Khosla, Associate Professor of Psychology, Daulat Ram College, University of Delhi and Dr. Monika Misra, Assistant Professor of Psychology, SOSS, IGNOU, New Delhi.

or the study of the soul. The founders of psychology were both philosophers and psychologists and both tried to find answers to the philosophical questions in a scientific manner, like distinction between nature and nurture, existence of free will, etc. The word 'psychology' (*Psychologia* in Latin) dates back to 16th century, but was popularized in German by the early 18th century philospher Christian Worff. One of the most influential early users of the term in English was Herbert Spencer, who published the first volume of his *Principles of Psychology* in 1870.

Psychologists preferred using the word *mind* rather than *soul*. Psychology was one of the last special sciences that separated from philosophy in the nineteenth century. Today, psychology is very popular among students and has become a part of everyday lives. So, in this unit, we will talk about interesting facts and information about the origin of psychology. This unit will explain what psychology is all about and what are the different approaches applied by psychologists to understand human behavior. The unit will further elucidate various subfields of psychology and the methods used to conduct research in psychology. It will also discuss the diverse areas where psychologists work. Finally, development of psychology in India will be discussed.

1.2 DEFINITION OF PSYCHOLOGY

It is difficult to define psychology as it has a very vast scope. As the discipline was emerging, there were long debates as what should be studied in psychology and how it should be studied. The most popular definition is that it is the science of human and animal behavior and it includes the application of this science to different problems of the human beings.The most accepted definition today is *psychology is the science of behavior and mental processes*. Thus, there are three parts to the definition. Firstly, psychology is a science because it systematically tries to gather data by carefully observing and recording events or behaviors of humans and animals under controlled experimental conditions.Thus, measurement of behavior is as objective as possible in psychology.The knowledge that is gained collecting data with the help of experiments and other methods of observation, is then applied to solve real-life problems.

Secondly, the term behavior in the definition implies the overt actions and reactions. Whatever the animals or humans do, that is of interest,can be recorded, such as actions, thoughts, emotions, attitudes, etc. Lastly, the term mental processes refer to all the covert or internal processes, such as thinking, feeling and remembering. Succinctly said, psychology is a science that seeks to understand and predict human and animal behavior (Morgan, King, & Robinson, 1984).

Box 1.1

Psychology is the study of the mind and behavior. The discipline embraces all aspects of the human experience — from the functions of the brain to the actions of nations, from child development to care for the aged. In every conceivable setting from scientific research centers to mental health care services, "the understanding of behavior" is the enterprise of psychologists.

-American Psychological Association

1.3 PSYCHOLOGY AS A SCIENCE

The ancient Greek philosophers inquired into how human beings *know the world*. This is known as **epistemology (**Greek words *episteme* means knowledge and *logos* means discourse**)**. If we trace the history of psychology, we find that psychology emerged from merging of *physiology*, a branch of biology (natural science) and

the branch of philosophy, known as *epistemology,* or the theory of knowledge. Thus, the conceptual foundations of psychology are found in philosophy, but the creation of an independent science of psychology came from biology. The early psychologists believed that psychology could be developed through a systematic framework by conducting research in experimental laboratories. Contribution by Darwin (theory of evolution), Newton (conceptualization of physical laws), and Mendeleev (Periodic Table of Elements) strengthened the systematic approach towards psychological research. Thus, in the beginning, psychology was a synthesis of physics, physiology and mental philosophy and the psychological research was restricted to mind-body-physical relationships. Later, with the growth in the discipline, social, cultural and interpersonal problems of human behavior were included. It may be added here that the theoretical leanings of the psychologists, for example physiological psychologists (focus of study is nervous and glandular system) or social psychologists (concerned with social aspects of human behaviour), is most important in understanding behaviour. There have been different views as to whether psychology should a part of natural sciences or social sciences.For psychology to be considered as a natural science, the main assumptions are, *natural monism* (also known as reductionism, where a theory or a phenomenon is reduced or simplified to its simplest part), *operationism* (validity of the finding depends on the validity of the procedures employed in arriving at that finding), and *determinism* (all actions are subject to natural laws and must be explained in terms of causative factors in individual's heredity and environment).For psychology to be considered as a social science, the researcher uses experiments, follows all precautions of scientific observation and control, and interprets the results with the help of quantitative or statistical techniques. Though, there are no assumptions in designing experiments or studies as well as in interpreting data.

Psychology thus, studies human and animal behavior very carefully, in a systematic manner.It is as objective in its evaluation as any other field of science. It has an *empirical approach*. It gathers information or data by doing experiments and observations, analyses, and interprets data within a framework that maybe replicated and verified, rather than relying on others opinions, beliefs or discussions.

Box 1.2 : Empiricism or Empirical Approach

All sciences are based on empiricism. Developed by English philosopher John Locke, this approach states that our senses (hearing, taste, touch etc.) are the only legitimate source of gaining information about this world.

The experiments that are conducted, have certain variables that are controlled and are designed in such a way that if someone else wants to repeat the study, they can do so.The data is collected very systematically and quantified in order to understand the order of the events that take place. Nowadays, qualitative approach has also gained importance. The results obtained thus, contribute in developing certain theories that help to predict behavior. Sometimes, theory also guides the research endeavor.

Nomothetic and Idiographic approach

It is an approach to describe the aims, procedures, and theoretical orientation of psychologists. Psychologists with *nomothetic* approach seek to establish general laws and principles governing mental and behavioural processes, ignoring the individual. In this approach, a number of participants are selected as being a representative sample of the population. After data collection and analysis, inferences and generalizations are carefully done from the experiment.

The *idiographic* approach is concerned with the understanding of a particular individual or event. The inquiry is focused on the person because this approach emphasizes that each individual is unique and must be understood in terms of his or her psychosocial environment.

1.3 ORIGIN AND DEVELOPMENT OF PSYCHOLOGY

It should be clear by now as to how psychology is defined and why psychology is considered as a science. In the beginning, psychology was a part of philosophy. It moved away from philosophy and became an independent discipline approximately 138 years ago. 'Psychology has a short history but a long past', this remark was made by Hermann Ebbinghaus over a century ago, which is a kind of reflection on Greek philosophers who wrote on human nature.Thus, Greek philosophers like Socrates (428-348 BCE), Plato (428-347 BCE) and Aristotle (384-322 BCE) tried to explain human mind and its relationship to the physical body as early as 4 BCE. Socrates famous thought 'know thyself' emphasized on the importance of self and personal reflection. Later on, French philosopher René Descartes (1596-1650) considered pineal gland (body physiology) as the 'seat of the soul', the place where all thoughts are formed.

The success of experimental methods in physics motivated some scientists to use experiments to study mind and behavior. One of the first scientists to study psychological processes was the German physiologist Gustav Theodor Fechner (1801-1887), who studied psychophysics, a branch of psychology. The first laboratory was established in 1879 in Leipzig, Germany by Wilhelm Wundt(1832-1920).In 1883 in the USA, the first formal psychology laboratory was set up in John Hopkins University by Wundt's student, G. Stanley Hall (1844-1924).There was much progress, but moving away from philosophy was quite difficult. American Psychological Association (APA) started in 1892 and Hall became its first president. William James (1842-1910) wrote the first textbook on psychology known as "The Principles of Psychology". The psychologists, in the beginning, had an empirical approach to understand thinking, attention, imagery, etc.The experiments were done to study the mind and mental experiences. Gradually, different schools of thought came up with different viewpoints about the nature of the study of psychology. They emphasized that the focus should be on the study of behavior rather than the mind.

Now, let us look at the main schools of thought or the main perspectives in psychology, which have contributed in the development of the discipline. These approaches begin from the traditional to modern and focus defining behaviour and conducting research according to the leanings of the psychologist(s).

1) **Structuralism:** The main focus is on analyzing the basic structures of the human mind. This view is known as *structuralism.*It is associated with **Wilhelm Wundt and Edward Titchener** (Wundt's student). Wundt believed that consciousness could be broken into thoughts, experiences, emotions and other basic elements. The process to examine and measure one's subjective experience objectively was known as **objective introspection.** Objectivity here refers to unbiased approach and this was the first attempt to bring objectivity and measurement in psychology. **Edward B. Titchener** (1867-1927) became interested in knowing the structure of the mind. With structuralism came an active interest in knowing the elements of consciousness. Structuralism was very strong in the beginning, but faded out in 1900s.

Box 1.3

WILHELM WUNDT (1832-1920): Father of Experimental Psychology

Wilhelm Maximilian Wundt was born on August 16, 1832, in Neckarau,Baden, Germany. He was the forth child of minister Maximilian Wundt and his wife, Marie Frederike. He began his formal education at a Catholic gymnasium which he disliked and failed. He was transferred to another gymnasium in Heidelberg from where he graduated in 1851. Wundt joined medicine and after a poor start, he excelled in his studies. Wundt received an assistantship with Hermann von Helmholtz. His fundamental work *Principles of Physiological Psychology* was published in 1873 and 1874. This work proposed the main tenets of his experimental psychology and inspired scientific psychology across the world.

Figure 1.1: Wilhelm M. Wundt

Image Source: http://www.famouspsychologists.org/

2) **Functionalism:** This view was strongly influenced by Darwin's theory of natural selection (functionalists believed that the theory could be applied to psychological characteristics) and the focus of study was functions of mind and behavior (like learning, memory, problem-solving and motivation). **John Dewey** (1859-1952) developed functionalism, focusing on what the mind and behavior do and how they enable a person to adapt to new and complex situations.**William James** (1842-1910), the main contributor, was concerned on how the mind allows people to function in the real world. This approach came to be known as functionalism. James established psychology laboratory at Harvard University.

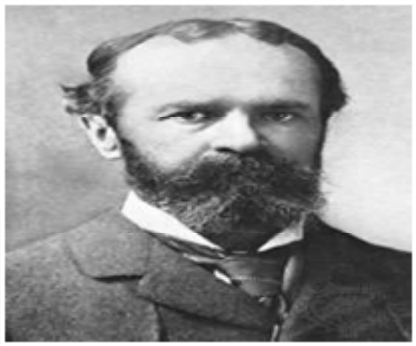

Figure 1.2: William James

Image Source: https://www.britannica.com/

3) **Gestalt Psychology:** Later psychologists conducted experiments to study sensations in order to know how the mind functions. In 1912, **Max Wertheimer** (1880-1943), **Kurt Koffka** (1886-1941) and **Wolfgang Kohler** (1887-1967) founded gestalt psychology in Germany. They emphasized upon the whole notion of sensory experience, connecting the sensations to relations and organization as a whole. They studied the mind by applying the *principles of organization* to human behavior.

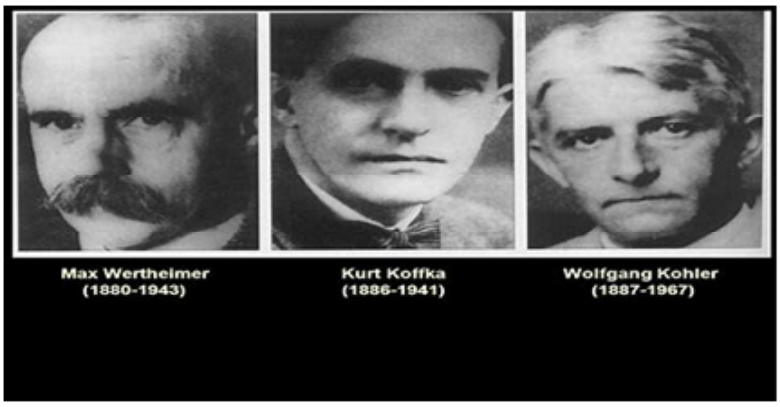

Figure 1.3: Max Wertheimer, Kurt Koffka, Wolfgang Kohler

Image Source: https://slideplayer.it/slide/576962/2/images/

4) **Behaviourism:** This school originated with **John B.Watson** (1879-1958) and **Burrhus Fredrick Skinner** (1904-1990), who disregarded mind as the matter of study and stressed that psychology should study only observable forms of behavior, ignoring the covert processes.They gave more importance to the study of behavior and what activities animals or humans engage in. Watson emphasized on conditioned responses, learned behavior and animal behavior. **Ivan Petrovich Pavlov** (1849-1936), a physiologist whose studies of digestion won him the Nobel Prize in 1904, concluded that stimuli other than food, may produce salivation and this led him to study conditioned reflex in detail.

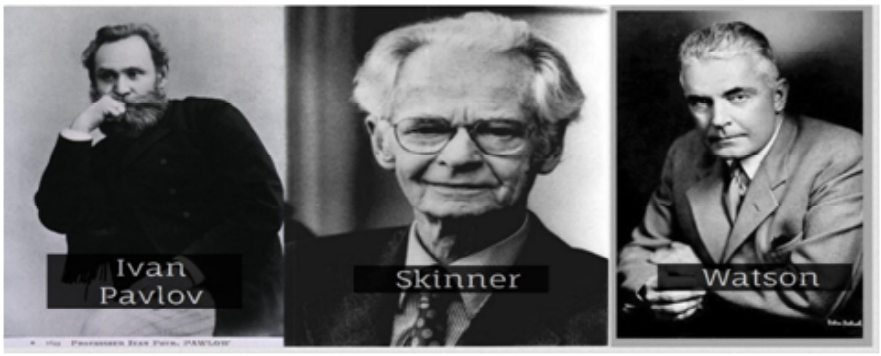

Figure 1.4: Ivan Pavlov, B.F.Skinner, J.B.Watson

Image Source: https://www.emaze.com/

Figure 1.5: Sigmund Freud

Image Source: https://www.alamy.com/stock-photo

5) **Psychoanalysis:** Psychoanalysis was founded by Austrian psychiatrist, **Sigmund Freud** (1856-1938). Freud proposed that *unconscious motivation* plays an important role in nervous disorders and stressed the importance of early childhood experiences in personality development. Freud believed that urges and drives are expressed in behavior and thought.The focus is on the role of unconscious thoughts, memories and feelings. These unconscious thoughts and memories were revealed through free-talk and dream interpretation, in a process called *psychoanalysis*. Freud influenced psychologists like **Carl Jung** (1875–1961), **Alfred Adler** (1870–1937), **Karen Horney** (1855–1952) and **Erik Erikson (1902-1994).** There approach was known as *psychodynamic* approach and were referred as Neo-Feudians.

6) **Humanistic Perspective:** Also known as 'third force' in psychology, focused on people's ability to direct their own lives. The key features are free-will, freedom to choose one's destiny, strive for self-actualization, and achievement of one's own potential. The main founders are **Abraham Maslow** (1908-1970) and **Carl Rogers** (1902-1987).

Figure 1.6: Carl Rogers and Abraham Maslow

Image Source: http://slideplayer.cz/slide

7) **Cognitive Perspective:** The gestalt approach and the development of computers stimulated interest in studying higher-order mental processes.This perspective gained prominence in 1960s and focused on memory, intelligence, language, problem-solving, and decision-making. Main contributors are German psychologist **Hermann Ebbinghaus** (1850–1909), who started the study on memory by investigating the formation of associations by learning serial lists of nonsense syllables, and the English psychologist, **Sir Frederic Bartlett** (1886–1969), who studied the cognitive and social processes of remembering.

Figure 1.7: Hermann Ebbinghaus

Image Source: https://quotesgram.com/hermann-ebbinghaus-quotes

8) **Sociocultural Perspective:** The main focus is on social and cultural factors that influence behavior. Research from this perspective is important because it can highlight the different influences of environment, social norms, class differences, ethnic identity, etc. Sociocultural psychologists concluded that norms of western cultures are primarily towards *individualism* and norms from east Asian cultures are primarily oriented towards *collectivism* or interdependence. Social psychologist **Leon Festinger** (1919-1989) proposed *cognitive dissonance* theory that states that a person is aware at some level if she or he acts inconsistent with her or his belief, attitude or opinion.

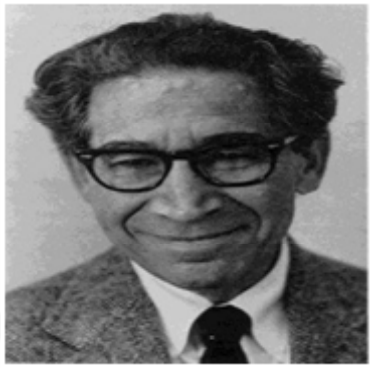

Figure 1.8: Leon Festinger

Image Source: https://hubpages.com/education/

9) **Biological Perspective:** It is concerned with the biological bases of behavior and mental processes. Role of nervous system, hormones, brain chemicals, and glandular system are the biological causes of behavior, and they are the focus of research.

10) **Evolutionary Perspective:** This perspective is inspired by Charles Darwin's theory of natural selection. *Evolution* was first proposed by Darwin which involves three basic components, namely, *variation, inheritance* and *selection.* The internal mechanisms are *adaptations* and are products of natural selection that has helped the humans (living species) to survive and reproduce world over. Evolutionary psychologists believe that the behavioural predispositions or tendencies, such as 'aggression', is determined by genes and which is transfered from one generation to the next. Research from evolutionary perspective examines behaviour (aggression, mating, etc.) in different species, which may be influenced by evolution. They also give importance to sociocultural factors that could have led to the actual behaviours. David Buss is one of the main founders of evolutionary psychology.

Figure 1.9: David M. Buss

Image Source: https://thebestschools.org/

Table 1.1: Important Schools of Psychology

Schools of Psychology	Main Idea	Main Proponents
Structuralism	Identify the basic elements or 'structures' of psychological experience with the help of 'introspection'	Wilhelm Wundt, Edward B. Titchener
Functionalism	The focus is on how the mind allows the people to function in the real world	William James
Psychoanalysis	Highlights on the role of unconscious thoughts, feelings, memories and early childhood experiences in determining behavior	Sigmund Freud
Gestalt	Focus is on perception and sensation, 'the whole is greater than sum of its parts'	Max Wertheimer, Kurt Koffka, Wolfgang Kohler
Behaviorism	Focus is on observable behavior only	Ivan Pavlov, John B. Watson, B. F. Skinner
Humanistic	Self-actualization and free-will are most important features	Abraham Maslow, Carl Rogers
Cognitive	Concerned with the study of mental processes, like, perception, thinking, memory, and decision-making	Hermann Ebbinghaus, Sir Frederic Bartlett, Jean Piaget
Socio-cultural	Based on how the social situations and the cultures in which people find themselves, influence thinking and behavior	Fritz Heider, Leon Festinger, Stanley Schachter
Biological	Behavior is the result of genetic influence, hormones, and neural mechanism	Charles Darwin, E.Wilson, J.M.Harlow
Evolutionary	Concerned with evolutionary origin of behaviour	David M.Buss, D. Singh

Check Your Progress 1

1. Define psychology.

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2. Why is psychology considered a science?

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3) Complete the following table:

Schools of Psychology	Main Idea	Main Proponents
Structuralism		
Functionalism		
Psychoanalysis		
Gestalt		
Behaviorism		
Humanistic		
Cognitive		
Socio-cultural		
Biological		
Evolutionary		

1.5 SUBFIELDS OF PSYCHOLOGY

There are different sub-fields of psychology. Psychology involves a wide range of studies of mind, behavior, perception, learning, to name a few. Before explaining the sub-fields, let us first differentiate between a psychologist, psychiatrist and a psychiatric social worker. A **psychologist** has a doctorate degree in psychology and not a medical degree. After academic training and specialization in a specific area, the psychologist works in a particular vocational setting or a career. On the other hand, a **psychiatrist** has a medical degree in psychiatry, and makes diagnosis and treats patients of psychological disorders by prescribing medicines. A closely related field is of **psychiatric social worker** who has earned a Master's degree in this area and is mainly concerned working on the environmental conditions that may have an impact on psychological disorders.

Psychologists examine different patterns of behaviors and study how external and internal factors influence the mind and behavior. There are varied interests of different psychologists. Some may have interest in social psychology, while others may be interested in cognitive psychology, while some may be interested in community and developmental psychology both.

There are many applications of psychology and many areas of work.

Figure 1.10 shows the type of settings where psychologists work.

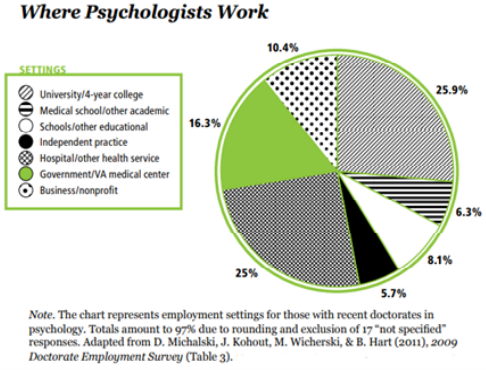

Figure 1.10: Where Psychologists Work?
Image Source: http://www.apa.org/

Some of the major subfields of psychology and the career choices in psychology are as follows:

Cognitive Psychology: It is the area where psychologists study how the human mind, thinks, remembers and learns. Psychological principles are applied to understand the decision-making process and how we perceive the world.

Clinical Psychology: The field is concerned with assessment, diagnosis, causes and treatment of mental disorders. Most of the clinical psychologists are engaged with state mental hospitals or community mental health centres, schools, private practice, research and teaching.

Counselling Psychology: Counseling psychologists deal with people having problems of milder emotional or personal intent.Generally, people who need help in making a career choice or deciding which educational program to opt for, seek help from a counseling psychologist. They may use a variety of assessments such as tests or interviews to assess interest, aptitude, intelligence or personality attributes.Some counselors may also help people having family problems or marital problems.

Environmental Psychology: The focus is on human-environment interrelationship. Psychological principles are applied to improve interaction among people and for sustainable living.

School Psychology: The major focus of this field is psychology of learning and effectiveness of school programs. School psychologists work with elementary, and secondary school children, teachers, parents and school administration. They provide counseling and guidance in schools and assess students' interests, aptitude, adjustment, learning ability, intelligence, and such related factors. Testing also helps to diagnose students who have behavioral difficulties. Counselling is given to those students who need special attention.

Educational Psychology: The focus of this area is on psychology of teaching. Educational psychologists are involved in more general kind of problems that are not of immediate concern. They guide the students to enhance their efficiency in learning in school by working on the school curriculum and motivational skills.

Experimental Psychology: The field is concerned with the study of different facets of behavior like, learning, memory, perception, etc. using controlled experiments in the laboratory or the field. They try to understand the basis of behavior and thought and try to develop certain modification techniques on the basis of their research findings. They try to investigate how mental processes or behaviours are experienced and how behavior can be directed.

Physiological Psychology: The field examines the relation between brain and behavior in humans and animals. Impact of nervous system and glandular system on behavior is the focus of physiological psychologist.They use invasive and non-invasive techniques to study the biological basis of behavior.

Organizational Psychology: Psychological principles are applied to work-settings to enhance the well-being and performance of employees. Organizational psychologist uses various psychological tests to select and place employees in the jobs they are suited for.Many organizations employ organizational psychologists to hire people, train them, manage their interpersonal skills and job satisfaction, employee-employer communication, etc.The research in this field pertains to finding solutions to the problems faced in the organizational sector with respect to the employees or the work output or any other emotional problem faced by the employees.

Social Psychology: Social psychology studies groups of people, their relationship to one another, their characteristics, attitudes, beliefs, their decision-making process and communication with other members of their group, group cohesion, etc.The emphasis is to understand the behavior of an individual in a group.

Developmental Psychology: Developmental psychology is concerned with behavior across the life span, that is, from beginning of childhood, through adolescence into adulthood and how the behavioural patterns change across different developmental stages. Developmental psychologists particularly try to examine any behavioral disorders that occur during childhood.They also try to understand the cognitive, perceptual, social, moral, and language development that takes place in children.

Community Psychology: It is a new area of psychology that deals with community problems, principles, social issues, and health issues. Psychologists help the people living in one community to deal with their problems, seek out their traditional forms of psychotherapy, stress, child-rearing practices, social systems etc.

Sports Psychology: It is also a new area that focuses on psychological aspects of sports behavior. Sports psychologist works with professional teams at school/ college level or national and international level to enhance performance in sports by working on exercise and team work.

Health Psychology: This is an emerging area that is concerned with the physiological processes, behavior, and social factors that influence health and illness. Health psychologists work in clinical settings, and are involved in research and teaching in higher educational institutes.

Forensic Psychology: It is a new field in psychology that applies psychological principles in the area of criminal justice system and legal investigations. Forensic psychologist works on the rights of victims, rights of accused, criminal profiling, policy-making, and other related areas.

Check Your Progress 2

1) Differentiate between a psychologist and a psychiatrist.

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2) Define the work of a sports psychologist and a forensic psychologist.

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1.6 RESEARCH IN PSYCHOLOGY

It must be clear by now that psychology is considered a science as it accomplishes the key assumptions of a scientific approach. By scientific, it is meant that there is less likelihood of subjective bias and errors in collecting and interpreting data. So, the key assumptions in a scientific investigation are like,

- Description: A psychologist is concerned with observing behaviour. The focus is on describing what is happening, where it is happening, to whom it happens, and what is the context in which an event happens.
- Explanation: The psychologist based on the observations tries to explain the phenomenon. Thus, the theory will emerge which will explain the facts.
- Prediction: It is concerned with changing or modifying behavior.
- Control: This step refers to modifying behavior from an undesirable to a desirable one.

It is not necessary that the psychological investigation may follow all the above assumptions. A psychologist may only describe and explain a phenomenon while as, a therapist (researcher) is involved in controlling that will help in behavior modification. Thus, the goals of research may differ keeping in perspective the objective of the study. So, to carry out a research in psychology, the basic steps to be followed are like this:

1) Problem: This is the first step to start a research. If you are curious about any interesting phenomenon and to which you want to find an explanation, you will form a question. For example, a researcher might be interested in studying whether exposure to more screen time (mobile, computer, television, tabs) makes children vulnerable to inattentiveness and decrease in school performance.

2) Hypothesis/es: Question is followed by a tentative explanation known as *hypothesis*. Hypothesis testing is fundamental to any scientific investigation and which leads to theory generation.

3) Testing the hypothesis: Hypothesis testing depends on the research design, the method in which the researcher collects and analyses and interpret data to get an explanation about the problem or question.

4) Interpretation and conclusion: After the results are obtained, it will be clear if the hypothesis is accepted or rejected.If it is a quantitative research design, the results obtained will be statistically analyzed. If the study is qualitative, then qualitative methods will be employed to analyse data. Statistical methods are used to find out association between variables or differences between groups.

5) Reporting the results: The results are to be reported so that it may be replicated, though replication is not easy. How the research was conducted, why it was conducted, and what were the findings has to be reported and shared with other researchers so that investigation continues and new knowledge is added to the research question.

Box 1.4 : Replication

A study maybe replicated that is, it is repeated to see if the same results are obtained in order to establish reliability of the results.

1.7 METHODS OF RESEARCH IN PSYCHOLOGY

There are various approaches to study psychology scientifically. A *research design* is a method used by the researcher to collect, analyze and interpret data. It may be qualitative, quantitive or mixed approach (that includes both qualitative and

quantitative). Primarily, three types of methods are used in research in psychology. They are descriptive method, experimental method, and correlational method.

1.7.1 Descriptive Method

There are three main types of descriptive research design. They are *case study, survey and systematic observation.*

1.7.1.1 Case Study

Case study is based on a small set of participants, this may include one participant or a small group.The basic premise is that each person is unique. It gives a detailed account of an individual's behavior and emotions. Interesting examples who have used case study are Freud, who used case study as a method to gather information from his patients that helped him to conclude psychoanalytic theory of personality. Jean Piaget also used case studies of his own children to come out with the most important theory on cognitive development. Rokeach (1964) 'The Three Christs of Ypsilanti: A Psychological Study', is an important case study of three patients with schizophrenia. The main disadvantage of case study is that the results cannot be easily generalized. The method is very subjective and hence, is prone to subjective bias.

1.7.1.2 Survey

In survey method, the researcher asks question about the problem being studied. This maybe conducted with the help of face-to-face interview, telephonic interview, online-interview or questionnaire. Many questions can be asked and a lot many participants can be included in survey method. Though, the researcher has to ensure that the participants are a **representative sample** (sample is randomly selected from a large population of participants) of the group selected. Also, survey method has a disadvantage where the participants might not give correct answers, that is there true opinion. This may also happen when the participant thinks that the answer is not socially desirable or correct.

1.7.1.3 Systematic Observation

One of the important methods to study behavior is observation. It collects data or gathers information in a systematic manner.The experimenter does not manipulate an independent variable in this method.The researcher simply make systematic observations of the events/behaviors that are occurring naturally in the environment. After making a number of observations, the researcher tries to understand the plausible reasons for the observed behaviour(s).The researcher tries to understand how people vary in their behaviors and then look for logical reasons to explain the observed differences.When a number of observations are made to deduce the logical cause of behavior, it is known as inductive reasoning. From this, various principles of behavior are developed.However, there are various reasons that may impede the observed behaviors and it is relatively difficult to make the deduced observations, unlike an experiment where information is gathered in a more controlled setting. Systematic observation is preferred along with other forms of data collection as a supplement to information also. When human behavior is observed in natural conditions or where the behavior occurs is known as **naturalistic observation.** Naturalistic observation is mostly employed to study animal behavior. This may be applied to human behavior also, for instance, if the researcher wants to conduct a study in a shopping centre.

1.7.2 Experimental Method

Experimental method involves a research problem that needs to be investigated. Based on the review of the literature and theoretical background, certain assumptions are made about the observable events. This assumption is known as a *hypothesis* which is a statement about the expected outcome of events.The person who does an experiment is known as an *experimenter* and the person or animal on which the experiment is done is known as the *participant*. The experimenter keeps some events or behaviors constant that are likely to influence the expected observation.There are some conditions known as *variables* that could be an object or event or condition which could have different values.It can vary quantitatively and is easily measured. Variables are of different kinds. There is an *independent variable* that is manipulated by the experimenter and the effect of the independent variable is seen on the *dependent variable*. For example, if the problem is to study the effect of temperature on mood. Then the independent variable is the temperature and the dependent variable is the mood. A dependent variable can be the response of the person to a particular stimulus. A *stimulus* is an object or event that evokes a *response*.

In order to be sure that the independent variable is causing an influence on the dependent variable certain things to have to be controlled.Only the specific independent variable is changed and rest all the other factors that might influence the response or the dependent variable are controlled.There are extraneous factors that could influence the performance or the dependent variable and hence they need to be controlled.Thus, there are some conditions which might influence the results and they must be controlled.Experimental design is used to control these extraneous sources of variation.One way is to have a *control-group design*.In this, the control group is not given the independent variable while the experimental group is subjected to the independent variable. Both the control group and the experimental groups are matched as far as possible so that if there is any difference in the responses of both the groups, it would be attributable to the independent variable that was introduced. The control group works as the baseline against which the experimental group is checked. In the *within-group design*, a baseline behavior is recorded before introducing the independent variable, then a recording is done after introducing the independent variable. A pre and post comparison is done is to see if the there is any difference in the responses. This design has an advantage as each subject serves as his or her own control, so the baseline behavior that is established before giving the independent variable is compared with the behavior that results after the independent variable is given.Independent variable does not have a long-lasting effect, it dissipates after some time.Sometimes the researcher may be interested in doing A-B-A design, where A is a condition without an independent variable and B is a condition with the independent variable. This is done just to make sure that the observed effect was indeed due to the independent variable that was introduced.

An important quality of a good experiment is that is must be replicable.That is to say that keeping the conditions same, variables same another experimenter should be able to replicate it or repeat it a number of times to confirm or reconfirm the obtained findings. There are some limitations too.Sometimes the experiments may be dangerous for the participants hence certain ethical issues have to be kept in mind even for the animals who are used in experiments (see box 1.4). We must be careful to generalize the findings from an experiment as an experiment is an artificial situation created to conduct an experiment and hence, these findings may not apply to real life or natural situations.Sometimes the experiment may interfere with the very event they are trying to measure hence, the experimenter has to be very careful while designing an experiment.

1.7.3 Correlational Method

When information is collected from two variables on one sample or from two samples on one variable of interest, then correlation method is used. This method tries to understand the correlation or the relationship that exists between two sets of scores. For example, if we want to study if tall people are more intelligent than short people? Or if we want to study are intelligent people also happier? If we are interested in finding out how an increase in one score would lead to a corresponding increase or decrease in another score. Or if there is no correlation between the two set of scores.The statistical procedure used helps us to compare how a particular score relates to its corresponding score in the given set of scores.The correlation value is measured by the correlation coefficient, r. The value of the correlation coefficient can vary from +1 to -1. The value of +1 indicates a perfect correlation.This means that the standing of one score is exactly the same as the standing of its corresponding pair score in the given set of scores.This is a perfect correlation or the highest correlation that can happen.However, the correlation of -1 is also a negative correlation but a perfect one again, but it reveals that an increase in the value of one score will have a corresponding decrease in the value of another corresponding score.That is high scores in one set of scores is related to low scores in the other set of scores.

When there is no correlation between the set of scores, it is known as zero correlation, r=.00. This means that the value of one score in a set of scores is not related to the value of another score in the other set of scores.Thus, one cannot make any predictions here. For example, if the correlation between two sets of scores is zero, then we cannot predict the occurrence of the behavior on the basis the scores of the second set. If the correlation between intelligence and happiness is zero, it implies that intelligent people may or may not be happy. If the correlation between them is +1, it means that with an increase in intelligence scores there will be a corresponding increase in happiness scores too.If the correlation between them is -1, it indicates that with an increase in intelligence there is a corresponding decrease in happiness.

Correlations can be presented on a *scattergram*. The values of one set of scores are on the X-axis and the other set of scores is presented on the Y-axis. There are different scores spread in the scattergram as points referring to the position or value of the score on both measures.Hence, with the scattergram, it is easy to know the direction or the degree of correlation between two variables. Figure 1.11 illustrates the degree and direction of the relation between two variables.

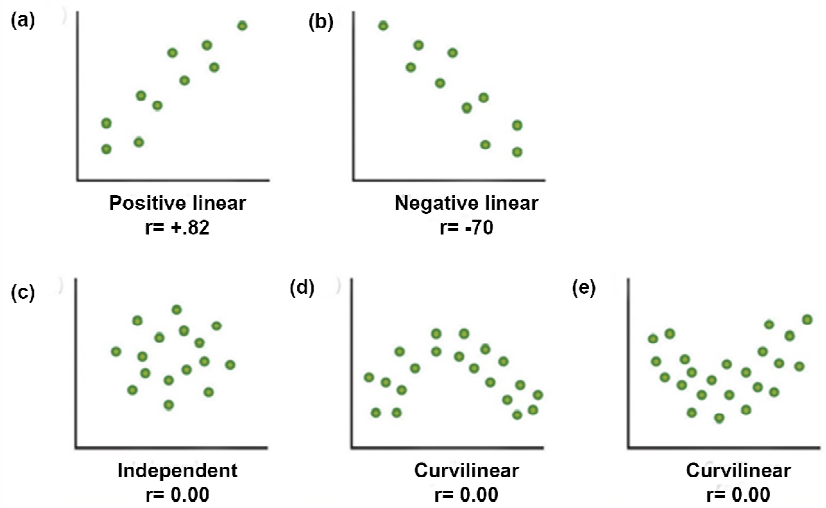

Figure 1.11: Degree and direction of the relation between two variables (Pearson Correlation Coefficient)

Box 1.5 : Research ethics in psychology with human participants

Research is an integral part of Psychology. Research is conducted by trained psychologists who have to follow strict guidelines as laid down by the government agencies or follow guidelines proposed by American Psychological Association (APA). Researcher has to strictly adhere to the norms as the research is being conducted on human participants or animals. Few of the concerns while conducting research on human participants are:

No harm to the participants

Free choice to leave the experiment anytime

Protecting the privacy of participants

Use of deception (participant should be fully aware of the nature of the research)

Informed consent (participant should know her/his rights during research phase)

Debriefing (the participant is debriefed after the research and explained the purpose and procedures involved in the research)

Every research proposal has to placed before *Institutional Review Board* (a committee that is formed in every Institute/ University where the research is undertaken) which reviews the cost-benefit analysis of the research proposal.

Check Your Progress 3

1) List the key assumptions in a scientific research?

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2) Define 'systematic observation' as a method of research in psychology.

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3) What is the range of correlation?

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1.8 PSYCHOLOGY IN INDIA

Psychology in India was greatly influenced by the western theories and concepts. According to Dalal (2010), the discipline did not connect to the inherent knowledge present in Indian scriptures and texts which have a potential to develop psychological theories of self and human development. The study of Psychology in India was first initiated in the University of Calcutta, in 1916, though the syllabus was prepared by Sir Brojendra Nath Seal (Vice Chancellor of Calcutta University), way back in 1905. Dr. N. N. Sengupta was the first faculty who was also a Harvard-trained scholar. Western model was adopted in research and teaching. The first generation of psychologists after independence were people from the background of Philosophy. In the early 20th century, Girindra Shekhar Bose, a psychoanalyst became the first president of the Indian Psychoanalytic Society (1922). He was the first person to blend in Hindu thought with Freudian concepts, and this was evident in his doctoral thesis in 1921 on "Concept of Repression". In 1924, Psychology courses started in Mysore University. The Indian Psychological Association was established the same year. And after two years the first psychology journal " Indian Journal of Psychology" was founded which was much more advanced than its contemporaries at that time. In 1932, Psychology courses started in Aligarh Muslim University. Psychology courses started in Madras University in 1943. In 1957, psychology was introduced at the Masters level in University of Delhi with philosophy and psychology. However, in 1964, the psychology department established itself as an independent department under the guidance of Late Prof. Ganguli. In 1924, Mr. M.V.Gopalswamy was heading the department in Mysore and he was trained in psychological assessments.The National Institute of Mental Health and Neurosciences (NIMHANS) was started in Bangalore in 1974. In 1961, Prof. Durganand Sinha started psychology department in Allahabad University. At present, Psychology in India focuses on the study of human behavior using indigenous techniques and methods along with the western models. There are various Indian journals of significance such as *Psychology and Developing Societies*, *Journal of the Indian Academy of Applied Psychology, Psychological Studies*, *Indian Journal of Clinical Psychology*, and many others. There are many associations which have emerged to strengthen the bond of communication and learning with psychologists not only from India but also all over the world as the Indian Psychologist's Group on the web. Indian Association of Psychology, Indian Association of Clinical Psychology, National Academy of Psychology, Indian Academy of Applied Psychology are some of the prominent groups of Indian Psychologists. Researches and writings of some of the Indian psychologists such as H.S.Asthana, Anand Paranjpe, J.B.P.Sinha, D.Sinha, Amit Ranjan Basu, Ashis Nandy, Sudhir Kakar, Mansi Kumar, Ajit Dalal, K. Ramakrishna Rao, Girishwar Misra , Uday Pareek, Janak Pandey, T.S.Saraswati, are some of the most influential in the field.

1.9 SUMMARY

Now that we have come to the end of this unit, let us recapitulate all the major points that we have covered.

- Psychology is the scientific study of human and animal behavior and it includes the application of this science to different problems of the human beings.
- The earlier psychologists were philosophers but later on, the discipline adopted more empirical, objective and scientific approach in its study.

- Psychology is a science because it systematically tries to gather data by carefully observing and recording events or behaviors of humans and animals under controlled experimental conditions.
- Psychology views human behavior from various perspectives (traditional to modern) like nature of consciousness (structuralists), functions of mind (functionalists), importance of organization in mental experience (gestalt), observable or potentially observable behavior (behaviourism), unconscious motivation (psychoanalysis), behavior as a result of nervous and glandular changes (biological), learning, memory and comprehension of social environment (cognitive), personal competence, self-esteem and achievement (humanistic), evolutionary origin of behavior (evolutionary) and behavior influenced by cultural and social norms (sociocultural).
- The first lab was established in 1879 in Leipzig, Germany by Wilhelm Wundt (1832-1920). In 1883 in the USA, the first psychology lab was set up in John Hopkins University by G. Stanley Hall.
- Psychology is applied in various fields such as counseling, clinical, organization, forensic, sports, health, school, etc.
- To study psychology scientifically, three main methods are used. They are experimental method, systematic observation and correlation method.
- Experimental method involves a research problem that needs to be investigated. Based on the review of the literature and theoretical background, certain assumptions are made about the observable events. This assumption is known as hypothesis which is a statement about the expected outcome of events.
- In systematic observation method the researcher does not manipulate an independent variable. He or she simply makes systematic observations of the events/behaviors that are occurring naturally in the environment. After making a number of observations, the researcher tries to understand the plausible reasons for the observed behaviors.
- When information is collected from two variables on one sample or from two samples on one variable of interest, then correlation method is used. This method tries to understand the correlation or the relationship that exists between two sets of scores.
- Development of psychology in the west greatly influenced the emergence of psychology as a discipline in India. The study of Psychology in India was first initiated in the University of Calcutta, in 1916. The first generation of psychologists in India after independence were people from the background of Philosophy. Many Indian psychologists with their rigorous research and influential writings have immensely contributed to the development of psychology.

1.10 REVIEW QUESTIONS

1) A scientific explanation that remains tentative until it has been adequately tested is called a/an

   a) theory

   b) law

c) hypothesis

d) experiment

2) To estimate the degree of the relationship between birth order and achievement motivation, a researcher would do a/an _____ study

a) naturalistic

b) inventory

c) correlational

d) experimental

3) One of the reasons to study psychology is

a) to understand the human mind and how it works

b) to learn how to manipulate others

c) to completely understand and predict human behaviour

d) to have the answers to all of life's questions

4) The first textbook on psychology was

a) The Principles of Psychology

b) The Laws of Psychology

c) The Theories of Psychology

d) The Nature of Psychology

5) The study of Psychology in India was first started in

a) University of Allahabad

b) University of Calcutta

c) University of Delhi

d) University of Mysore

6) Define psychology and discuss its major fields.

7) What makes psychology scientific? Explain.

8) Who were the major figures in the historical development of psychology?

9) Describe the experimental method of study.

10) Trace the development of psychology as a discipline in India.

1.11 KEY WORDS

Psychology : It is the science of human and animal behavior and it includes the application of this science to different problems of the human beings.

Empirical observation : Observation based on experiment, rather than on argument, opinion, or belief.

Science	:	It is a systematized body of knowledge gathered through carefully observing and measuring events.
Clinical Psychology	:	It is that branch of psychology which deals with the assessment and treatment of mental illness and abnormal behaviour.
Counselling Psychology	:	It deals with people having problems of milder emotional or personal intent. People who need help in making a career choice or deciding which educational program to opt for seek help from a counseling psychologist.
Experimental method	:	It involves manipulating one variable to determine if changes in one variable cause changes in another variable.
Observation method	:	Observation method involves watching a participant in his or her natural setting and recording relevant behavior for later analysis.
Correlation method	:	This method tries to understand the association or the relationship that exists between two variables.

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David M. Buss. Retrieved January 5, 2019, from https://thebestschools.org/features/most-influential-psychologists-world

Where Psychologists Work?Retrieved November 03, 2018 from http://www.apa.org/careers/resources/guides/careers.pdf

1.14 ONLINE RESOURCES

- For more on Psychology as a Science, visit
  - https://cpa.ca/cpasite/UserFiles/Documents/publications/Short.pdf
  - https://www.simplypsychology.org/science-psychology.html
  - https://pdfs.semanticscholar.org/6ace/76be6864ce2024c154d5db2dfe190215bbaf.pdf
  - https://cfl.in/wp-content/uploads/2015/02/Is-Psychology-a-Science.pdf
- For more information on Subfields of Psychology, visit
  - https://www.apa.org/careers/resources/guides/careers.pdf
  - https://rabbiablog.com/fields-branches-psychology-definition.pdf
  - http://www.eolss.net/sample-chapters/c04/e6-27-01-00.pdf
  - https://bsosundergrad.umd.edu/sites/bsosundergrad.umd.edu/files/psychology%20career%20subfields%20chart.pdf
- For an overview of Research Methods of Psychology, visit

- http://lib.oup.com.au/secondary/science/Psychology/3and4/Oxford-Psychology-3-and-4-2e-Ch1-Research-methods-in-psychology.pdf
- http://psycho.unideb.hu/munkatarsak/balazs_katalin/modszertan1/Modszertan_Goodwin_kivonat.pdf
- http://cogprints.org/2643/1/EOLSSrm.pdf

- For more on Evolutionary perspective, visit
  - https://plato.stanford.edu/entries/evolutionary-psychology
- For an interesting article on Development of Psychology in India, refer to
  - Origins and Development of Psychology in India: Outgrowing the Alien FrameworkDurganand Sinha. *International Journal of Psychology*. First published: December 1994. https://doi.org/10.1080/00207599408246559
  - A journey back to the roots: Psychology in India. https://www.ipi.org.in/homepages/homepage-ajit.php

Answers of Multiple Choice Questions

1) (c), 2) (c), 3) (a), 4) (a), 5) (b)

BLOCK 2

PERCEPTION, LEARNING AND MEMORY

ignou
THE PEOPLE'S
UNIVERSITY

UNIT 2 SENSATION AND PERCEPTION*

Structure

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2.0 LEARNING OBJECTIVES

After reading this unit, you will be able to:

- differentiate between sensation and perception;
- explain the nature of perception and its scope;
- explain the process of perception;
- identify the factors affecting perception;
- describe the laws of perceptual organization;
- summarize the most common types of perceptual constancies; and
- explain the basis of perceptual illusion.

2.1 INTRODUCTION

In Block 1, you learned that psychology is the scientific study of behavior and mental processes. Now in this unit, you will take a closer look of a very important mental process, that is sensation and perception. Understanding the process of sensation and perception is very important and psychologists are working closely with experts in applying the principles to diverse areas like defence, robotics, health, and sports. So, to understand the process, consider the following example:

You walk in a flower garden and see a beautiful rose, the word comes out from your mouth 'how beautiful', or you walk by the side of a river and see a crocodile, recognise it and escape. In our daily life we distinguish between two objects, although the world has dazzling array of objects like humans, animals, houses, plants, etc. But how do we really do it? How do we know the world around us? Have you ever thought on this issue? If not, it does not matter!

2.2 SENSATION

The Scottish philosopher Thomas Reid (1710-1796) first distinguished between sensation and perception. It was explained that sensations are the activities of sense organs as they are experienced in the consciousness. While as, perception is dependent on sensation and, different from sensation in that the perceiver is aware of objects or events in his or her environment. Thus, sensation is the awareness due to stimulation of a sense organ and perception is the organization and interpretation of sensations. There are six senses, seeing (eyes), hearing(ears), smelling(nose), touching(skin), taste (tongue), and sense the orientation of body's positions (proprioception and

kinesthesia). Our sensory receptors provide us with a variety of visual, tactile, auditory and olfactory information. Every sense accomplishes the process of *transduction*, that is the stimuli is detected by the receptor cells, which is then converted to electrical impulses and then carried to the brain.

Thus, the processes through which we come to experience the stimuli present in the environment are known as sensation and perception. Human senses translate physical energy into electrical signals by specialised receptor cells and transmit to our brain via specialised sensory nerves through which information about our environment is received. The study of sensation is related to the initial contact between organism and the physical environment focusing on different forms of sensory stimulation and the input registration by the sense organs (e.g. the eyes, ears, nose, tongue and skin). Perception is the process through which we interpret and organise the received information so as to produce our conscious experience of objects and their relationship. In this process, physical energy, such as light, sound waves, heat emanating from objects, is transformed by the concerned sense organs into a code and transferred to and interpreted by the brain. The line between the two terms sensation and perception, therefore, is somewhat arbitrary. Sensation typically refers to the direct reception and transmission of messages, whereas perception refers to the active process of integrating and organising these sensations.

The relationship between various forms of sensory stimulation (electro-magnetic, pressure, sound waves) and their registration by sense organs (eyes, tongue, skin, ears) is the process of sensation. This definition of sensation has the following components:

i) involvement of sense organs of the organism.

ii) presence of stimulus of stimuli in the physical environment

iii) constructing knowledge out of raw material, and

iv) initial contact, i.e. contact without meaning

Take an example: you encounter the pleasant fragrance of a rose. You get the fragrance through the sense organ 'nose'. Rose is the stimulus present in the physical environment. You feel something and it is constructing knowledge out of raw stimulus material. You just have the initial contact without clear cut knowledge of source, i.e. rose. Feeling up to this stage is sensation. Imagine some other example of similar nature and try to understand the meaning of sensation. Sensation is the starting point of knowledge of presence of any object around us.

2.2.1 Human Senses and Physical Energy

The beautiful sight of sun-rise, the intense "crack" of start of an old motor-cycle, the smooth touch of a skin of body, the summer heat, the intense cold, the foul odor, the sweet taste, all these are experienced by us. But how? These are all through different sense organs. Our sense organs-eyes, ears, skin, nose and tongue – provide sensations of vision, hearing, skin senses, smell and taste. Physical energy emanates from objects such as light, sound waves, heat and touch. These physical energies provide different types of sensations when presented as stimuli. You have known here two things, that is (i) our senses include vision, hearing, skin senses, smell and taste, (ii) physical energies emanates from objects such as light, sound waves, heat and touch. In the absence of physical energies as stimuli, sensation normally does not take place.

2.2.2 Process of Sensation

The process of sensation is very easy to understand. Physical energy, such as light,

sound waves, heat, emanating from objects becomes stimuli and is received by concerned sense organs like eyes, ears, and elsewhere through specialised receptor cells. The energy is next converted into electrical impulses and this process is known as transduction. **The translation of a physical energy into electrical impulses by specialised receptor cells is known as transduction**. The electrical impulses then travel from the sense organs along nerve fibers to the central nervous system and finally to appropriate area of the cerebral cortex. The process of sensation includes the direct reception and transmission of messages to cerebral cortex.

2.3 OUR SENSES

2.3.1 Vision

We see through our eyes and it acts like a colour television or a camera. The physical stimulus, i.e. light admits into it through a small hole and passes through lens that focuses on a photosensitive surface. The vision is managed through the cornea, pupil, iris and retina in the eyes and receptor cells transmit finally the information to the brain via optic nerve (see figure 2.1). Sensation of colour takes place by nerve cells called *cones.* Black and white sensation takes place by optic nerves called *rods.* Rods and cones are distributed on retina, the number being more than 100 million and 6 million respectively. These rods and cones help in *light or dark adaptation.* You may have the experience of going to theater when movie has started. The theater is dark and you stumble around not making out location of seat or people. After a few minutes you are able to locate seat and people around. Adaptation from bright to dim light is managed by rods and cones present in eyes. Chemicals in rods and cones are build-up faster in dim light with greater concentration than in by bright light stimulation, hence, adaptation to darkness becomes easy. The cones adapt quickly in the dark as compared to rods. But when adapted fully, the rods are much more sensitive to light than cones. Cones are located in the centre of the eye and rods on the edge of the retina. In pitch darkness, if you want to see a dim light look away from the object and not on it, you will see dim light more clearly. When you see away from the object in darkness, rods situated on the edge of retina become more active, providing better visibility. Try this process in a cinema hall. When movie is in progress and you want to move to the gate with dim light on the passage, you will have a better visibility of the way if you do not look at dim light point but away of it. It is said that a candle flame can be seen at a distance of 30 miles on the dark clear night as rods of retina become more active due to distinct image.

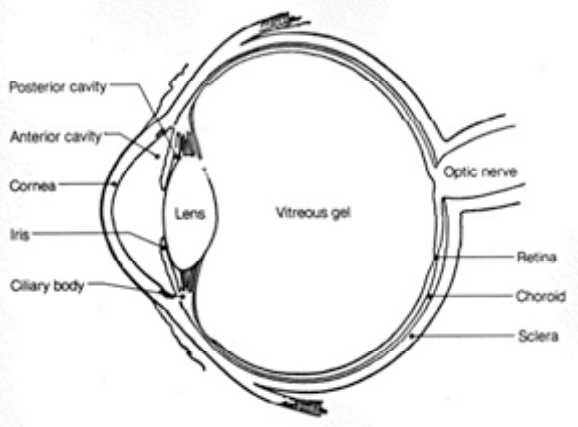

Fig.2.1: Diagram of the eye

2.3.1.1 Visual Acuity

You see many people using spectacle for reading or for seeing far objects or both. They

are not able to discriminate the details in the field of vision. This is greatly affected by the shape of a person's eyeball. When eyeball of a person is too big, the lens of eye focuses the image in front of the retina and not directly on it. In this case, vision to near object is clear, but far objects, appears blurred. This phenomenon is called *nearsightedness*. When eye ball is too short, the lens focuses the image behind the retina and the result is that far objects are in sharp focus but close objects become indistinct. This condition is known as *farsightedness*. Nearsightedness or farsightedness are the examples of non-discriminating objects in the field of vision properly. This ability to discriminate properly the details in the field of vision is known as *visual acuity*. There appears to be a relationship between advancement in age and visual acuity. Normally, as age advances visual activity becomes poorer in most cases.

2.3.1.2 Blind Spot

At one spot of the retina where the nerves of the eye converge to form the optic nerve is called *blind spot*. Blind spot has no visual acuity. These optic nerves connect the eyes to the brain from the back wall of the eyeball. People compensate the effects of blind spot by moving their head or making use of the other eye unknowingly. You must have now understood, how sensation of vision takes place with visual acuity in our daily life.

2.3.2 Hearing

Ears are through which sensation of hearing takes place. You have two ears on two sides which detect sound from the external world. Sound source produces changes in air pressure by vibrations or movements. It is noticed and registered through the ears. There are three main characteristics of sound – pitch, loudness and timbre. Pitch, the high or low quality of a sound, is determined by the frequency of vibration of waves. Faster the vibration, higher the pitch. Loudness is the amplitude of sound waves, the expansion and contraction. When you turn up the volume of television, you increase the amplitude of vibrations, hence, sound becomes louder. Timbre is the quality of sound that comes from a particular sound source. For instance, a note played on shehnai, will not sound the same as played on piano. This difference of richness is known as timbre. This way, pitch, loudness are the characteristics of hearing and frequency, amplitude are the characteristic of sound waves. There are three parts in an ear – the outer, the middle and the inner ones, which help in auditory functioining (see figure 2.2)

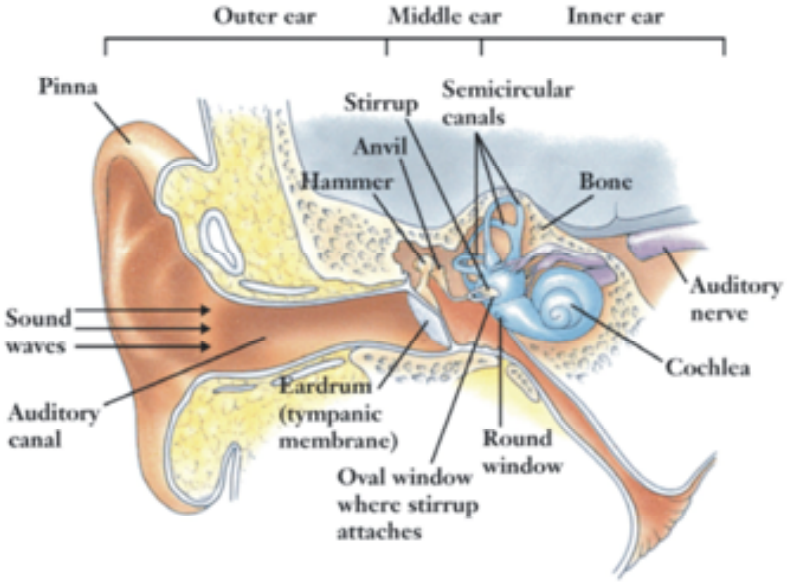

Fig. 2.2: Structure of Ear

2.3.3 Smell

The five senses vision, hearing, smell, taste and skin senses tell us about the objects and events close to our body. Vision, hearing and smell are receptive systems that enlarge our world by responding to a stimuli at a distance. Of these, smell in many ways is most primitive. The sense of smell, you get, from stimulation of receptor cells present in the nose. Smell provides information about chemicals suspended in air which excite receptors located at the top of our nasal cavity. Humans have only about 50 million olfactory receptors whereas, dogs possess more than 200 million such receptors. Dogs are more sensitive to smell therefore, they are put in dogsquad to detect crime and criminals in police department. Further, sensitivity of our olfactory receptors is limited in terms of stimuli range. Carlson (1998) stated that human olfactory receptors can detect only substances with molecular weights – the sum of the atomic weight of all atoms in an odorous molecule is between 15 and 300. This is the reason that you can smell alcohol contained in a mixed drink, with a molecular weight of 46, but cannot smell one table spoon sugar, with a molecular weight of 342. The sensation of smell in humans, in many ways, is the most primitive as compared to other senses. But in other species, olfaction is more effective. Certain animals secrete special chemical substances called *pheromones* which trigger particular reactions in other members of their own kind. In some cases, olfaction works as primitive form of communications. Individual differences are available in humans in smell sensation due to different reactions of olfactory receptors in them and the placement of stimuli.

2.3.4 Taste

Sensation of taste is related to smell as well. Tastes primarily depend upon the taste buds scattered across the upper surface and side of tongue. Each taste bud contains several receptor cells. Humans possess about 10,000 taste buds. In contrast, chickens have only 24 and the maximum number of taste buds is in catfish, the number being 175,000, distributed all over the body. You may be thinking, based on your experience, that you can distinguish a large number of flavours in food. It is not true. You have only four basic tastes – sweet, salty, sour and bitter. But why do you have such an opinion that you can distinguish many more tastes than these four? The reason is that while eating you are not aware of only taste of the food but of its smell, its texture, its temperature, the pressure it exerts on your tongue and mouth, and many more sensations. But the basic sensation of taste depends on taste buds. Normally, sensitivity to salt is highest on the tip and sides of the tongue. Sour is detected on the sides of the tongue and bitter on the back of the tongue. This view is based on widely held hypothesis that each of these primary taste qualities is associated with different kinds of taste receptors. Further, question about the stimuli that produce these four basic taste qualities, the answer is not definite. Sweet is produced by various sugars, but also by saccharin, a chemical compound that is structurally very different from sugar. Just what these substances have in common which activate the same taste receptors is still not known. The number of taste buds on the tongue decreases with age. As a result, older people are comparatively less sensitive to taste than children are.

Fig. 2.3: Tongue Diagram

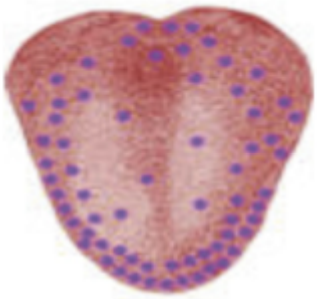

Fig. 2.4: Bitter Taste Buds

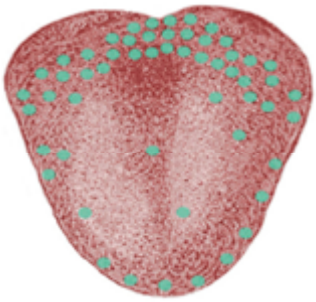

Fig. 2.5: Salty Taste Buds

Fig. 2.6: Sour Taste Buds

2.3.5 Skin Senses

Consider the following example : Keep three buckets of water – one cold, another warm and third lukewarm. Now put one hand in cold water bucket and another hand in warm water bucket. You will feel that warmth or cold comes only on the portion where the hands meet both water and air. Take out your both hands and put in the third bucket filled with lukewarm water. You will feel cold in the hand that was in warm water and warm to the hand that was in cold water. The sensation in hand depends on the temperature to which the skin was previously adapted. Stimulation of the skin informs the organism of what is directly adjacent to its own body. Skin senses are, in fact, a combination of at least four different sensations: pressure, warmth, cold and pain. These sensory qualities are so very different that lead to the belief that they are produced by various underlying receptor systems. Skin sensitivity is acute in those parts of the body that are most relevant to exploring the world that surrounds us directly: the hands, the fingers, the lips, the tongue. Different spots on the skin are not uniformly sensitive to the stimuli which produce different sensations. Now have another experience of skin sensation on yourself. Get yourself blind folded. Now with the tip of a ball pen, probe an area of your skin lightly, you will feel pressure at certain points where the pen contacts your skin, but not at every point. You do the same process one by one with a cold wire, warm wire and a pin. With cold wire you will feel cold at various specific points, with warm wire, you will feel warmth at various points and the point of pin will produce spots of pain. Such a sensation takes place as different points on the skin are serviced by receptors that are sensitive to different kinds of stimuli. The experience you have when you are touched lightly with a pointed object is called pressure or touch. Some parts of the body are more sensitive to pressure or touch. The lips, the fingers, the hands and the tip of the tongue are most sensitive areas. The arms, legs, and body trunk are less sensitive. This way, different account of touch or pressure is required to produce such an experience which varies for different parts of the body. Less is known about the underlying receptor systems for temperature and pain. Skin also contains receptors for heat and cold. These temperature receptors are more concentrated on the trunk of the body with hands and feet with standing greater temperature extremes. Cold receptors

are about six times more than the heat receptors. Sensation of pain has been the subject of much controversy. Some investigators believe that these are specialised pain receptors which are activated by tissue injury and produce an unpleasant sensation. Others believe that pain is the outcome of the over estimation of any skin receptor. Pain seems to be received by a variety of nerve endings not only in skin but in other sense organs. Extreme stimulation of any sense organ may cause pain like very bright light, loud noise, high or low temperature.

2.3.6 Kinesthetic Sense

The kinesthetic senses provide information about positions and movements of your muscles and joints. Close your eyes and touch your lips with finger. You know where both parts of the body are. The sense that gives us information about the location of our body parts with respect to one another and allows us to perform movement is known as kinesthesia. Kinesthetic receptors are available in muscles which send information to the brain about the load on the muscle and degree of contraction. Other receptors are in joints. There kinesthetic receptors provide information about body movement. Kinesthetic senses moreover provide sense of balance or equilibrium of the body. When this sensitivity is destroyed, one may not be in a position to maintain balance in the body parts, with sense you make distinction between objects of different weights by lifting. These senses keep track of body movement and body position in relation to gravity.

Check Your Progress 1

1) What is visual acuity? What are the factors related to acuity and how is it measured?

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2) Define the blind spot. Give an example.

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3) Describe the process of sensation of taste. What is the importance of taste buds?

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2.4 PERCEPTION: NATURE AND SCOPE

In the previous section, you learned about sensation. This section will explain the process of perception. The process of perception can be understood with an interesting example of South African English movie, *Gods Must be Crazy* (1980). The movie begins with an empty bottle of soft drink being dropped from the sky/heaven (but it is an airplane) and lands near a bushmen (Kalahari Bushmen Tribe) who was out for hunting.

The people in this part of the world, live a simple life and are not aware of technology. Thus, the bottle, a new object to the people, brings conflict to the once peaceful community. The following lines are narrator's description of the scene when the Bushmen are looking at the new object:

Narrator: "One day, something fell from the sky. Xi had never seen anything like this in his life. It looked like water, but it was harder than anything else in the world. He wondered why the Gods had sent this thing down to the earth. It was the strangest and most beautiful thing they had ever seen, and they wondered why the Gods had sent it."

What do you think, why these Bushmen were not able to recognize the bottle as we do? Is this because of their limited experience? If so, then does it mean our understanding of the world depends on our experiences? The answer is yes and our experience directs the process of perception. But what is perception? What factors affect it? We will seek answers to these questions. Further, we will also see various principles of perceptual organisation, types of perception and errors in perception.

Perception enables us to look, feel and experience the world, as it is. It is the way we interpret our experience. Since, we cannot attend to all of the incoming information, we focus on one and selectively attend to it. Attention helps to filter all the unnecessary sensory information or block it out (Broadbent, 1958).The focus of attention depends upon internal and external factors. Internal factors are like interest, motivation, needs or preparatory factors. External factors are intensity, size, repetition, contrast, novelty, and movement. So, for instance, any stimulus that is novel will catch one's attention more easily than an object that merges in the background.The louder the sound, the more likely is the person to attend to it. If there are two lights, the brighter light will attract more attention. The more often a stimulus is repeated, the more easily it is perceived.

Box 2.1

Perception includes all processes, that helps us in interpreting the sensory information and understanding the external world meaningfully.

Broadly speaking, the process of perception involves three steps when it encounters stimuli viz. (i) selection, (ii) organization and, (iii) interpretation. These stages of the process of perception have been discussed in detail in the following section.

2.5 STAGES OF PERCEPTION

This section will explain in details the stages involved in perception as well as the factors affecting these stages.

Stage I: Selection

The first stage of perception is "selection". Since our brain has limited capacity,

therefore, it cannot attend to all stimuli. We unconsciously or consciously select some stimuli and ignore others. The selected stimulus becomes the "attended stimulus". Now, look at the following two figures (see Figure 2.7 and 2.8). What do you see?

Figure 2.7: Rabbit or Duck

Figure 2.8: Vase or Human Face

Your interpretation of these two figures depends on your organisation of the information, and organisation of the information, in turn, depends on your attention. Take for example, the second figure. Some people give more attention to the white portion and thus see two human faces, while some focus their attention on black part and perceive it as a vase. These differences in answer suggest that individual differences also occur in the process of perception.

Stage II: Organization

In this stage, stimuli are arranged mentally in a meaningful pattern. This process occurs unconsciously. Many principles have been proposed to explain the process of organisation. Section 2.7 discusses the Gestalt principles of organisation. It will help you to understand how humans naturally organize stimuli to make a meaningful pattern and thus interpret the stimuli.

Stage III: Interpretation

In this last stage, meaning is assigned to the organized stimuli. Interpretation of the stimuli is based on one's experiences, expectations, needs, beliefs and other factors. Thus, this stage is subjective in nature and the same stimuli can be interpreted differently by different individuals.

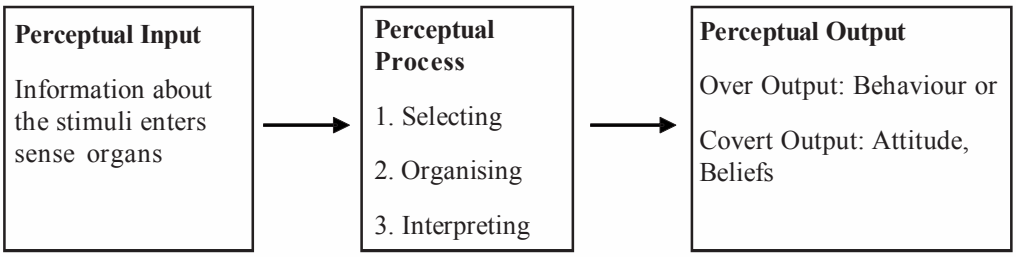

Figure 2.9: Process of Perception

2.6 THEORETICAL APPROACHES TO PERCEPTION

Two separate theoretical approaches have been proposed by psychologists to explain the process of perception in pattern recognition. One is known as "**top-down processing approach**" and, the other is "**bottom-up processing approach**". As

the name suggests, both the approaches are opposite in their perspective with regard to pattern recognition of visual stimuli.

Table 2.1: Theoretical Approaches to Perceptual Process: Pattern Recognition

Bottom-up processing	Top-down processing
Process of perception is direct	Process of perception is indirect
Perception is a data driven process i.e., stimuli carry sufficient information to be interpreted meaningfully and we do not need to rely on our experiences	Perception is an experience driven process i.e., stimuli does not have sufficient information to be interpreted meaningfully and therefore, we need to rely on our experiences
James J. Gibson (1966) was one of the strongest advocates of this view	Richard Gregory (1970) was the strongest advocate of this view

Thus, the top-down processing uses the existing knowledge to organize the features of the stimuli, while as bottom-up processing analyses smaller features and constructs the complete picture. Both the types of processing approaches are often used together in perceiving the visual stimuli.

Box 2.2 : Role of attention in perception

The dish antenna we use in our home, receives all available signals from the satellite but the tuner of the television-set selects signal according to our wishes. Similarly, our senses can register numerous stimuli at a given time but attentional processes help us in selecting relevant stimuli responsible for perception. Following are some important functions of attention in context of perception:

1) **Selective attention:** The most important function of attention is *selectivity*. It refers to a process by which attention is focused on stimulus of ongoing interest, while ignoring other irrelevant stimuli. Selective attention acts as a filter.

2) **Sustained attention:** It is the ability to attend to a stimulus for a longer period of time without being distracted. For instance, job of looking at a radar screen, requires sustained attention. Our attentional process helps us in doing this kind of monotonous jobs.

2.7 LAWS OF PERCEPTUAL ORGANIZATION: GESTALT PRINCIPLES

In the early 20th century, three German psychologists Max Wertheimer, and his associates Wolfgang Köhler and Kurt Koffka proposed new principles for explaining perception called as Gestalt principle. *Gestalt* psychology is *form* psychology. According to Gestaltists, the process of perception does not involve perceiving an array of stimuli as an object but it involves our tendency to seek a form or pattern in it. The literal meaning of the word *Gestalt* is form or configuration. The basic premise of Gestalt psychology is that 'whole is different from the sum of its part'. This implies that organization (or structured whole, known as Gestalten) gives a different meaning to the perception. It is because of organization that we are able to perceive complex patterns as unitary forms or objects. Organisation could be in the way things are grouped together. Based on this basic premise, Gestalt psychologists proposed a number of principles or laws to explain how we perceive smaller units of stimuli as a whole, having a particular pattern. These principles are known as *laws of perceptual organization.* In the following section, let us discuss some important Gestalt laws of perceptual organization but before doing so, can you find thirteen faces in the following picture (see Figure 2.10)?

Figure 2.10 : The Forest Has Eyes by Bev Doolittle (1984)
Image Source: http://www.greenwichworkshop.com

a) Law of Figure-ground Relationship

This principle states that we have a tendency to segregate our world in the form of figure and ground. We always see a figure (image) against the background. Figure is that part of stimuli which has our focus of the visual field, whereas the ground is background. Figure has a definite shape and is better remembered whereas, background is shapeless and has no limits. Now look at the Figure 2.11. What do you see? Two people or two pieces of chess (two queens and one bishop)? When you focus on people, chess pieces disappear in the background and when you focus on the chess pieces, people become background. In either case, you will organize the figure (image) against the background.

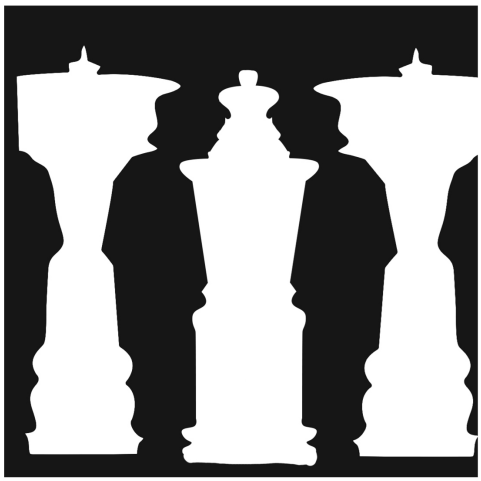

Figure 2.11: An example of figure-ground relationship

b) Law of Proximity

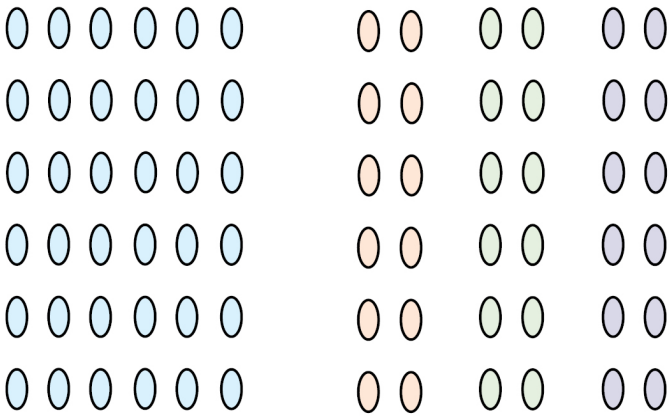

Figure 2.12: The Gestalt principle of proximity

This refers to the grouping of elements or objects that occur close together. In order to perceive stimuli meaningfully, stimuli which are closer to each other are perceived by us belonging to one group. Due to this reason, people tend to see circles as cluster or group rather than individual circles; see Figure 2.12. Our brain tends to group large elements as one, so as to make interpretation more easily.

c) **Law of Good Figure/ Law of Pragnanz/Law of Symmetry:**

Figure 2.13: The Gestalt Principle of Pragnanz

The word Pragnanz is a German in origin, meaning "good figure". Therefore, this principle is also called as "law of good figure". According to this principle we have a tendency to organize stimuli to make the figure balanced or symmetrical.Thus, out of all possible ways of grouping stimuli, we tend to group stimuli in the simplest and stable shape. Thus, we can say that simpler forms are more perceived by us. For example, instead of perceiving Figure 2.13 as consisting of five separate circles, we tend to perceive it as a symbol of Olympics.

d) **Law of Continuation**

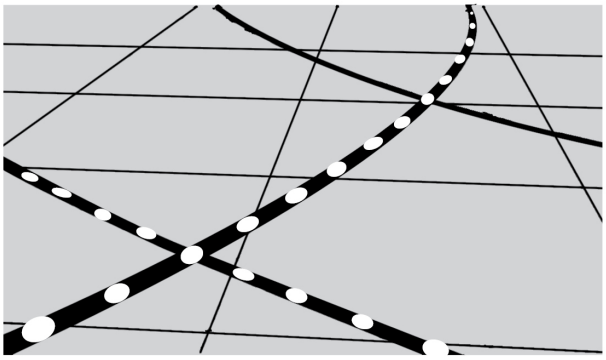

Figure 2.14: An example of law of continuation

It refers to our tendency to perceive figures in continuation rather than in parts. This principle is exhibited more in the perception of line. Figure 2.14 is generally perceived by us as a line instead of separate circles and black patches.

e) **Law of Common fate**

Figure 2.15: The Gestalt Principle of Common Fate

Image Source: http://cdn.zmescience.com

This law involves movement. It states that things are organized according to their movement together in a group i.e., stimuli moving in similar directions are perceived as belonging to same group, as shown in Figure 2.15.

f) **Law of Closure**

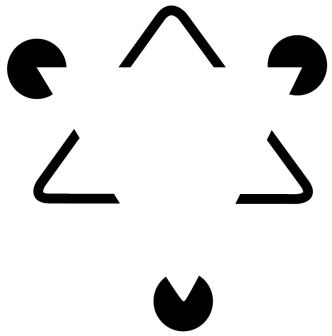

Figure 2.16: An example of law of closure

We sense so many things but it is the law of closure that completes our perception. The perceptual processes organize our perceptions of the stimulus by filling in the gaps in our sensations.Look at Figure 2.16 for an example of closure. This law should not be confused with the law of proximity.

g) **Law of Similarity**

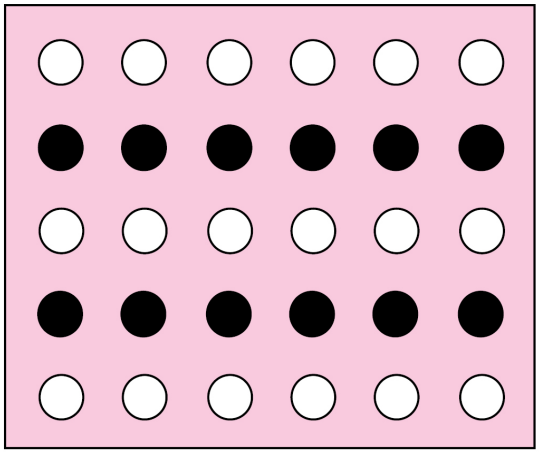

Figure 2.17: The Gestalt Principle of Similarity

This principle suggests that things are grouped together according to their similarity.For instance, in the Figure 2.17, we tend to group circles based on its colours. In real life also, we use this principle extensively. For example, during a cricket match, we tend to group players based on the colour of their jersey.

Check Your Progress 2

1) Differentiate between sensation and perception.

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2) List the different laws of perceptual organization.

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2.8 FACTORS AFECTING PERCEPTION

There are central determinants in perceptions. They are factors such as sets, attitudes, values, needs, and other similar intervening variables. Helmholtz and other Gestaltists have emphasized the significance of such determinants.

2.8.1 Effect of Motivation or Need and Set as Perceptual Determinants

Motivation always plays a vital role in various psychological processes including perception. You must have observed that when you feel hungry, the smell of the food catches your attention more easily than when you are full. Many experimental studies have also reported the same effect. In a classic experiment by Sanford (1936), it was shown that hungry participants perceived ambiguous stimuli more as food-related stimuli than non-hungry participants. Similarly, in a recent study, Changizi and Hall (2001) demonstrated that the need for thirst also affects perception. Participants showed a greater tendency to perceive transparency (common property of water) in ambiguous stimuli.

2.8.2 Effect of Expectation or Perceptual Expectancy

Perceptual expectancy is a person's readiness or a predisposition to perceive things in a particular way. In a classic experiment, Bruner & Minturn (1955) illustrated the role of expectation in our perception. In one condition they showed the participants an ambiguous figure of '13' in the context of numbers like this,

Figure 2.18: Stimulus used in first condition by Bruner & Minturn in their experiment

Image Source: https://www.simplypsychology.org

In the second condition they showed the same ambiguous figure of '13' in the context of alphabets like this;

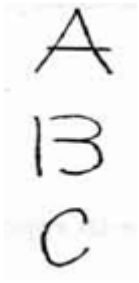


Figure 2.19: Stimulus used in second condition by Bruner & Minturn in their experiment

Image Source: https://www.simplypsychology.org

In the first condition, participants perceived the ambiguous stimulus as 13 while in the second it was perceived as B. The ambiguous stimulus in both conditions was same but interpreted differently due to participants' expectation.

Box 2.3: The rat-man experiment

In a classical study, Bugelski and Alampay (1961) used an ambiguous picture of the 'rat-man', as shown in the Figure 2.20. This picture was presented in two conditions. In one condition, participants were first exposed to animal picture and then to the ambiguous 'rat-man' picture. Whereas, in another condition participants were first exposed to neutral pictures followed by the picture of 'rat-man'. Experimental condition in which participants were exposed to animal picture perceived this ambiguous picture more as a rat than in the later condition.

Figure 2.20: Rat-man stimulus used in a study by Bugelski and Alampay (1961)
Image Source: https://www.simplypsychology.org

2.8.3 Effect of Emotions

What do you think if emotions can affect your perceptual ability? McGinnies (1949) utilized list of words, eleven of which were neutral (*apple, child, river, music, sleep*) and seven were emotionally toned (*raped, whore, penis, bitch*). McGinnies found significant differences between the neutral and emotional (critical) words. The threshold was higher for emotional words, galvanic skin response was greater and there were more distortions for emotional words, which was interpreted as anxiety-avoidance response in the form of *perceptual defense* mechanism that protected the participants from unpleasant meanings of the critical words. Emotions do not hamper perception always. Studies have suggested that when the perceptual task is irrelevant to emotions, it hinders your performance. Whereas, when it is relevant to emotions it facilitates performance (Dodd, Vogt, Turkileri, &Notebaert, 2016; Compton et al., 2003).

2.8.4 Effect of Stimulus Characteristic

You may have noticed that the horns used by heavy trucks usually have high frequency, high pitch and high volume. Why? Just to seek your attention. Studies have shown that those stimuli which sound, taste, look or feel different, grab our attention more than other stimuli and thus affect our perception. According to the evolutionary psychologist, this property has a survival purpose. It has helped humans in identifying danger.

2.8.5 Effect of Experience

Figure 2.21: A Flamingo shaped pen
Image Source: https://www.amazon.in

Prior experience plays an important role in the way we interpret stimuli; it shapes your perception. For example, if you mistakenly perceive a rope as a snake in the dark, then your previous experience is guiding your perceptual process. What do you see in the above picture (see Figure 2.21)? A Flamingo shaped pen, right? Even though this is not a typical pen, but you perceive it as a pen because of your previous exposure.

2.8.6 Effect of Culture

Now look at the following hand gesture and interpret it. What does it mean?

Figure 2.22: A hand gesture

In India, it refers to beautiful or being perfect but in Brazil, it is a rude gesture.This example suggests that interpretation of a stimulus changes with the change in the culture.

2.9 PERCEPTION OF DEPTH

Depth perception refers to one's visual ability to perceive the world in three dimensions and thus enabling us to judge the distance of an object. If there is no depth perception, then it would be very difficult to walk on the road, drive car, etc. The ability is not present at birth, but develops very early in age. So, partly it is innate and partly it is learned through experience. A very famous experiment conducted by Gibson and Walk (1960) tested the ability of depth perception in 6-14 months old infants by placing them on a *visual cliff* (an apparatus to study depth perception). The study concluded that the infants moved away from the cliff or cried and wanted to go to their mothers. The process by which we determine the distance of an object is known as distance perception. Our brain uses both monocular cues (one eye is used) and binocular cues (both eyes are used) to judge depth and distance.

2.9.1 Monocular Cues

These are those information or cues that our brain receives from one eye only. These cues are weaker than binocular cues in strength. Such cues are used by painters to give three-dimensional perspective from a flat painting. See Figure 2.23.

Figure 2.23: Use of monocular cues in flat painting for depth perception
Image Source: https://upload.wikimedia.org/wikipedia/commons/

Following are some of the common monocular cues:

2.9.1.1 Relative Size

Figure 2.24: Hot air balloons flying in the air
Image Source: http://www.freestockphotos.biz

This cue gives us information about the distance of an object based on its relative size with a similar object. This cue works on both two-dimensional and three-dimensional images. The basic premise is that if two objects are of the approximately similar size, then the object which is perceived as larger is closer (see figure 2.24).

2.9.1.2 Texture Gradient

Figure 2.25: Flower meadows
Image Source: https://commons.wikimedia.org

This cue is based on our perception of the change in the gradient or degree of texture. The texture of the objects which are nearer to our eyes are rough or distinct, but as you further move away from it, the texture of the object will become less distinct or smooth and thus suggesting the perception of more distance. For example, if you look at Figure 2.25, the flowers that are farther, seems smoother, but if you look at the flowers that are nearer, you can notice the details of the meadow. This change in the texture correlates with the distance.

2.9.1.3 Arial Perspective (atmospheric) or Haze

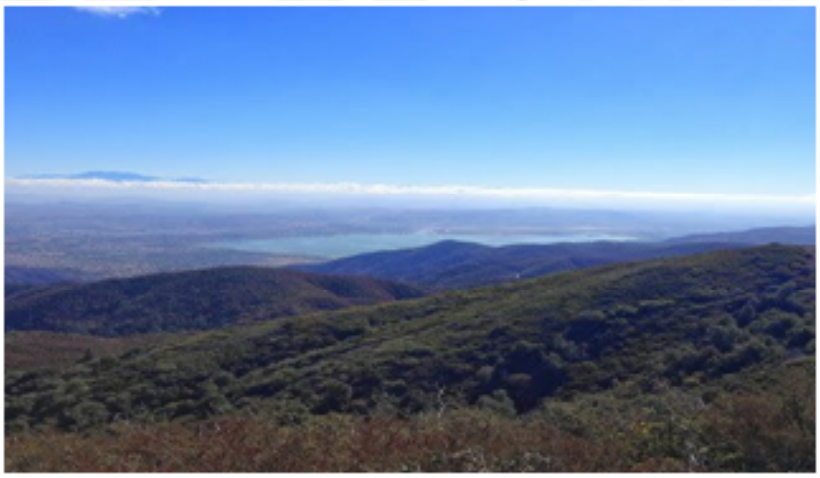


Figure 2.26: Los Pinos Peak- Southern California, USA
Image Source: https://www.gohikeit.com

Objects are perceived at a distance if there is a presence of haze in the environment. Haze is the result of atmospheric dust particles, fog or water vapour. Sometimes perception of distance based on haze can be deceptive. The same mountain can be perceived as nearer or at distance depending on the presence of haze (see Figure 2.26).

2.9.1.4 Linear Perspective

Figure 2.27: Linear perspective
Image Source: http://acddpsych.blogspot.in

This cue is based on the convergence of straight lines at a point on the horizon. An appropriate example of this cue could be the perception of convergence of rail tracks or road at a distance (see Figure 2.27). This cue suggests that closure the lines are, the greater will be the distance.

2.9.1.5 Interposition/Occlusion

When two objects are overlapped, then the object which has been overlapped or obscured will be perceived as farther away than the overlapping object (see Figure 2.28).

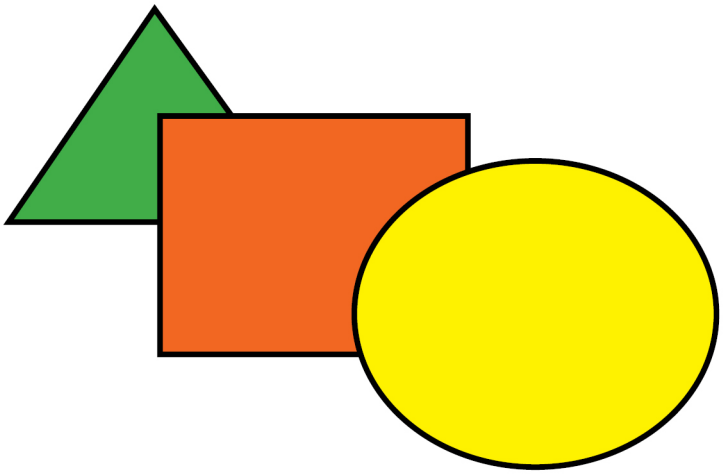


Figure 2.28: An example of occlusion

2.9.1.6 Accommodation

Even though this cue occurs with both eyes, it is still considered as a monocular cue. It is known as accommodation because the size of our lenses accommodates themselves based on the distance. Our lenses become thicker when an object lies closer to eyes while it becomes thinner when an object lies at a distance.

2.9.1.7 Motion Parallax

Motion perspective is the term used by J.J. Gibson for the flow of visual information surrounding a moving observer. The term is used with the focus on the critical point that as one moves about in the environment, objects at a different distance move at different speeds according to their distance from, and position relative to, the observer. This results in complex movements knows as motion parallax (see Figure 2.29).

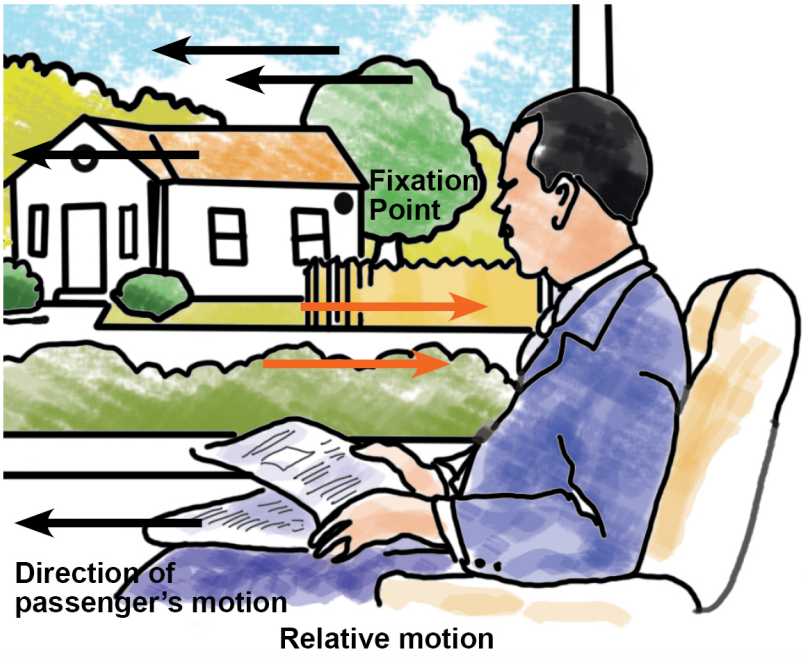
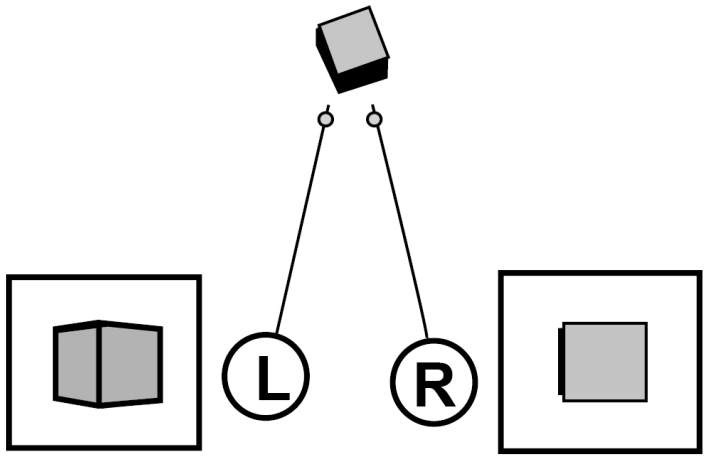


Figure 2.29: Train travel and Motion Parallax

2.9.2 Binocular Cues

The cues that we receive from both eyes are known as binocular cues. These cues are more powerful than monocular cues. The process of gaining binocular cues to assess depth is known as *stereopsis*. Following are two types of binocular cues:

2.9.2.1 Retinal Disparity (binocular parallax)



L= Left eye

R=Right eye

Figure 2.30: Formation of different retinal image by left and right eyes

Humans have two eyes, separated by the distance of average 6.3 cm. Therefore, the retinal image of the same object differs slightly from each other or *disparate* view. The closer an object is to eyes, greater will be the difference in its retinal image. Our brain analyses the degree of disparity between these two separate retinal images and produces a single image of the object to judge information on depth, height and width.

2.9.2.2 Convergence

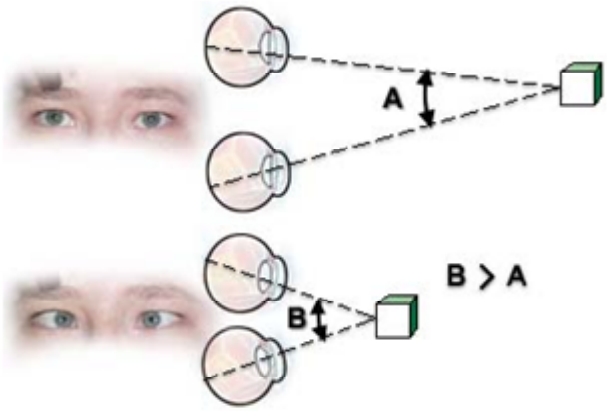


Figure 2.31: Two convergence angles formed by our eyes
Image Source: https://psychlopedia.wikispaces.com

Our eyes make an angle while focusing on an object, known as convergence angle. Convergence angle for distant and nearby objects are different. When an object is at a distance, our eyes make smaller convergence angle, but when an object is closer to our eyes, our eyeballs rotate inwards and form large convergence angle. This change in convergence gives a clue about distance and depth to the perceiver.

2.10 MOVEMENT PERCEPTION

How do we know that if a car is coming towards us or moving away from us? Movement perception is our ability to judge the direction and speed of a moving object. Psychologists have tried to answer the questions on movement perception by applying following four factors:

1) **Retinal motion:** When an object moves its image on retina also moves. This motion of the retinal image is detected by special visual neurons which are sensitive to change in motion and direction. In this way, we perceive movement.

2) **Motion after-effect (MAE):** If you fixate your gaze on a moving object for some time (few seconds to minutes) and then move your gaze to a stationary object. Then the stationary object will be perceived as moving in opposite direction to the original moving object. This phenomenon is known as MAE and occurs due to motion adaption.

3) **Induced movement:** When a smaller stationary body is surrounded by larger moving body then smaller body is perceived to move in the direction opposite to the larger body. Due to this phenomenon, we perceive moon as moving when it is surrounded by slowly moving clouds.

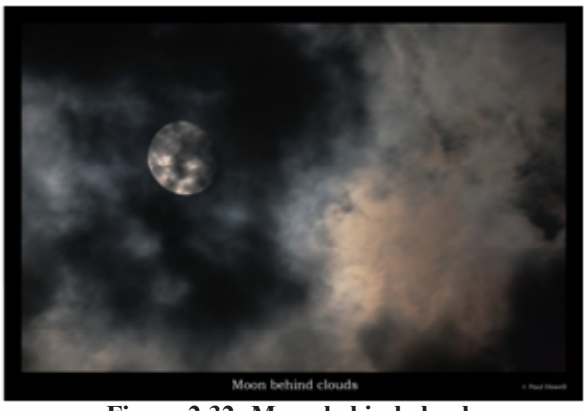


Figure 2.32: Moon behind clouds
Image Source: http://courses.washington.edu

4) **Apparent movement:** Also called as phenomenal motion, it was first proposed by Gestalt theorist Wertheimer (1912). In this phenomenon, when stationary stimuli are presented in succession, it is perceived in a motion. Perceived motion occurs without any energy movement across the receptor surface.That is, when the eyes, head and body are static, and there is no movement of the object, motion is still perceived.

Phi-phenomenon: This effect can be seen in a string of decorative lights, when the lights are turned in sequence, they appear to move, that is the light appears to move across the distance. The series of light goes on and off in a sequence, and movement is perceived.

Stroboscopic Effect: This effect is seen in movies. The example is a movie projector which places successive pictures of a moving scene onto a screen. When the frames are examined separately, there is still a picture that is different from the preceding one. When the frames are presented at the right speed, continuous and smooth motion is perceived.

Autokinetic Effect: If a person stares or fixates on a stationery spot of light in a completely dark room, the spot will eventually appear to move or drift. The movement may cover as much as 20^{o} of the visual field and is apparently not due to eye movements. It is also called as autokinetic illusion or phenomenon.

2.11 SIZE PERCEPTION

In this section, we will discuss those mechanisms that are involved in judging the size of the stimuli. Our ability to judge the size of the stimuli correctly even with the change in the distance has been explained using three hypotheses: the size-distance invariance hypothesis, familiar size hypothesis and the direct perception hypothesis.

1) **Size-distance invariance hypothesis (SDIH):** The basic premise of this hypothesis is that the perceived size of a stimulus is proportional to perceived distance (Kilpatrick and Ittelson, 1953). It further states that if information about the distance is available then size of the stimuli is interpreted based on retinal image. However, if the information about the distance is not available then size of the stimuli is judged based on the visual angle alone. The mathematical expression of this relationship is as follows:

$$\mathbf{S`/D`} = \mathbf{f}\ (\theta)$$

Where, S` = perceived size

D` = perceived distance

θ = visual angle

Here, before proceeding further, it is important to explain the term "visual angle". It is the angle made by our eyes after looking at the object.

2) **Familiar Size Theory/Cue:** This cue is used to judge not only size but also the distance and depth of the stimuli. We know the visual angle for a stimulus decreases with the decrease in the distance. Our brain uses this information (visual angle) along with our previous information of the size of the targeted stimulus and determines its actual size, distance and depth. Thus, according to this theory familiar size influences our size perception, which in turn influences our distance perception (Ittelson, 1960). However, later psychologists Gogel

& Da Silva (1987) proposed that the theory of familiar size is valid in all conditions. When the condition of viewing is improvised then we use egocentric reference distance to determine the size of the familiar object.

3) **Theory of Direct Perception:** Gibson in 1979 proposed the theory of direct perception. His ideas regarding size perception were summarised by Epstein (1982) (pg.78) as: "(i) there is no perceptual representation of size correlated with the retinal size of the object, (ii) perceived size and perceived distance are independent functions of information in stimulation, and (iii) perceived size and perceived distance are not causally linked, nor is the perception of size mediated by operations combining information about retinal size and perceived distance. The correlation between perceived size and perceived distance is attributed to the correlation between the specific variables of stimulation which governs these precepts in the particular situations".

Check Your Progress 3

Fill in the blanks

1) In a classic experiment, ... illustrated the role of expectation in our perception.

2) Monocular cues are ..... than binocular cues in strength.

3) The texture of the objects which are nearer to our eyes are rough or distinct, but as you further move away from it, the texture of the object will become less distinct or smooth and thus suggesting the perception of more .....

4) Objects are perceived at a distance if there is a presence of ..... in the environment.

5) ..... cue is based on the convergence of straight lines at a point on the horizon.

6) We humans have two eyes, separated by the distance of average .....

7) When an object is at a distance, our eyes make ..... convergence angle, but when an object is closer to our eyes, our eyeballs rotate inwards and form ..... convergence angle.

Answer:

(1) Bruner & Mintum (1955), (2) weaker, (3) distance, (4) haze, (5) linear perspective, (6) 6.3 cm, (7) small, large

2.12 ERRORS IN PERCEPTION: ILLUSION

Is perception a reality? Not always. The process of perception is capable of going wrong or misused. Knowingly or unknowingly, we tend to make mistakes and misinterpret the stimuli. When we 'misinterpret' the sensory information, then it is known as an illusion. Illusion also been defined as "a discrepancy between one's awareness and some stimulus" (Reynolds, 2008). Some typical examples of illusions include perceiving tree branches as ghosts or perceive rope as a snake at night. In this section, we will talk about some common forms of illusion.

1) **Muller-Lyre Illusion**

Which of the following lines appear longest (see Figure 2.32)?

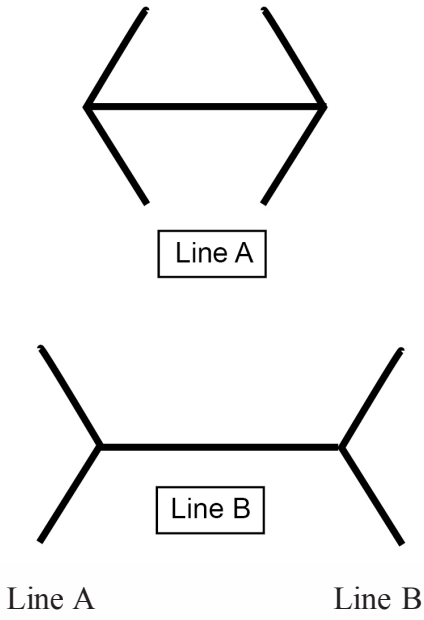


Figure 2.32: Muller-Lyre Illusion

If your answer is line A, then you are wrong. And if your answer is line B, then again you have given an incorrect answer because both lines are of equal length. The illusion you have just seen is a geometrical-optical illusion known as Muller-Lyer illusion. In this illusion, two straight lines of the same length appear to be of different length. Lines with inward pointing arrow seem shorter than the outward-pointing line. Also known as arrow-head illusion, in which perceived length of a line depends upon the shape and position of other lines that enclose it.

2) **Ponzo Illusion**

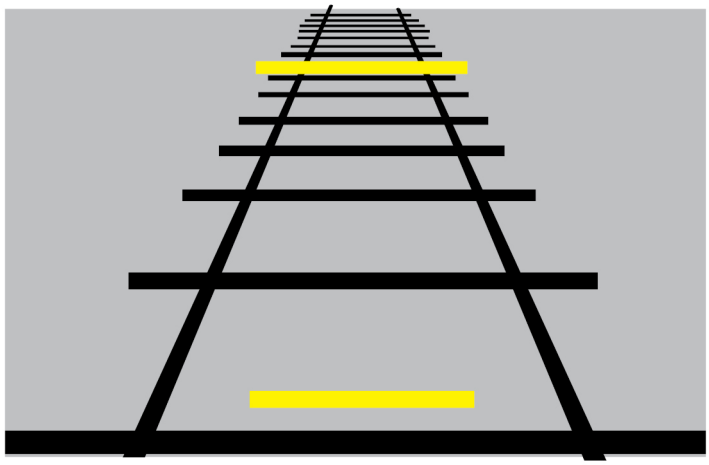


Figure 2.33: The Ponzo Illusion

It is also an optical illusion, in which two converging straight lines distort our perception of the size of two identical lines drawn across it. The upper yellow line appears to be longer than the lower yellow line, when in fact both are of the same length (see Figure 2.33). The incorrect judgment of the size of yellow lines happens because we use liner perspective cue to judge its size. It is also known as *railway illusion*.

3) **Ebbinghaus Illusion**

It is an optical illusion of relative size perception. Discovered by Hermann Ebbinghaus but popularised by Edward B. Titchener, this illusion is also known as Titchener circles. Now, answer this. Which of the following *magenta* circle is smaller (See Figure 2.34)?

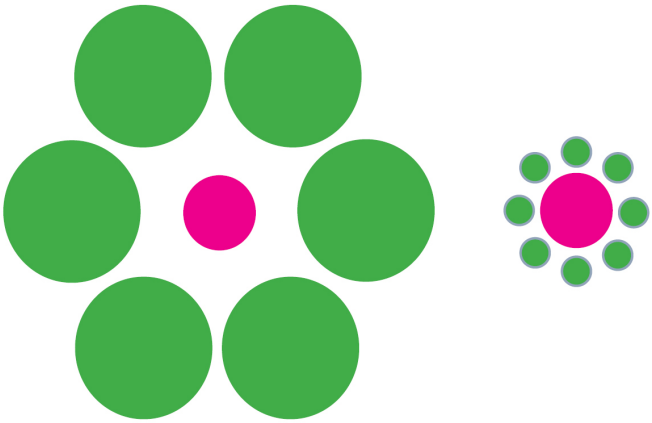


Figure 2.34: The Ebbinghaus Illusion

Irrespective of your answer, both magenta circles are of the same size. This is known as Ebbinghaus illusion. The perception of the size of magenta circle depends on the relative sizes of green circles.

4) The Ames Room Illusion

Named after its creator, American ophthalmologist and perceptual psychologist Adelbert Ames, Jr., this optical illusion leads to the distortion of perception of relative size. To an observer, a person standing in one corner of the room is perceived as significantly larger than the person standing in another corner (see Figure 2.35). The illusion provides a striking demonstration of the cues for depth perception.

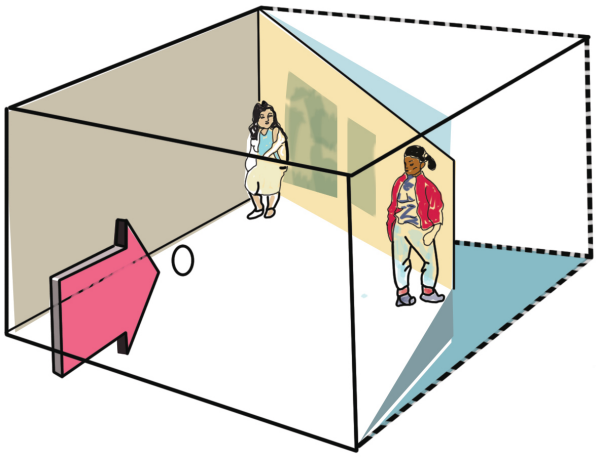


Figure 2.35: The Ames Room Illusion

5) The Moon Illusion

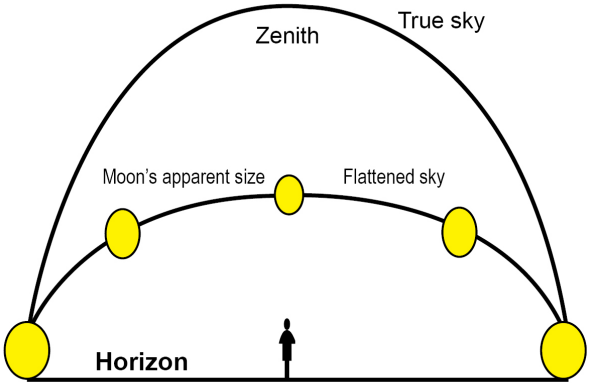


Figure 2.36: The moon Illusion

Have you ever noticed that the size of the moon when it is coming over the horizon? If yes, then you must have noticed that it looks bigger on the horizon than when it comes overhead. However, in reality, there are no differences in the size of the moon. Our perception of the moon having different sizes at horizon and zenith is known as moon illusion (see Figure 2.36). This illusion occurs because of our perception of the sky as a flattened dome and thus forcing our brain to reduce the size of the moon at zenith. Thus, the type of illusion is that of a shape or area.

5) **Poggendorff Illusion**

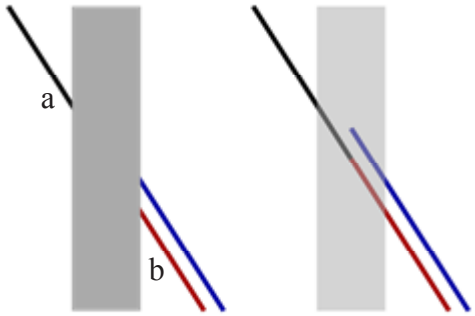


Figure 2.37: Poggendorff Illusion
Image Source: https://commons.wikimedia.org/wiki/

The Poggendorff illusion was influenced by Zollner illusion. When on ablique line is intercepted by a blank area defined by two vertical parallel lines, the two resulting segments of the oblique line do not appear to be in a straight line. In Figure 2.37, it seems that segment 'a' does not fall in straight line with segment 'b'. Line a appears to be too high or line b seems to be too low. This is known as Poggendorff illusion.

Check Your Progress 4

Fill in the blanks

1) When we ..... the sensory information then it is known as an illusion.
2) In ....., two straight lines of the same length appear to be of different length.
3) Ames room illusion was created by American ophthalmologist .....
4) Our perception of the moon having different sizes at ..... and ..... is known as moon illusion.
5) In Muller-Lyer illusion, lines with inward pointing arrow seem ..... than the outward-pointing line.

Answer:

(1) Misinterpret, (2) Muller-Lyer illusion, (3) Adelbert Ames, Jr., (4) horizon and zenith, (5) shorter

2.13 SUMMARY

Now that we have come to the end of this unit, let us summarize all the major points that we have covered.

- Sensation is the awareness due to stimulation of a sense organ. There are six senses, seeing (eyes), hearing (ears), smelling (nose), touching (skin), taste (tongue) and sense of orientation of body's position (proprioception and kinesthesia).

- Perception is a set of process, which helps us in understanding the world around us. The process of perception involves three steps when it encounters stimuli viz. (i) selection, (ii) organization and, (iii) interpretation.
- Two separate theoretical approaches have been proposed by psychologists to explain the process of perception. One is known as "Top-down processing approach" and, other is known as "Bottom-up processing approach".
- According to bottom-up processing approach process of perception is direct. Stimuli carry sufficient information to be interpreted meaningfully and we do not need to rely on our experiences.
- Whereas, according to top-down processing, perception is an experience driven process i.e., stimuli do not have sufficient information to be interpreted meaningfully.
- Gestalt principles of organization states that the process of perception does not involve perceiving an array of stimuli as an object but it involves our tendency to seek a form or pattern in it.
- The basic premise of Gestalt psychology is that 'whole is different from the sum of its part'. This implies that organization gives a different meaning to the perception. It is because of organization that we are able to perceive complex patterns as unitary forms or objects.
- Numerous factors have been found to affect our process of perception such as our expectation, emotions, stimulus characteristics,previous experiences and cultural background.
- There are different types of perception. Such as depth perception, distance perception, movement perception and size perception.
- Illusion can be defined as a process of perceptual distortion, leading to misinterpretation of the stimulus. People think they see something when the reality is quite different. There are many types of illusions, like, Muller-Lyre illusion, Ponzo illusion, Poggendorff illusion, Ames Room illusion and moon illusion.

2.14 KEY WORDS

Perception : It is a process of selecting, organising and interpreting the sensory information based on previous experiences, other's experiences, need or expectation.

Depth perception : It refers to one's visual ability to perceive the world in three dimensions thus, enabling us to judge the distance of an object.

Movement perception : It is our ability to judge the direction and speed of a moving object. Four factors involved are retinal motion, motion after-effect (MAE), induced movement, stroboscopic motion.

Size perception : Our ability to judge the size of the stimuli correctly even with the change in the distance is known as size perception.

Law of figure-ground relationship : This principle states that we have a tendency to segregate our world in the form of figure and ground. Figure is that part of stimuli which has our focus of the visual field, whereas the ground is background.

Principle of Pragnanz : According to this principle, out of all possible ways of grouping stimuli, we tend to group stimuli in the simplest and stable shape.

Perceptual expectancy : It is a person's readiness or a predisposition to perceive things in a particular way.

Monocular cues : These are those information or cues that our brain receives from one eye only. These cues are weaker than binocular cues in strength.

Binocular cues : Cues that our brain receives from both eyes.

Convergence angle : The angle made by our eyes while focusing on an object is known as convergence angle. Convergence angle for distant and near-by objects are different.

Stroboscopic motion : According to this phenomenon, when stationary stimuli are presented in succession, it is perceived in a motion. This phenomenon is used to explain the movement perception in videos.

2.15 REVIEW QUESTIONS

1) The first stage of perception process is
   a) Attention
   b) Interpretation
   c) Exposure to stimuli
   d) Response

2) The tendency for people to 'fill-in' the missing element of an incomplete picture is the definition of:
   a) Similarity
   b) The principle of proximity
   c) Figure and ground
   d) Closure

3) ..... depth cues require the use of both eyes.
   a) Monocular
   b) Binocular
   c) Monaural
   d) Binaural

4) According to the principle of ....., objects that occur close to one another tend to be grouped together.

   a) Similarity

   b) Good continuation

   c) Proximity

   d) Closure

5) What do you understand by perception? Describe the stages of perceptual process.

6) What is Gestalt principle of organization? Explain the following principles:

   a) Figure-ground relationship

   b) Law of closure

   c) Law of similarity

   d) Law of continuity

7) Explain perceptual expectancy and describe how it can affect one's perception.

8) Differentiate between monocular and binocular cues of perception.

9) Explain the factors responsible for movement perception.

10) Explain the process of size perception with reference to size-distance invariance hypothesis.

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2.18 ONLINE RESOURCES

- For more understanding on perception as a phenomenon, visit:
  - https://www.cognifit.com/perception
- For more on principle of perceptual organization, visit:
  - https://pdfs.semanticscholar.org/9bcf/2a9b3ed3defe86059a3ac180a188fad53aff.pdf
  - http://courseweb.stthomas.edu/mjodonnell/cojo232/pdf/gestalt.pdf

- https://courses.lumenlearning.com/wsu-sandbox/chapter/gestalt-principles-of-perception/

- For more on the factors affecting perception, visit:
  - https://pdfs.semanticscholar.org/c4bd/148e1a26ee1fd23449a6ffe8131e62213e17.pdf
  - https://pdfs.semanticscholar.org/e546/d1dd0c015059b4464fd8c178d89c9036bb9e.pdf
  - http://faculty.virginia.edu/perlab/pdf/ZadraCloreEmotPercept.pdf
- For more understanding on theoretical approaches of perception, visit:
  - http://cognitivepsychology.wikidot.com/cognition:topdown
  - http://www.socialscientist.us/nphs/psychIB/psychpdfs/Theories_of_Perception.pdf

Answers of Multiple Choice Questions

1) (c) 2) (d) 3) (b) 4) (c)

UNIT 3 LEARNING*

Structure

3.0 LEARNING OBJECTIVES

After reading this unit, you will be able to,

- explain the nature and scope of learning;
- identify different types of learning;
- differentiate and describe the theories of learning; and
- summarize the strategies used in the process of learning.

3.1 INTRODUCTION

You have acquired many good things in your life-time, such as, you know how to read, write and perform other functions in socially desirable manner. You have acquired these through experience in your life time. Such an experience has remained interactive. These skills help you in adjusting in life in an appropriate manner. How have you acquired such behaviour patterns? This is through the process of learning. Learning process is crucial to all organisms which eventually results in proper adaptation in different situations. In this unit, you will be introduced to learning, one of the key aspect of life. You will also know the learning processes and their characteristics. The theories and other related facts will also be presented in a simple manner.

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3.2 NATURE OF LEARNING

Learning is the key factor involved in behavioural change of an organism. Through learning, we make changes in our behaviour. There are many processes from which we get experience in life. Psychologists have found out such processes and are constantly engaged in conducting research in such areas.

The term learning has been defined by psychologists in many ways. According to the most acceptable definition, it is a "relatively permanent change in behaviour (or behaviour potential) resulting from experience" (Baron, 2001). Three apects in this definition that need attention are, first, 'relatively permanent change'. It is important to mention here that any temporary change in behaviour can not be termed as learning. Such as, feeling sleepy after taking drugs or heavy meals or feeling tired due to illness. Second, permanent change due to ageing or maturation (as a person grows and develops), will not be considered as learning. For example, change in height takes place because of maturation. Third, here 'experience' does not mean our own experience only. Learning can also occur through direct experiences as well as vicarious, i.e., observing events and participating in them (Bandura, 1986).

From the above explanation, it is obvious that all modifications of behaviours are not learned. Some modifications do take place due to physical maturity. In most of the cases the distinction between learning and maturation is very clear but in some places this distinction is less obvious. You take an example of infant's walking. Normally, infant does not walk before the age about 12-15 months. They walk when they are physically fit and ready, perhaps, without learning. So, walking here does not have the role of learning. But in children, recognition of colour is the outcome of learning. This way, the impact of learning and maturation on modification of behaviour are different.

Now, the question is why we 'learn'? What is the importance of the process called 'learning'. Learning is an important process in human behavior. The reason being, it helps us in adaptation and in survival. Learning may be good as well as bad, and learning can be of many types. Some of the most important types of learning have been discussed in the following section.

3.3 TYPES OF LEARNING

a) **Motor learning**

Motor learning involves acquiring of a new motor skill or functions as a result of practice or experience. This learning helps us in executing motor functions, for example walking, running, skating, driving, climbing, etc.

b) **Verbal learning**

It involves acquiring skills to communicate with others by using words, sounds, pictures, etc. The earlier studies were conducted with *nonsense syllables* which differed according to meaningfulness. A list of syllables of high association value, such as LUV, LOS, RUF, were compared to syllables which are comparatively meaningless, like XUY, ZER, XUT. McGeoch (1930) concluded that when the learning of three-letter words was compared to the learning of nonsense syllables with different association values, three-letter words were significantly easier to learn than nonsense syllables with 100 percent association value; when the association value decreased, the non-sense syllables were harder to learn.

c) **Concept learning**

The type of learning in which we learn to classify stimuli based on its characteristics

and features. For example, our ability to identify a barking, four legged animal with a tail as a 'dog', is the part of concept learning. We have learned that the word dog refers to this particular type of described animal. A classic study by Bruner, Goodnow, and Austin (1956) emphasized cognitive interpretations of the process of concept formation. Eighty-one cards were used in the experiment that were different on the basis of four attributes, namely number of borders, color of figures, shape of figures, and number of figures. The task was to learn the concept that the experimenter has in mind. For instance, 'all cards with one figure and two borders'. The cards are presented and the participant says that the card is an example of the concept or not. The experimenter tells whether the response is right or wrong for each card. Thus, the process helps in forming a hypothesis that makes the participant learn the concept.

d) **Discrimination learning**

Our ability to discriminate between stimuli and giving response accordingly is known as discrimination learning. In one of the classic study of concept formation conducted by Hull (1920), analysed the findings on the bases of discrimination learning. The participants learned to discriminate the *common element* in the characters and on the basis of one's experiences, can recognize and use similar elements when they appear in new settings. Hull interpreted concept formation, on the principles of conditioned learning- reinforcement, generalization, and selective discrimination.

3.4 THEORIES OF LEARNING

Learning is a very integral part of our lives. It influences the way we perceive information, understand and use language, our thoughts, beliefs, attitudes, and so forth. Learning is a change in behavior that is relatively permanent in nature as it is influenced by practice and experience.The change in behavior could be good or bad and it may last for some time at least.There are different ways in which learning occurs and this will be explained as follows:

3.4.1 Pavlov's Classical Conditioning

Ivan Petrovich Pavlov (1849-1936), a famous Russian physiologist,was the pioneer in the study of learning. He was awarded Nobel Prize in 1904 in the field of medicine, for his work on physiology of digestion. He used classical experiments in learning and established many basic principles of learning. Classical conditioning is a kind of learning that is based on the classical experiments by Pavlov. This kind of conditioning is also known as **respondent conditioning** or **Pavlovian conditioning**.This kind of conditioning involves pairing of two stimuli.One is called as the *conditioned stimulus (CS)* and the other is *unconditioned stimulus (UCS)*.The CS is also known as the neutral stimulus.This is so because when it is presented initially for a first few times, it merely serves to alert the organism and not evoke any response.The UCS is a stimulus that produces a reflex response consistently known as *unconditioned response (UCR)*. The CS and UCS are paired repeatedly a number of times so that conditioning can be done. The CS is presented a little before the UCS. The time gap between the CS and UCS is known as the *inter-stimulus interval* and it ranges from about half a second to a few seconds. When the neutral stimulus is repeatedly paired with the UCS, it acquires the properties of the UCS and hence produces the unconditioned response,UCR. If the CS and the UCS are paired a number of times with appropriate inter-stimulus interval, then the stimulus that was originally neutral will begin to produce a response that is produced by the UCS before the CS and UCS were paired together.

In his classic experiment, Pavlov designed a special apparatus to assess how much saliva the dog elicits on seeing the food. He attached a tube to his salivary glands that could collect the saliva that was secreted and collect it in a cup attached to the dog's neck. Pavlov trained the dog to salivate at the sound of the bell. He rang the bell after presenting the food that was the UCS. This was done a number of times till the dog acquired the conditioning, which is the relationship between the food and the bell.This was plotted on a learning curve and was known as the ac*quisition curve*. When the CS was repeatedly paired with the UCS, the salivation increased. Pavlov repeatedly tested this with new CS and UCS and found that any stimulus that reliably produces a reflex response can serve as a UCS. Once the response has been acquired, if the bell (CS) is rung without presenting the food (UCS), then the dog's salivation decreased. That is to say, that if the CS is presented without being followed by the UCS, the CR reduces gradually, known as *extinction curve*. After a period of rest,when the bell (CS) was rung again, it led to salivation in the dog.This is known as *spontaneous recovery*, as the learning had not completely ended and after a break, the dog responded thinking about the past association between the CS and UCS.Hence, this association had not diminished.That is to say that some learning still remained after extinction (Pavlov's experiment). The level of saliva was much more at the time of spontaneous recovery than it was at the time of extinction. When the pairing of the CS and the UCS was repeated again, it produced a stronger response (salivation). This is known as *reconditioning*.

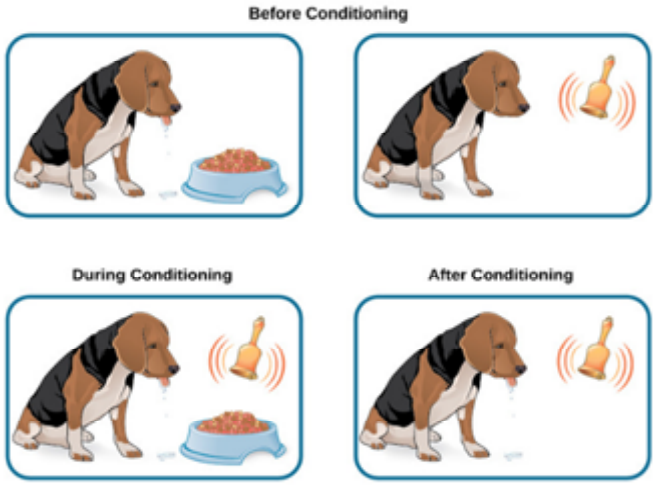

Figure 3.1: Steps involved classical conditioning of a dog
Image Source: https://courses.lumenlearning.com

Box 3.1

A review of important terms:

Unconditioned Stimulus (UCS): A stimulus that can produce response unconditionally and naturally, whenever it is presented. For example, cutting an onion can make you cry or pollen from flower can make you sneeze. Here, onion and pollen are two examples of UCS.

Conditioned Stimulus (CS): A stimulus that was initially neutral in nature i.e., was not capable of producing any response. Later, with repeated paring with UCS, it is able to predict a UCS and thus can elicit the response originally meant for UCS only.

Unconditioned Response (UCR): Response for which we do not need any previous learning i.e., which occurs automatically without any condition. As discussed already, 'crying' while cutting onion and 'sneezing' due to pollen, are two examples of UCR.

Conditioned Response (CR): The response we give to a conditioned stimulus because of some experience is known as CR.

Principles of Classical Conditioning

Pavlov's experimental findings concluded five basic principles of classical conditioning. They are summarized as follows:

Acquisition: A CR is acquired by a series of contiguous pairings of CS and UCS. In *simultaneous conditioning*, CS and UCS are presented at the same time and continue together until CR occurs. In *trace conditioning*, CS is presented first, and after a brief delay UCS follows. In *backward conditioning*, UCS is presented before CS. In *delayed conditioned response*, CS is presented somewhere between few seconds up to a minute before UCS and may continue with it for a few seconds. According to Pavlov, simultaneous, trace and delayed conditioning were effective procedures to acquire learning.

Extinction: Once Conditioned, Always Conditioned?

Pavlov after coming up with the principle of learning tried to understand the conditions under which one can unlearn the acquired conditioning. So, how can we get rid of conditioning? Stop giving UCS. When the conditioned stimulus is presented for a number of times in the absence of UCS, it will eventually lead to the disappearance of the conditioned response; this phenomenon has been termed by Pavlov as **extinction**. In the context of Pavlov's dog, if the bell was not followed by any food for many presentations, then after some time, the dog will stop salivating in response to the bell. But, when US (bell) is again followed by UCS (food) after extinction has taken place, conditioned response (salivation) will return very quickly-a process known as **reconditioning**. The reappearance of the conditioned response after a time interval due to UCS-CS pairing is known as **spontaneous recovery**.

Generalization and Discrimination: Responding to similarities and differences

Pavlov also found that if the animal could be trained to respond to a bell, he could also be trained to respond to a buzzer with a similar response. This is known as **generalization** of the CS to other stimuli that were somewhere similar to the original CS where the learning took place. The level of generalization depends upon the extent to which the new stimulus is similar to the CS. Sometimes phobia can be treated by using this procedure by pairing the feared stimulus with a pleasant one. On the contrary, if Pavlov's dog responded to the bell used in the experiment only and ignored other similar sounding bell, then this phenomenon will be called as **stimulus discrimination**-tendency to make a response to a certain stimulus and ignore others.

Higher-Order Conditioning

A CS after acquiring the ability to elicit CR may acquire reinforcing properties. For example, buzzer (CS) has been used to elicit salivation (CR) with food (UCS). After salivation is established to the buzzer (CS or CS_1), CS_1 will now be paired with a flashing light (CS_2). After repeated trials CS_2 will elicit CR_2. This is when higher-order conditioned response is established. Such responses are difficult to establish and maintain.

Principles of classical conditioning can help in behavior modification or behavior therapy by extinction or reconditioning of the unpleasant emotional responses.

3.4.1.1 The Little Albert Experiment: Applying Classical Conditioning on Human Learning

Can we apply the principle of classical conditioning on human learning also? **John**

B.Watson was highly influenced by Pavlov's work on dogs. Thus, Watson wanted to demonstrate that the principles applied to humans also. Watson and his co-researcher **Rosalie Rayner**, conducted an experiment 'Little Albert' on a nine-month old child named "Albert". Watson hypothesized that children's fearful response to loud noise is an unconditioned response. He further proposed that using the principles of classical conditioning a child can be made fearful to any neutral stimulus. In the baseline condition of experiment, Watson and his assistants exposed little Albert to a number of stimuli (harmless objects and animals) such as a white rat, a rabbit, mask etc. As expected, the little Albert did not show any fearful response to these objects. In control condition, when Albert was exposed to the rat, Watson made a frightening noise by striking a piece of metal with a hammer. This made Albert fearful and he started crying. After repeated presentation of white rat with a loud noise, he began to cry just after seeing the rat and tried to escape. Later, it was observed that Albert started to generalize his fear and became afraid to similar looking white and furry objects, like a rabbit, fur coat, and a fake beard.

So, in the above experiment,

Neutral Stimulus: White rat

Unconditioned Stimulus: Loud noise

Unconditioned Response: Crying and fearful emotional response

Conditioned Stimulus: White rat

Conditioned Response: Crying and fearful emotional response

Figure 3.2: Rat or rabbit, I don't like it.
ImageSource: https://www.newscientist.com

Watson claimed that human behavior could entirely be determined by careful manipulation of stimulus and response.

Box 3.2: Learned Helplessness

The phenomenon of learned helplessness was given by Martin Seligman in the late 1960s while working on classical conditioning with dogs. He noticed that those dogs who received an unavoidable electric shock for a number of times did not act to rescue themselves when they had an opportunity for it in the subsequent situations. Whereas, those dogs who received no inescapable shock, took action to save themselves from the electric shock. He termed the behaviour of the first group as *learned helplessness*- one's learned response to not to take any appropriate action to avoid aversive stimuli. In other words, one's tendency to avoid taking any action for a successful escape from an aversive or painful situation due to the history of failed attempts. The theory of learned helplessness has also been successfully applied to understand the problem of depression in human beings.

Figure 3.3: Seligman's learned helplessness experiments with dogs used an apparatus that measured when the animals would move from a floor delivering shocks to one without.

Image Source: https://virtualuniversity.in

3.4.2 Skinner's Instrumental Conditioning

Instrumental conditioning is also known as operant conditioning. This kind of learning involves some kind of behavior or action that is instrumental in producing reinforcement (or reward) when it operates upon the environment. Operant conditioning is based on the research findings of **Edward L. Thorndike** and **B.F.Skinner**. In this learning, the most important thing to understand is reinforcement. Reinforcement is any stimulus or event which increases the likelihood that the response will occur again. It could be a reward or a punishment.For example, when the rabbit is given a carrot after running a distance, he will run faster to eat more carrots. Here, carrot is reinforcement in the form of reward. Thus, we can say that the nature or occurrence of a particular response depends on the extent to which the reinforcement is given. Hence, the term operant is used.That is the way the response operates on the environment, its desirability or non- desirability will strengthen or weaken the occurrence of the response.

Skinner used a simple experiment to explain this concept. He placed a rat in a box.There was a lever which if pressed would activate the food or water delivery mechanism.This was called as the Skinner box.The rat is placed in a box and the experimenter delivers the food pellets by pressing the lever from outside.The rat eats the pellet one at a time.After some training, the rat is left alone in the box and the experimenter does not release the food pellets for him. After some time, when the rat is hungry again, he moves about exploring the box and by chance tends to press the lever that releases the food pellet. Thus, food pellet is the reinforcement that depends upon the pressing of the lever. Then the rat moves about in the box and again tends to press the lever by chance.This enables him to eat another food pellet. Thus, after that he does not explore much but tends to press the lever again and again quickly to eat the food pellets that are released. Hence, the operant behavior is very evident now.The number of times the rat presses the bar in a particular time are counted and recorded as rate of responding per unit.A cumulative recorder is used to record the rate of responding, that is the number of responses recorded per unit time. The examples of reinforcement could be smiles or approval of others that can make the response more likely to occur.

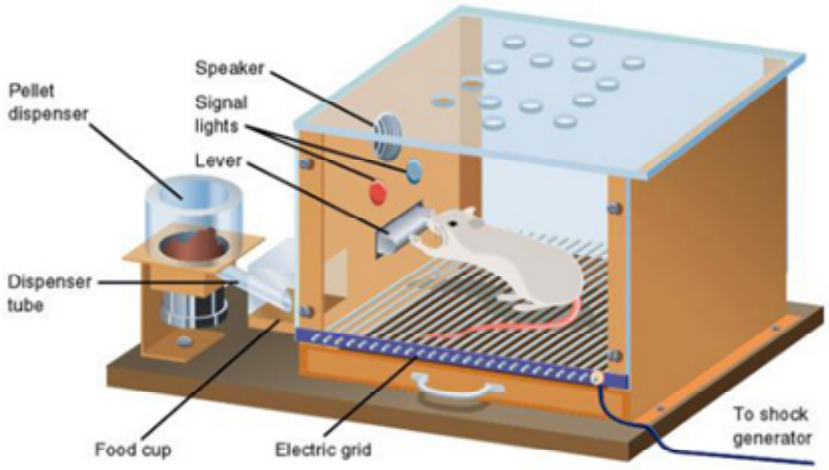

Figure 3.4: A Skinner box
Image Source: https://www.simplypsychology.org/

Operant conditioning helps in shaping a response.The reinforcement can be used to shape the behavior in a relatively shorter period of time.The learner learns the desired behavior when the chain of simple behaviors leading to the desired behavior is reinforced step by step. As each step is learned and the desired response is given, reinforcement is given. This makes the occurrence of the response more likely to occur again. This method of shaping is known as the method of *successive approximations*. This method of shaping is often used to shape the behavior of children, attitude, language, beliefs, etc.For example, when a child learns to walk, each step she/he takes, is reinforced to encourage her/him to walk.

Thus, the learning of the response is contingent on the reinforcement that follows it. Hence, if the response is not followed by reinforcement, then the tendency to produce that response will also reduce.This process when the tendency to produce a response again and again reduces due to non-reinforcement of the response is known as **extinction**.This means that once the response is not followed by reinforcement, then it is less likely to occur in future.

Stimulus **generalization** also takes place in operant conditioning. The more similar is the new stimulus to the previous one,the more likely is the response to be reinforced. In stimulus **discrimination**, the ability to discriminate is learnt when the response elicited by one stimulus is reinforced and in the presence of another stimulus is not reinforced. Thus, reinforcers are items or events that will strengthen the response. There are two types of reinforcers, namely, **primary reinforcer** and **secondary reinforcer**. Food is an example of primary reinforcer. It fulfills the basic need of hunger motive. Money is an example of secondary reinforcer. It acquires reinforcing properties by being associated with the primary reinforcer. Thus, a child learns to use money when she/he observes that it can be exchanged (traded) for a toffee.

Skinner postulated that the timing of reinforcement is very crucial for learning. It determines the speed of the learning as well as strength of learned response. All responses should not be reinforced, for the response to be continued for a long period of time. Thus, the **schedules of reinforcement** are used in operant conditioning. In **continuous reinforcement**(CRF) every response being learnt is reinforced so that it becomes more likely to occur again. **Partial reinforcement** or intermittent

reinforcement takes place when reinforcement is not given on every desired behavior. The main types of partial reinforcement schedules (schedules of reinforcement) depend upon the time at which the reinforcement is given or the rate/number of times the reinforcement is given to the response.

i) **Fixed-ratio schedule (FR):** This depends upon a particular number of responses that must be made before the reinforcement is given. For example, reinforcement is given after every fourth response or every third response. This schedule leads to a high rate of response that occurs at a relatively steady rate.

ii) **Fixed-interval schedule (FI):** The reinforcement is given after a fixed interval of time, irrespective of the number of responses delivered.The performance is relatively varied in this kind of a schedule.The responses become fewer after the reinforcement has been given and then it slowly increases before it is the time for the next reinforcement. This tends to produce a variable rate of response during the time interval.

iii) **Variable-ratio schedule (VR):** In this schedule the reinforcement is given after a varied number of responses. That is it may be given after the first response,then after three responses, then after five responses and so on. So, there is no fixed number of responses preceding the reinforcement.This kind of reinforcement schedule leads to a high and steady rate of responding.

iv) **Variable-interval schedule (VI):**The reinforcement is given after a varied interval of time.That is to say that it may be given after one-time interval and then after another interval and so on. This causes behaviors that resist extinction as in case of VR schedules and provide steady rates of responding.

Table 3.1: An Overview of reinforcement and punishment used in instrumental conditioning

Procedure	Stimulus Event	Effects	Behavioural Outcomes
Positive reinforcement	Some desirable stimulus (e.g., food, sexual pleasure, praise)	Strengthens responses	Organism learns the response
Negative reinforcement	Some undesirable (aversive) stimulus (e.g., heat, cold, harsh criticism)	Strengthens responses that permit escape from or avoidance of stimulus	Organism learns to perform responses that permits him/her to avoid or escape from negative reinforces
Positive punishment	Something undesirable (aversive) stimulus	Weakens the responses that precede occurrence of stimulus	Organism learns to suppress responses that lead to unpleasant consequences
Negative punishment	Something desirable	Weakens responses that lead to a loss or postponement of stimulus	Organism learns to suppress responses that lead to loss or postponement of desired stimulus

Box 3.3: The principle of *Shaping* and *Chaining*

Have you seen a circus or have you watched an animal performing some tricks or stunts in a movie? How can they perform such a complicated behaviour?

The answer to this question lies in two principles of operant conditioning called as **shaping** and **chaining**. Shaping is a process of learning a new behaviour in which successively closer approximation of the desired behaviour is reinforced, that is the organism will be rewarded for each small step towards targeted behaviour.

Any complex behaviour or skill is the chain of many steps. The process of **chaining** involves breaking a task into small steps and then teaching these steps in sequence or chain. In chaining, only the targeted behaviour is rewarded, i.e., once the trainee accomplishes the last step, the person will be rewarded. For example, if you want to teach a child to use the spoon to feed himself/herself, then chaining principle can be used.

Box 3.4: Premack Principle

Given by David Premack, it is a principle of reinforcement. According to this principle, a more preferred behaviour can be used as reinforcement for a less preferred behaviour. For instance, in order to make her child develop the habit of reading, a mother tells the child that if she reads a book for 20 minutes then she could play outside for 20 minutes, The mother is using Premack principle.This is also known as 'Grandma's Rule' because the grandmother or any care giver often use this principle. Likewise, the child is asked to clean her/his room before leaving the house to play.

3.4.3 Bandura's Social Learning Theory

According to Bandura's (1977) social learning theory, learning occurs in a social setting by observing others behaviour and its outcome. This observational learning can occur in two ways: (i) direct observation, and (ii) indirect observation. In direct observation, you learn behaviour by observing others (called as model) directly, while in indirect observation you learn by observing or hearing others experiences. This kind of indirect learning is known as vicarious learning. Suppose you wanted to go on a trip to North-eastern states of India. One of your friends who recently came back from a trip of north-east suggests you to carry umbrella or raincoat, as it can rain anytime. What will you do? There are very high chances that you will listen to the other person's experience and carry an umbrella. This kind of learning is an example of vicarious learning.

Bandura's (1961) famous experiment with the bobo doll showed how behaviors can be learnt by observing others' behaviors. People whose behaviors are observed are known as models. These models provide information about how to interact with others, how to express one self, how to play, etc. Our parents, teachers, peers, TV actors, film actors, singers, sportspersons, or any significant person could serve as a model for learning behaviors that could be pro-social, as altruistic or anti-social, as criminal acts.

Box 3.5: Bobo Doll Experiment

Bandura and his colleagues conducted an experiment on children to investigate the role of observational and imitation in learning social behaviour, such as aggression. They selected 72 children between the age group of three to six years. Children were randomly assigned to three groups: one control and two experimental conditions. In one group of experimental condition, children were shown a movie with an aggressive model, beating, hitting and abusing a bobo doll. In another experimental condition, a non-aggressive model was shown playing peacefully and friendly with a bobo doll. Whereas, in control condition children were not shown any movie. Later, all groups of children were placed in a room full of varieties of toys. It was observed that children

who were exposed to aggressive model imitated the model's behaviour. They also punched, hit, and used abusive words for bobo dolls. In contrast, the children of second experimental group, who were exposed to non-aggressive model, did not demonstrate any aggression with bobo doll. This was one of the landmark studies in psychology. It suggested that observation and imitation play crucial role in learning.

Figure 3.5: Children imitating aggressive behaviour of the actor of the film
Image Source: https://thedirtpsychology.org/

Bandura further suggested that whatever information the person grasps, this information is then actively processed and various cognitions are involved before the observations are displayed as expressed behaviors. These cognitive processes are as: (1) the extent to which we **attend** to the information and (2) how well we remember or **retain** the observed behavior. This is followed by how well we are able to **reproduce** the observed behavior and what **motivates** us to perform the observed behaviors.

Check Your Progress1

1) Differentiate between classical and operant conditioning?

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2) Explain learned helplessness with the help of the theory of classical conditioning.

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3) List the main principles involved in observational learning.

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4) Differentiate between partial and continuous schedule of reinforcement.

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3.5 COGNITIVE LEARNING

Many psychologists proposed that to explain learning of behaviour based on simple stimulus-response association, is not appropriate. Since, both humans and animals possess the brain, therefore learning without higher mental processes is not possible. Learning based on cognitive processes is known as cognitive learning. In this section, we will discuss two prominent forms of cognitive learning, latent learning and insight learning.

3.5.1 Latent Learning

Gestalt psychologist, Edward Tolman was the main proponent of latent learning. Tolman and his colleagues (Tolman &Honzik, 1930; Tolman, Ritchie, & Kalish, 1946) in a series of experiments on rats demonstrated that learning can take place without immediate reinforcement.

In a study by Tolman and Honzik (1930), hungry rats were trained to run in a maze (see Figure 3.6).They took three groups of rats; reward group, no-reward group and, no-reward/reward group. For the first group, they placed hungry rats in a complicated maze with food at the end, while the second group never received any food after coming out of the maze successfully. Rats of the third group received no food for the first ten sessions but for their eleventh session, they received food as reinforcement. Results suggest that rats of the first group took lesser time for every next trial to reach their goal while the rats of the second group showed very slight improvement in their time and errors. Interestingly, rats of the third group initially also showed very slight improvement in their error but once they became aware of the presence of food by its smell, their performance improved dramatically and in fact, it was on par with the performance of rats of the first group. This change in behaviour was attributed to **latent learning** or the learning that takes place but does not express until the situation for it is conducive.

Figure 3.6: Tolman's maze
Image Source: https://courses.lumenlearning.com

3.5.2 Insight Learning

Given by one of the founders of Gestalt psychology, Wolfgang Kohler, insight learning refers to the sudden realization of a problem's solution. Kohler proposed that not all kind of learning depends on trial-error or conditioning. We also use our cognitive processes to learn. Using cognitive processes, we visualize the problem and solution for it internally. Even though this learning takes place implicitly but the change in the behaviour is long lasting.

To prove his point, Kohler conducted a series of experiment on chimpanzees, with whom the human share 99 percent DNA. In one such experiment, Kohler placed a chimpanzee in a cage and placed a banana above its reach. Initially, after a few failed attempts to get that banana, chimpanzee started spending its time unproductively by playing and sitting. Suddenly, after some time chimpanzee started piling up the kept wooden boxes on top of each other and climbed, and grabbed the banana. Kohler argued that the internal process that led the chimpanzee to use boxes in this way is an example of insight learning.

Figure 3.7: Chimpanzee trying to reach banana placed above his reach
Image Source: http://slideplayer.com

The famous story behind Archimedes "Eureka" moment and sudden realization of gravitational force after seeing a falling apple by Isaac Newton, are some of the most famous examples of insight learning.

3.6 STRATEGIES IN LEARNING: IMAGERY, REHEARSAL AND ORGANISATION

What could be the best way or strategy of learning information? Cognitive and educational psychologists have done extensive studies in finding out the most appropriate strategies of learning. Findings suggest that learning can be improved by using the method of imagery, rehearsal and organisation. In this section, we will discuss these strategies briefly.

1) ***Mental Imagery:*** Answer the following questions:

   - How many windows are in your house?
   - How many vowels are in the spelling of 100?

For answering the first questions, people will imagine themselves as taking a mental tour of their house and counting the number of windows. And for answering the second question, people mentally form the image of the spelling of digit 100 and count the number of vowels present in its spelling.

So, here mental imagery has helped you in answering these questions. Without the ability to produce mental images, you would have not answered it correctly. Studies have suggested that if you are capable of producing mental images of the information to be remembered, then, you can learn things more efficiently. It can be defined as one's ability to visualize the situation or information mentally. Developmental studies have suggested that older students get more benefits using this method. Learning information using imagery, involves two steps:

1) Reading the information to be remembered.
2) Mentally forming a picture of that information.

If the mental image contains all the relevant information, then it will be more accurately learned. Further, reading from a book or source having lot of details also helps in forming images and thus, improves learning.

2) ***Rehearsal:*** Rehearsing refers to repeating of information over and over again to order to learn it. Rehearsal can be two types: maintenance rehearsal and elaborative rehearsal. In *maintenance rehearsal*, information is simply repeated a number of times, without understanding the underlying meaning, to keep it in memory. On the other hand, *elaborative rehearsal* is a method of learning information by making an attempt to elaborate it either by understanding its underlying meaning or by making meaningful connections with other information. Studies have suggested that learning a concept or information using elaborative rehearsal method is more effective, as it helps in retaining information for longer period. One way of doing elaborative rehearsal is *elaborative interrogation*. It involves asking 'why' question for the information to be remembered and then generating an answer. Studies have suggested that this specific technique is useful in remembering facts.

3) ***Organisation:*** This strategy of learning requires reorganisation of information to be remembered in such a way that would facilitate learning process. For example, you were asked to remember the following list:

   Delhi

   Ostrich

London

Ludhiana

Yak

Greenwich

Owl

You can either learn these items by making separate groups for city and animal names or you can create a new word by taking first alphabet from each word, such as, DOLLY-GO. This method helps of organization of information improves learning for two reasons; (i) it reduces the large number of information into manageable amount, and (ii) it helps in retrieving information more accurately.

Check Your Progress 2

Fill in the blanks

1) ..... was the main proponent of latent learning.

2) Learning that takes place but does not express until the situation for it is conducive is known as .....

3) ..... was the main proponent of insight learning.

4) ..... refers to the sudden realization of a problem's solution.

5) Findings suggest that learning can be improved using the method of imagery, ... and organisation.

6) Rehearsal can be of two types: ..... and ..... .

Answers

(1) Tolman, (2) latent learning, (3) Wolfgang Kohler, (4) insight learning, (5) rehearsal, (6) maintenance rehearsal and elaborative rehearsal.

3.7 SUMMARY

Now that we have come to the end of this unit, let us recapitulate all the major points that we have covered.

- Learning can be defined as a "relatively permanent change in behaviour (or behaviour potential) resulting from experience".
- Ivan Petrovich Pavlov gave principles of classical conditioning, which is also known as **respondent conditioning** or **Pavlovian conditioning**. This kind of conditioning involves pairing of two stimuli. One is called as the *Conditioned Stimulus (CS)* and the other is *Unconditioned Stimulus (UCS)*.
- Instrumental conditioning also known as operant conditioning was given by B. F. Skinner. This kind of learning involves some kind of behavior or action that is instrumental in producing reinforcement (or reward) when it operates upon the environment.
- The phenomenon of learned helplessness was given by Martin Seligman in the late 1960s while working on a classical conditioning with dogs. It can be defined

as one's tendency to avoid taking any action for a successful escape from an aversive or painful situation due to the history of failed attempts.

- According to Bandura's social learning theory, learning occurs in a social setting by observing others behaviour and its outcome. This observational learning can occur in two ways: (i) direct observation, and (ii) indirect observation.
- Learning based on cognitive processes is known as cognitive learning. Types of cognitive learning are latent learning and insight learning.
- Findings suggest that learning can be improved using the method of imagery, rehearsal and organisation.

3.8 REVIEW QUESTIONS

1) Blinking in response to a puff of air directed to your eye is a(n):

   a) UCR

   b) UCS

   c) CR

   d) CS

2) A year after surviving a classroom shooting incident, a child still responds with terror at the sight of toy guns and to the sound of balloons popping. This reaction best illustrates:

   a) an unconditioned response.

   b) operant conditioning.

   c) latent learning.

   d) generalization.

3) Airline frequent flyer programs that reward customers with a free flight after every 25,000 miles of travel, illustrate the use of a ..... schedule of reinforcement.

   a) fixed-interval

   b) variable-interval

   c) fixed-ratio

   d) variable-ratio

4) Which pioneering learning researcher highlighted the antisocial effects of aggressive models on children's behavior?

   a) Watson

   b) Bandura

   c) Pavlov

   d) Skinner

5) Explain different types of learning.

6) Differentiate between theory of classical conditioning and operant conditioning.

7) Explain the principles of extinction, spontaneous recovery and reconditioning.

8) Describe the different types of reinforcement schedules.

9) Explain the phenomenon of learned helplessness and discuss how it is a form of classical conditioning.

10) What do you understand by the principle of shaping and chaining?

11) Differentiate between latent learning and insight learning.

3.9 KEY WORDS

Classical Conditioning : A basic form of learning in which one stimulus comes to serve as a signal for the occurrence of a second stimulus. Organisms acquire information about the relations between various stimuli, not simple associations between them.

Operant Conditioning : A form of learning in which behaviour is maintained or changed through its positive or negative consequences. Positive consequences lead to the repetition of behaviour, whereas, negative consequences will lead to avoidance of behaviour.

Reinforcement : It is any stimulus or event which increases the likelihood that the response will occur again. It could be a reward or a punishment.

Premack Prinicple : This principle states that, a more preferred behaviour can be used as reinforcement for a less preferred behaviour.

Chaining : The process of breaking a task into small steps and then teaching these steps in sequence or chain by rewarding only targeted behaviour is rewarded.

Schedule of reinforcement : Rules determining when and how reinforcement will be delivered, is known as schedule of reinforcement.

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- Chimpanzee trying to reach banana placed above his reach. Retrieved June 1, 2018, fromhttp://slideplayer.com/slide/7222286/

3.12 ONLINE RESOURCES

- For more on Latent learning, visit
  - https://courses.lumenlearning.com/wmopen-psychology/chapter/psychology-in-real-life-latent-learning/
  - https://www.psychestudy.com/behavioral/learning-memory/latent-learning
  - http://fac.hsu.edu/ahmada/3%20courses/2%20learning/learning%20notes/9%20tolman.pdf
- For more information on Social Learning Theory, visit
  - http://www.asecib.ase.ro/mps/Bandura_SocialLearningTheory.pdf
  - https://www.lsrhs.net/sites/kleina/files/2012/11/SocialLearningTheory.pdf

- For more information on Pavlov's classical conditioning, visit
  - https://courses.lumenlearning.com/boundless-psychology/chapter/classical-conditioning/
  - https://web.mst.edu/~psyworld/general/cc/cc.pdf
  - https://courses.edx.org/c4x/SMES/PSYCH101x/asset/Chapter_7.pdf
- For more on Learned Helplessness, visit
  - https://ppc.sas.upenn.edu/sites/default/files/learnedhelplessness.pdf
  - https://positivepsychologyprogram.com/learned-helplessness-seligman-theory-depression-cure/

Answers for *Multiple Choice Questions*:

1) (a), 2) (d), 3) (c), 4) (b)

UNIT 4 MEMORY*

Structure

4.0 LEARNING OBJECTIVES

After having read this unit, you will be able to:

- explain the concept of memory and its nature;
- describe the various models of memory;
- identify different types of memory;
- explain the process of forgetting;
- describe different theories of forgetting it; and
- know various strategies of enhancing memory.

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4.1 INTRODUCTION

Consider the following examples:

Do you know how to ride a bike? If you know, then how much do you think about rotating the pedals or balancing while riding the bike?

How much time do you take while processing the information of a repeated television advertisement that you are watching?

Do you remember the last time you met your school teacher?

Instances mentioned above and other such instances, highlight the importance of *memory* in everyday life. The term memory refers to conscious retrieval of previously experienced information. So, for the above instances, the process of conscious retrieval of the experienced information is the part of the process. However, all instances involve different types of memory!

A glance over the two preceding units on Perception and Learning, reflect that the two processes are important for human behavior along with Memory. Perception, learning and memory are closely linked. An object or event is perceived, learned, memorized and recalled, thereby helping the individual to adapt. In this unit, we shall turn our attention to the process of memory. In the first part of the unit, nature, scope and models of memory will be explained followed by types of memory. In the latter part of the unit, we shall summarize about the process of forgetting and the strategies to improve memory.

4.2 NATURE AND SCOPE OF MEMORY

What did you eat in dinner yesterday? What is the name of your best friend? Do you know how to drive a car or ride a cycle? How did you feel when you got highest marks in your class? The mental process you used to answer all of these questions is known as **memory**. In 1885, Hermann Ebbinghaus (1850-1909), a German psychologist was the first person to study memory in a scientific way. Ebbinghaus conducted memory experiments on himself and the findings were found to be valid. Ebbinghaus taught himself **nonsense syllables** (consonant-vowel-consonant trigrams, like TOB, etc.). They can be pronounced but are meaningless. Ebbinghaus created 20,000 such trigrams in his experimental study. He assumed that meaningful stimuli would be more memorable than non-meaningful stimuli. Based on the experimental findings, Ebbinghaus also concluded that *distributed practice* (the efforts to learn the material is spread overtime) is often better than *massed practice* (the attempt to memorize the material at once).

Memory refers to the ability of retaining information and reproducing it over a period of time when required to perform a cognitive task. It has been conceptualised as a process comprising of three stages; (i) encoding, (ii) storage, and (iii) retrieval. All information received by our senses goes through these stages.

i) **Encoding:** It is the process of converting sensory information into a form that can be processed further by the memory systems.

ii) **Storage:** In this second stage, received information by memory systems are stored so that it can be used at later time also.

iii) **Retrieval:** It refers to locating and bringing the stored material to one's awareness when required to complete a task.

However, any obstacle or hindrance in the completion of any of these stages can lead to memory failure.

4.3 THEORIES OR MODELS OF MEMORY

Whatever we have learnt needs to be stored properly so that we are able to retrieve it when we want to.This process involves memory.There are different theories or models of memory.

4.3.1 Information-processing Model

1960s onwards, cognitive approaches were based on the model of computer as an information-processing mechanism. In 1968, American psychologists Richard Atkinson and Richard Shiffrin (1968) proposed Atkinson-Shiffrin Model of memory which is very similar to the way computer handles the input and storage of data. This model involves various steps to store information.

a) **The sensory register or memory:** This receives information from the various sensory receptors from the environment. Here, the information is held for a very brief period of time, perhaps a few seconds.The information passes from the sensory register to the short-term memory, only if attention is paid to it.

b) **Short-term store or memory:** This is also known as *working memory.* William James referred it as **primary memory.** Here, the information is kept for 20 to 30 seconds. The information that is attended to, is processed here in a rehearsal buffer and repeated again and again.It has a very limited capacity to store information. G. A. Miller (1956) suggested that the capacity of working memory was about seven items (plus or minus two), By items, Miller argued that a lot of information could be packed in a single item. This strategy was called *chunking* and the basic unit of information in working memory is known as *chunk.* Chunking can help to store more information in short-term store. Several pieces of information can be combined into chunks and stored in short-term store and later retrieved. It stores sound of the speech, visual images,words, meaningful sentences. Since the storage is very small, most of the new incoming information, displaces the previously stored information. Information that is rehearsed well, then moves to the long-term memory. Rehearsal here means to actively maintain the item in working memory. Rehearsal can be made in two ways. In *maintenance rehearsal*, the information is repeated again and again. This information may not be passed on to the long-term memory. In *elaborative rehearsal,* strategies are used to organize and give meaning to the material to some other concept that is encoded. Elaborative rehearsal associates the item in working memory to existing long-term memory structures.

c) **Long-term store or memory:** Information that is rehearsed well,then moves to the long- term memory and the information that is not rehearsed is lost. The information is organized in different ways in long term store for days, months, years, and maybe forever. The long-term memory has unlimited capacity to store information. Information is generally not forgotten from long term store, and if any forgetting occurs, it is because the information has not been retrieved or organized properly. The information that is stored in long-term store consists of meaningful words, sentences, ideas, and various experiences of our life.

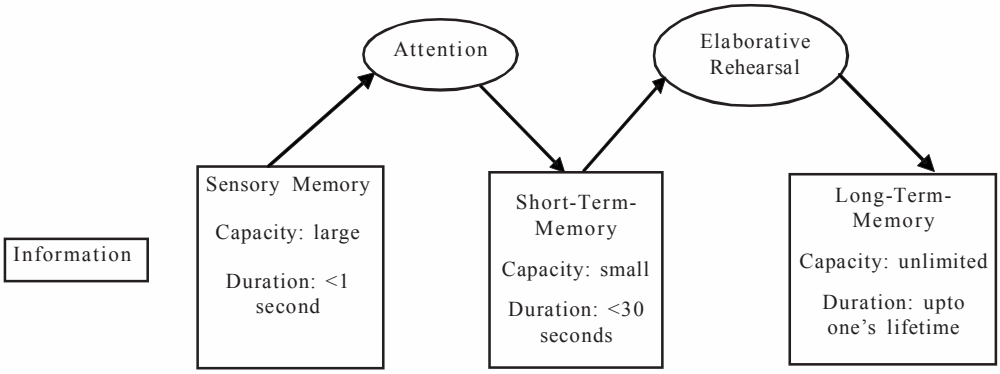

Figure 4.1: Information-Processing Model

4.3.2 Levels of Processing Theory

This model refutes the claim of Atkinson and Shiffrin model that memory consists of different subsystems. According to level of processing (LOP), whether information will be retrieved successfully or not depends on its level of processing. LOP refers to the fact that more meaning-based handling of information leads to better encoding of information. According to this model, the information that is encoded is processed at different levels. The manner in which information is first encountered and rehearsed leads to a different depth of processing. Fergus Craik and Robert Lockhart (1972) have proposed that elaborative rehearsal leads to deeper processing and maintenance rehearsal leads to shallow processing. Craik and Tulving (1975) proposed three LOP;

a) *Physical/Structural Processing:* Encoding of information based on its physical attributes-shallow processing.

b) *Phonological Processing:* Encoding based on how it sounds. Such as, 'Hat' rhymes with 'Cat'-shallow processing.

c) *Semantic Processing:* Encoding done based on its meaning and/or concept-deep processing.

Studies on this model have suggested that deeper the level of processing, the higher will be its probability to be retrieved successfully (better retention of the information than shallow processing).

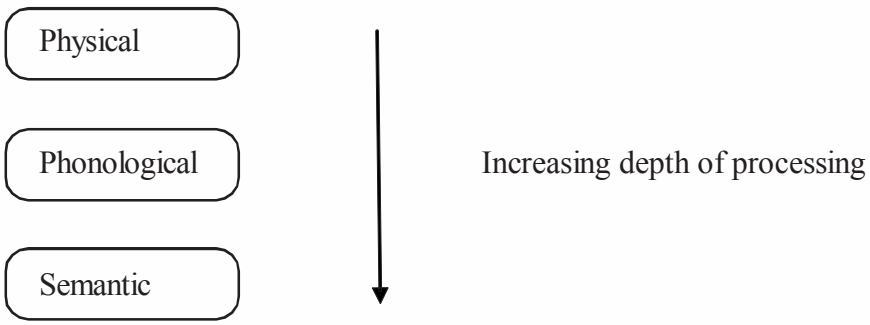

Figure 4.2: Level of Processing (Craik & Tulving, 1975)

4.3.3 An Integrative Model: Working Memory

The concept of STM propounded by Atkinson and Shiffrin was very narrow. They considered STM only as a short-term memory storehouse but later studies disapproved it. Later studies suggested that STM is dynamic in nature i.e., it works not just as

a storehouse of information but also responsible for manipulation of incoming information for the completion of a cognitive task. Baddeley & Hitch (1974), after incorporating the idea of level of processing (LOP) proposed a new model for STM and termed it as working memory. Thus, working memory can be defined as "a limited-capacity system for temporary storage and manipulation of information for complex tasks such as comprehension, learning, and reasoning" (Goldstein, 2011, p. 131). Baddeley's model of Working Memory (WM) consists of four components: the *central executive,* the *phonological loop,* the *visuospatial sketch pad,* and the *episodic buffer* (see Figure 4.3).

- The **central executive**, as the name suggests, works as an executive in our working memory. It coordinates and regulates cognitive operation between sub-ordinate systems namely, phonological loop, visuospatial sketch pad and episodic buffer. It decides which of the memory will become part of long-term memory and which will fade away.
- The **phonological loop** is responsible for storing verbal and auditory information. The information stored in phonological loop will decay within 2 seconds, unless it is not rehearsed. It consists of two components, **phonological store**, which stores information for few seconds; and the **articulatory rehearsal process**, responsible for rehearsing the information in order to keep the information stored in phonological store from decaying. For instance, trying to remember a phone number, you have just been told by your friend, involves phonological loop.
- The **visuospatial sketch pad** keeps visual and spatial information stored. For instance, the mental picture that comes up in your mind while listening to a story or solving a puzzle, involves using your visuospatial sketch pad.
- The **episodic buffer** is responsible for combining information from phonological loop, visuospatial sketch pad and long-term memory to generating a unitary episodic representation of information. Thus, this component helps us in making a sense of the received information.

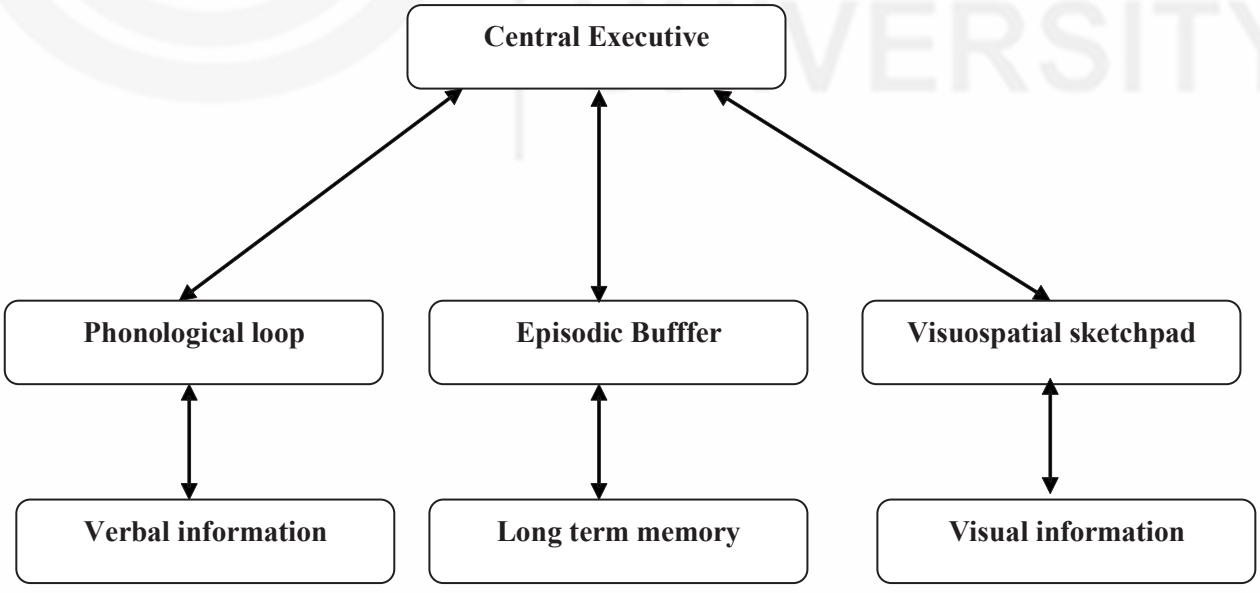

Figure 4.3: Baddeley's Model of Working Memory

Box 4.1: Declarative vs. Non-declarative Memory

Declarative Memory or Explicit Memory: It refers to that memory system which can be controlled consciously and for which we are aware of in some form. It involves effort and intention, and it generally declines with the age. Recalling the name of a friend, remembering a contact number or ATM pin involves declarative memory. There are basically three types of declarative memory namely; *working memory, episodic memory and semantic memory*.

Non-declarative Memory or Implicit Memory: That system of memory for which we have no awareness. It works unconsciously and without any efforts and intentions. It is unaffected by aging. Following are its three forms:

1. Priming

It is the process that works unconsciously and helps in speeding up the process of retrieving. This process suggests that memory can be activated unconsciously also.

2. Conditioning

As already discussed in the previous unit, this form of memory is responsible for learning an association between two stimuli.

3. Motor/Procedural memory

The process of learning a motor skill is slow but once it is well learned, it becomes automatic in nature. That is, it does not need any further attention or conscious effort. Such as the motor process involved in walking does not need any conscious effort.

Check Your Progress 1

1) What are the three stages of memory?

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2) List important characteristics of Short-Term Memory and Long-Term Memory.

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3) Name the three levels of processing proposed by Craik and Tulving model of memory.

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4) What is the importance of central executive component in working memory?

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4.4 TYPES OF MEMORY

The last two sections focused on nature of memory and the various models of memory. In this section, we will continue with the different types of memory.

4.4.1 Semantic Memory

Semantic memory is like the knowledge of the world. So, it may include knowledge about culture, history, sports, music, etc. This kind of memory tends to encode, store or organize, retrieve information (knowledge of the world) in the memory according to its meaning.This also talks about how the information is related to other kinds of information that already exists in the memory.There is very little forgetting when information is stored according to the meaning, or logical hierarchies, or semantically (Quillian, 1966). Closely related, but different type of memory is **lexical memory.** It is the representational system for the words of our language. Psycholinguists are interested in the structure of lexical memory.

4.4.2 Sensory Memory

Sensory memory, which is also known as 'fleeting memory' sometimes, is closely related to the process of perception. It is responsible for keeping a record of our percept for very brief period of time. It is important to note here that our sensory register works as a memory system. The information from environment first reaches sensory memory and if required attention is given to the information, it moves to other memory systems. It can store information only for a fraction of a second to allow cognitive processing.Psychologists have argued that there is visual sensory memory, an auditory sensory memory, an olfactory (smell) sensory memory, a gustatory (taste) sensory memory, and a tactile (touch) sensory memory. However, a bulk of literature is available on *iconic* sensory memory; that is memory for visual inputs and *echoic* sensory memory, memory for auditory inputs.Some people also have *eidetic imagery* or *photographic memory* which is a rare ability to access a visual memory over long period of time. George Sperling (1960) was credited for conducting classic experiments on sensory memory.

Box 4.2: Sperling's Sensory Memory Experiments

Cognitive psychologist George Sperling (1960), in his classic experiment demonstrated the hypothetical existence of iconic memory (visual sensory memory). Participants were shown a matrix of 12 letters (4x3 grid) for a brief time (50 msec). Participants were asked to report in either whole-report technique or partial-report technique. In the former, the participants were asked to report all the letters of the matrix. But the participants could report only five letters. In the partial-report technique, the participants had to report the words, as per the tone that occurred just after the stimulus grid disappeared. The tone's volume was different for each line (high tone for top row, medium tone for middle row, and low tone for lowest row). Participants could report three words from each

line, thus suggesting that nine letters were visible as compared to five in the whole-report condition. Thus, Sperling concluded that sensory memory is a low-level system separate from working memory.

4.4.3 Episodic Memory

The memories that are stored with respect to the time when they happened are known as episodic memory. The various episodes of our life experiences that are encoded, stored, retrieved memories in the LTM that are related to our personal individual experiences. They may have a reference to our past events or things that happened to us at particular times.

4.4.4 Autobiographical Memory

Figure 4.4: Our memories
Image Source: https://www.newscientist.com

As the name suggests, it is the memory of your own past events or personal experiences. Our autobiographical memory (AM) is generally accurate but sometimes it is also influenced by constructive nature of memory. But, do we remember life events from all periods of life equally? Studies have suggested that people from middle age remember life events from their youth period and early-adult period more vividly than their recent past (Read & Connolly, 2007). Marigold Linton (1975, 1982) did a classic study on AM using Ebbinghaus' method of introspection. She kept a diary for six periods, recording at least two events per day. She studied these recorded memories to understand the nature of AM.

4.4.5 False memory

As the name suggests, it is the memory of an event that never happened. It can be defined as "a mental experience that is mistakenly taken to be a veridical representation of an event from one's personal past" (International Encyclopedia of the Social & Behavioural Sciences, 2001). Also known as recovered memory or pseudo memory, these memories are very vivid and emotionally charged. In majority of the false memory cases, people were found to have memory associated with the act of childhood sexual abuse or violence. Various studies have suggested that our memory in not fixed and it can be easily manipulated through effective suggestion, such as during a session of psychotherapy. False memory syndrome is very relevant in the context of psychotherapy and forensic witness. In one such study, it was found that around 20 percent memory of the witnesses were false (Mazzoni, Scoboria, and Harvey, 2010).

4.4.6 Flashbulb Memory

Figure 4.5: 9/11 terrorist attack on twin towers of World Trade Centre, USA

Image Source: https://www.onthisday.com

What were you doing, when you first heard about 9/11 attack? What was your first reaction? Many people still have very clear memories of 9/11 attack. They could recall what they were doing when they first heard about it, from where they heard it, how they felt and other details vividly. So, what is so special about this memory? According to Roger Brown and James Kulik (1977), these memories are so vivid that it seems to be preserved and found to be quite accurate. In context of India, people old enough to recall assassination of Prime Minister Indira Gandhi or Rajeev Gandhi may have flashbulb memories of these events.

What are the reasons for such vivid memories of an event? Studies have pointed out a number of factors like, emotional intensity of the event (Bohannon, 1988). Another view suggests that because of the significance, we retell our experiences leading to frequent rehearsal and thus making those memories more accurate and vivid even after many years (Bohannon, 1988).

Box 4.3: Retrieval Processes: Recall and Recognition

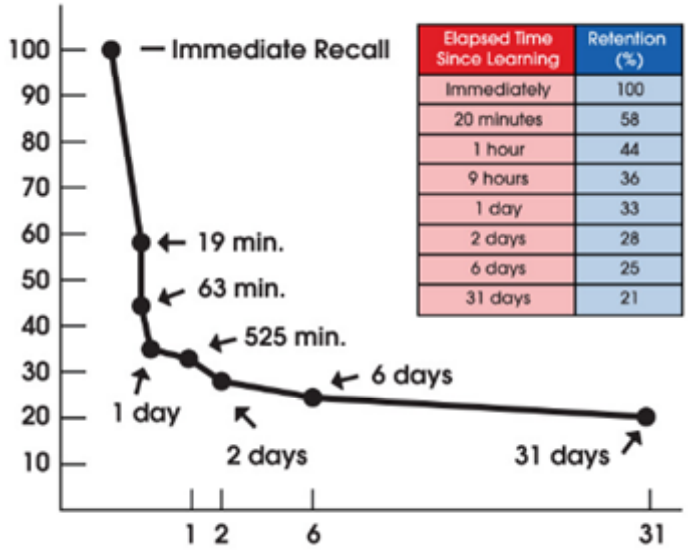
Recall and recognition are two processes with the help of which we may retrieve information. In recall, the information is retrieved without the help of external cues. For instance, from where did you do your schooling. Similarly, essay-type questions, short-answer, fill in the blanks, are examples of recall. An important feature of recall is *serial-position effect* (Murdock, 1962). The information in the beginning and at the end is remembered more accurately than the information present in the middle. *Primacy* and *recency effect* are also interesting features of recall. The former is the tendency to remember words that occur in the beginning and the latter is the tendency to remember information that is presented at the last (the information is still there in short-term memory to be retrieved) (Craik,1970, Murdock, 1962).

Recognition is a process where the information is matched to what is there in the memory. For instance, multiple-choice questions, matching, true-false. It is easier than recall, since the cues are present. An interesting feature in recognition is *false positives*, when a person thinks that she/he has recognized or recalled some information but infact , it is not there in memory.

4.5 FORGETTING

Why do we tend to forget the names of the people we just met? Or why do we forget the phone number we just dialed few minutes ago? We all have experienced forgetting in one's day to day life, but what are the causes behind it? Psychologists have defined **forgetting** as our inability to recall already encoded and stored information from our memory system.

To understand the nature of forgetting, Hermann Ebbinghaus, a German psychologist (discussed in the first section), conducted the first systematic experiment in 1879. He created many CVC (constant vowel constant) nonsense syllabuses such as NAK or PUD and administered on himself (The method of conducting experiment on one self only and using your own experience is known as *introspective method)*. To investigate the nature of memory and forgetting, first he memorised lists of nonsense syllabus until he had reached a pre-defined criterion and then measured the number of syllables retained by him after variable time interval. Further, he also noted the number of trials taken by him to relearn the same list of syllables again at variable time interval. Based on his observations, he came up with the following curve (see Figure 4.6) for explaining the nature of forgetting;



Elapsed Time Since Learning	Retention (%)
Immediately	100
20 minutes	58
1 hour	44
9 hours	36
1 day	33
2 days	28
6 days	25
31 days	21

Figure 4.6: Ebbinghaus forgetting curve
Image Source: http://www.keyandparent.com

This curve is famously known as *Ebbinghaus forgetting curve*. You can see from the graph that the rate of forgetting is the maximum in the starting but after a few hours it becomes slow. Recent studies have reported similar results.

Main theories available in the literature, explaining the causes of forgetting are as follows:

a) ***Theory of Interference***

According to this theory, forgetting occurs due to interference with other memories. This interference can be of two types:

Proactive Interference (Pro=forward) - Forgetting of newly acquired information due to interference from previously learned information.

Retroactive Interference (Retro=backward) - Forgetting of previously stored information due to learning of new information.

The experiments of the both types may be conducted in the following manner:

Retro-active inhibition

Groups	Original Learning	Interpolated Activity	Recall
Control	Learning of list A of 10 Nonsense syllables	Rest for 5 minutes	List A
Experimental	Learning of List B of 10 Nonsense syllables	Learning of list C of 10 Nonsense syllables for 5 minutes	List B

Pro-active inhibition

Groups	Original Learning	Interpolated Activity	Recall
Control	Learning of list A of 10 Nonsense syllables	Rest for 5 minutes	List A
Experimental	Learning of List B of 10 Nonsense syllables	Learning of list C of 10 Nonsense syllables	List C

b) ***Trace Decay Theory***

It is an older theory, also known as disuse theory. Trace decay theory proposes that learning causes change in the central nervous system leading to the formation of *memory traces* or physical changes in the brain due to learning (Brown, 1958). When these memory traces are not used for long time, they fade away leading to forgetting. Thus, the underlying mechanism of this theory is "use it or lose it", i.e., if you do not use your stored information at regular interval of time, then you may be at the risk of losing it.

c) ***Cue Dependent Forgetting Theory***

According to this theory, forgetting can also occur due to the absence of an appropriate cue or presence of poor cue. Suppose you were given a list of objects to buy from the market. By mistake, you lost the list. Now, you are trying your best to recall all the items from the list, but there are good chances that you will forget many. Studies have suggested that if participants were given hint or cue about the category of those items, then it improved their recall. Studies have even suggested that the physical attributes of the environment also play a positive role in retrieval.

d) ***Encoding failure***

As discussed in the earlier section, encoding is an important process in memory. There are many events or objects that are not encoded properly and do not go beyond sensory memory. Thus, it results in failure to process information to memory. Encoding failure is also one of the reasons why people forget things.

Check Your Progress 2

1) Define sensory memory.

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2) What is autobiographical memory?

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3) What is Ebbinghaus forgetting curve?

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4.6 TECHNIQUES TO IMPROVE MEMORY

There are various techniques to improve memory. Different techniques are used for different circumstances. There are four broad principles that govern the memory techniques. They are as follows:

1) Process for meaning: As you learn new material, focus should be on the meaning of the stimuli. To achieve this, one should avoid distraction. In the presence of distraction, we loose our attention towards meaning in what we want to learn and remember.

2) Retrieval process: This is related to retrieval practice. Generate and practice the items that you need to remember from memory rather than read or restudy. Self-testing is the best retrieval practice.

3) Metamemory: It is the awareness and knowledge of our own memories. It helps in reflecting and monitoring memory. This way, it may help in strategic planning, allocation of study hours/resources, evaluation of performance, etc.

4) Distributed learning or practice: This is a superior method than massed practice (also discussed in the first section). So, one should avoid cramming because it is an inefficient way of learning. Distributed practice helps in improved memory efficiency.

Now, let us examine some techniques that aid in retrieving the information and also reduce the amount of forgetting. These are known as **mnemonic** (pronounced as ni-mo-nicks) **aids.**In this section, we will discuss about mnemonic methods or techniques of enhancing memory. There are basically two broad categories of mnemonics; one category of mnemonics uses images, while other uses principles of organization to memorise information.

4.6.1 Mnemonics Using Images

There are many strategies which uses images to improve efficiency in retaining and retrieval of information. Following two types of mnemonics use images:

1) *Method of Loci: Placing images at location*

Loci (pronounced as low-sye), is the plural form of "Locus", which refers to position or place. This method uses the location of a familiar place as a cue to retrieve information. Now suppose, you want to learn a list of objects that you want to buy from a nearby grocery store. The lists contain items like, egg, tomato, pen, washing powder and salt. Now to remember these items, first, visualise each of them to be located in some separate spatial location, such as, in different rooms of your house. Then, mentally go through your house visualising each item in a separate place. After reaching the market, all you need to do is to take another mental tour of your house and recall the items you have placed in different location in a sequence.

2) *Keyword method*

The keyword method is considered appropriate for learning vocabulary and foreign language. In this method, any two pieces of information is linked using images. Now suppose, you want to extend your vocabulary for English language. You come across a word "scowl" which stands for "an angry or bad-tempered expression". In order to learn its meaning, first you need to find a *keyword*, a familiar word that sounds similar to the *target word*, scowl. Now, using an image try to relate your target word with keyword. Since, the word 'scowl' sounds similar to owl, you can imagine a picture of owl with angry expression. Studies have suggested that this method of learning definition or vocabulary is far more superior than rote learning.

Figure 4.7: An owl with angry expression
Image Source: https://pixabay.com

4.6.2 Mnemonics Using Organisation

It improves the ability to learn and retrieve information accurately by applying the principle of reorganization of the material to be learned. In this section, we will discuss two types of mnemonics:

1) *Chunking*

It is a method of combining smaller units into meaningful larger units, such as, if you were asked to remember following series of number

1-9-3-9-1-9-4-5

If you are well versed with world history, then, you can also group these numbers in the following ways;

1939-1945

Second World War started in 1939 and ended in 1945. In this way, you can memorise as well as recall these numbers more accurately. You can also chunk information by using it in a sentences, songs or phrases.Therefore, it can be suggested that it is another way to remember large information. The items are grouped together according to some similarity or common theme at the time of encoding. So, it is easier to recall a chunk of information than individual bits.

2) *First Letter Technique*

In this technique, first letter of each word, you want to memorise, is taken to make a meaningful word or sentence. For example, colour of the rainbow can be remembered using this technique.

Violet

Indigo

Blue

Green

Yellow

Orange

Red

The word VIBGYOR stands for all the seven colours of rainbow.This method is also known as "acronyms", when the word is formed by taking the first letter or groups of letters from a name or phrase to be remembered. It helps in remembering the names of the events or the music notes with ease.

3) *Rhymes*

This involves using a similar sounding word at the end of each line of a verse. This enables to encode the information acoustically.

4.7 SUMMARY

Now that we have come to the end of this unit, let us recapitulate all the major points that we have covered.

- Memory refers to the ability of retaining information and reproducing it over a period of time when required to perform a cognitive task. It has been conceptualised as a process comprised of three stages; (i) encoding, (ii) storage, and (iii) retrieval.
- Information processing model was given by Atkinson and Shiffrin in 1968. According to this model memory consist of three stores or subsystem namely, the sensory memory, short-term memory, and long-term memory.

- Levels of Processing (LOP) model of memory was proposed by Craik and Tulving in 1975. According to this model, whether information will be retrieved successfully or not depends on its level of processing. LOP refers to the level at which information have been encoded. Craik and Tulving (1975) proposed three LOP; physical/structural processing, phonological processing, and semantic processing.
- Baddeley proposed a model for Working Memory (WM). According to his model, WM consists of four components namely, the *central executive,* the *phonological loop,* the *visuospatial sketch pad,* and the *episodic buffer*.
- There are various types of memory namely, semantic memory, sensory memory, episodic memory, false memory, and flashbulb memory.
- Forgetting can be defined as our inability to recall already encoded and stored information from our memory system.
- To understand the nature of forgetting, Hermann Ebbinghaus, a German psychologist, conducted first systematic experiment in 1879.
- The main causes of forgetting are explained in terms of theories, namely, *theory of interference, trace decay theory, cue dependent forgetting theory* and *encoding failure.*
- There are various techniques to improve our memory. These techniques are primarily based on the principles of *process for meaning*, *retrieval practice, metamemory* and *distributed learning or practice.* The main technique to enhance memory is known as mnemonics. There are two broad categories of mnemonics, one category of mnemonics uses images (*Method of Loci and Keyword method).* Whereas, the other method uses principles of organization to memorise information (*chunking, first letter technique, and rhymes).*

4.8 REVIEW QUESTIONS

1) The tendency for prior learning to inhibit recall of later learning is called ____.

   a) Encoding failure

   b) Repression

   c) Retroactive interference

   d) Proactive interference

2) A distinction is made in memory research between ..... memory and ..... memory. The former refers to ....., whereas the latter refers to ..... .

   a) Semantic; short-term; memory for personally meaningful events; memory held in temporary storage

   b) Episodic; autobiographical; memory for personally meaningful events; memory for general knowledge

   c) Semantic; procedural; memory for general knowledge; memory for personally meaningful events

   d) Semantic; episodic; memory for general knowledge; memory for personally meaningful events

3) The storage capacity of long-term memory is best described as

   a) A single item

   b) About seven items

   c) About seven volume

   d) limitless

4) The first step in placing information into memory storage is

   a) Mnemonics

   b) Short-term memory

   c) Sensory memory

   d) Rehearsal

5) ..... determines what information moves from sensory memory to short-term memory.

   a) Encoding failure

   b) Selective attention

   c) Repression

   d) Eidetic encoding

6) Describe the nature and types of memory.

7) Explain Baddeley's theory of working memory.

8) Differentiate between autobiographical memory and false memory.

9) What do you mean by forgetting? Explain any two causes of forgetting.

10) Explain information processing model of memory.

11) Elucidate different techniques to improve memory.

12) Differentiate between episodic memory and semantic memory.

4.9 KEY WORDS

Memory : It refers to the ability of retaining information and reproducing it over a period of time when required to perform a cognitive task.

Forgetting : It is our inability to recall already encoded and stored information from our memory system.

Method of Loci : It is a method of enhancing memory. It uses the location of a familiar place as a cue to retrieve information.

Chunking : It is another memory of remembering and recalling information correctly. In this method, smaller units of information are combined into meaningful larger units.

Autobiographical memory : It is the memory of your own past events or personal experiences.

Working memory : It can be defined as a limited-capacity system for temporary storage and manipulation of information for complex tasks such as comprehension, learning, and reasoning.

Encoding : It is the process of converting sensory information into a form that can be processed further by the memory systems.

Retrieval : It refers to locating and bringing the stored material to one's awareness when required to complete a task.

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- Ebbinghaus forgetting curve. Retrieved September 17, 2018, from http://www.keyandparent.com/Newsletter/04/news.html
- An owl with angry expression. Retrieved September 17, 2018, from https://pixabay.com/en/owl-animal-bird-angry-156933/

4.12 ONLINE RESOURCES

- For more understanding on the theory of level of processing, visit
  - http://shodhganga.inflibnet.ac.in/bitstream/10603/41677/9/09_chapter%202.pdf
  - https://www.instructionaldesign.org/theories/levels-processing/
  - http://wixtedlab.ucsd.edu/publications/Psych%20218/Craik_Lockhart_1972.pdf
- For more understanding on Baddeley's working memory, visit
  - http://www.csuchico.edu/~nschwartz/1.%20Working%20Memory%20-%20Theories%20and%20Models%20and%20Controversies.pdf
  - https://app.nova.edu/toolbox/instructionalproducts/edd8124/fall11/1974-Baddeley-and-Hitch.pdf
  - https://www.cs.indiana.edu/~port/HDphonol/Baddely.wkg.mem.Science.pdf
  - https://www.unige.ch/fapse/logopedie/files/1914/1285/1086/article1-barrouillet.pdf
- For a glimpse on how false memory can influence one's life and judiciary system, visit

- https://www.wired.co.uk/article/false-memory-syndrome-false-confessions-memories
- https://www.theguardian.com/science/2017/sep/23/inside-case-of-repressed-memory-nicole-kluemper
- https://www.theguardian.com/science/2010/nov/24/false-memories-abuse-convict-innocent
- https://www.independent.co.uk/news/false-memory-ends-sex-assault-case-1354848.html

- For more understanding on forgetting, visit
  - https://courses.lumenlearning.com/boundless-psychology/chapter/the-process-of-forgetting/
  - http://thepeakperformancecenter.com/educational-learning/learning/memory/forgetting/
  - http://psychologyrats.edublogs.org/files/2012/02/Unit_3_2012_INSJ_Theories-of-Forgetting-1612h26.pdf
  - http://socialscientist.us/nphs/psychIB/psychpdfs/TheoriesofForgetting.pdf
- For more understanding on mnemonics memory strategies, visit
  - https://www.memory-key.com/sites/default/files/books/mnemonics.pdf
  - http://www.ucdenver.edu/life/services/LRCOLD/Documents/Self-paced%20trainings/memory%20Techniques-%20student%20version.pdf
  - http://thepeakperformancecenter.com/educational-learning/learning/memory/memory-techniques/
  - https://www.mobap.edu/wp-content/uploads/2013/01/memorystrategies.pdf

Answers of Multiple Choice Questions

(1) d, (2) d, (3) d, (4) c, (5) b

BLOCK 3

MOTIVATION AND EMOTION

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THE PEOPLE'S
UNIVERSITY

UNIT 5 MOTIVATION*

Structure

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5.0 LEARNING OBJECTIVES

After having read this unit, you will be able to:

- explain the meaning and nature of motivation;
- identify the types of motivation;
- compare and summarize various theories of motivation; and
- describe the nature of frustration and conflict.

5.1 INTRODUCTION

Consider the following examples:

Example 1: *Sheena was taking part in 100 meters marathon in her college. But as she started running, there was a cramp in her left leg. But, despite the pain and discomfort, Sheena managed to finish the race and secure the first prize. What do you think might have made Sheena continue in the race and perform to her best?*

Example 2: *Sania's brother was getting married the next day and despite being preoccupied with the marriage preparations, she ensured that the report that she had to submit to her boss, was prepared and submitted as per the time given to her. What do you think promoted Sania to prepare the report and submit it in time?*

In the above two brief examples, the main question that arises is why the person (Sheena and Sania) behaved in that particular way. What was the driving force behind their behaviour? In our day today life as well, you will come across such behaviours, where you may wonder why certain individuals behaved the way they did. From getting something to eat, to helping a person injured in an accident, to completing work in time, one of the significant factors that can play a role is motivation. As certain behaviours may be displayed due to motivation, it is also possible that an individual may not behave in certain ways because of lack of motivation. For example, a student may not do well in his/ her examination because he/ she never felt motivated enough, intrinsically or extrinsically or an individual may not perform to his/ her best at work due to lack of motivation.

From the above examples, it may be concluded that motivation is a key factor that determines human behaviour and thus, it is also important, as a student of psychology, that we understand this term in a better way. Therefore, in this unit, we will discuss the concept of motivation in detail. First, we will talk about definition, nature and types of motivation. Then, we will discuss various theories explaining the concept of motivation.

5.2 MOTIVATION: CONCEPT

Motivation is the need within the individual to do something or to fulfill your desire. There are certain internal and external factors that are responsible for stimulating a desire and providing us with the energy to pursue our goals, needs and desires. Motivation involves three aspects that need to be understood. First, it talks about a need state in the organism that drives him/her towards the satisfaction of the bodily need. This need could be due to internal thoughts and feelings or could be due to external factors in the environment. Secondly, this need then induces a state of arousal or an action tendency. Thirdly, the action is directed towards attaining some goal.

5.3 NATURE OF MOTIVATION

The motives are responsible for propelling our action tendencies towards a desired state or goal. Motives are not visible directly, rather they are inferred from our behaviors. For example, if we observe a student working hard day and night on her/his task, we infer that she/he is motivated to score high. If we are able to make accurate inferences then we are also able to explain the behavior observed more accurately. For example, the choice of college that you take admission in, will explain if you have a need to learn or to belong to an institution to get a degree for a good job or because it is in close proximity. The motives help us to make choices which also in a way help us to make predictions about behavior. For example, if two friends always come together for a class, we predict that they are good friends, or if one is absent from the class, we may predict the other one will also be absent. The predictions may not be accurate but we can get a fair idea about the probability of the response or behaviour.

There is a motivational cycle that helps us to understand behavior (Morgan & King, 1979).This motivational cycle starts with a *need*, a state of lack or deficit of some necessity. The state of need leads to a *driving state.* Drives can be stimulated due to internal factors or external factors. Internal factors could be thoughts and memories while external factors could be the environmental factors. This driving state *arouses* you and pushes you to perform some *goal-directed behaviour*. For example, if we are thirsty there is a need for water, this need will drive us towards attaining water and once we have consumed water, the need is satisfied and the drive is reduced or diminished. So, once the performed behaviour leads to the *achievement* of desired goal, it reduces the drive and organism returns to a balanced state. The motivational cycle ends here. Then it arises again after a while when the urge for water (or any other need) arises again. Figure 5.1 illustrates the motivational cycle.

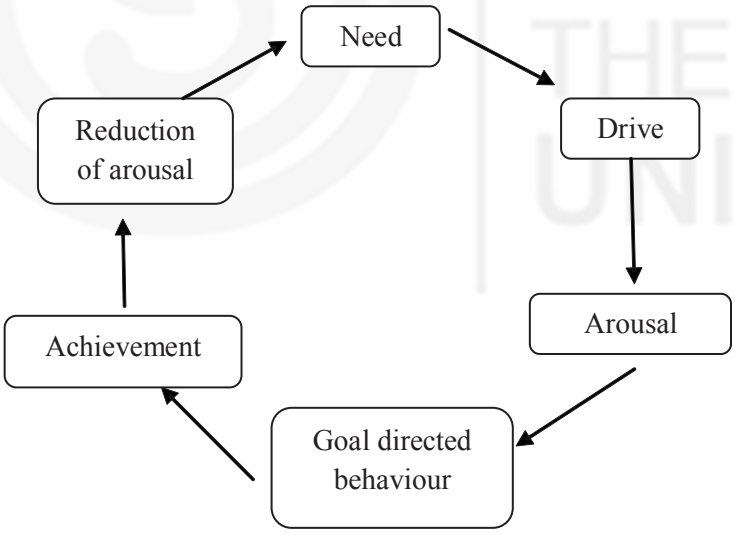

Figure 5.1: The motivational cycle

Before describing further, let us discuss the four terms that are related to motivation. These four terms are needs, drives, incentives, and motives.

Needs: These are related to the biological states of cellular or bodily deficiencies that lead to drives. For example, individuals need water, food and oxygen to survive (Feist and Rosenberg, 2015).

Drives: Feist and Rosenberg (2015, pg 397) define drives as "the perceived states of tension that occur when our bodies are deficient in some need, creating an urge

to relieve the tension". This means that need leads to or compels drive. Thus, when an individual is hungry, she/he will seek food. The need leads to drive and makes individual to behave in such a way that the deficiency created is dealt with.

Incentives: This is external or is from the environment (as opposed to drive that is internal) and plays a role in motivating behaviours. It could be an object or an event. For instance, a trophy won in a game can be termed as an incentive to do well in that game.

Motives: Most often the terms motivation and motives are used interchangeably. However, they are different as motivation can be termed as a general term, whereas motive is a specific term. Motive is something that actually drives an individual to take certain action and motivation is the process within which a motive drives an individual towards certain action.

Box 5.1: Few definitions of Motivation

The term motivation has been derived from a Latin word '*movere*', which means 'to move'. There are various definitions of motivation and some of them have been mentioned as follows:

Feldman (2015, pg. 287) defined motivation as "*the factors that direct and energise the behaviour of humans and other organisms*".

Feist and Rosenberg (2015, pg. 397) define motivation as "*the urge to move towards one's goals, to accomplish tasks*".

Chamorro- Premuzic (2015, pg. 272) defined motivation as *"an internal state, dynamic rather than static in nature, that propels action, directs behaviour and is oriented toward satisfying both instincts and cultural needs and goals"*.

Quick, Nelson and Khandelwal (2013, pg. 172) defined motivation as *"the process of arousing and sustaining goal directed behaviour"*.

Nolen-Hoeksema, Fredrickson, Loftus & Lutz (2009, pg 419) describe motivation as "*a condition that energizes behaviour and gives it direction*".

Check Your Progress 1

1) Define motivation.

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2) Explain motivational cycle.

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3) Differentiate between needs, drives and motives.

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5.4 TYPES OF MOTIVATION

This section will explain the types of motives.

5.4.1 Biogenic Motives

Also known as biological motives, these are used as the cause to understand behaviour by earlier psychologists. When there is a departure from the balanced physiological state of the body, known as *homeostasis,* it arouses various biological motives to restore the balance. This balance is very important for life. There are many such motives. Some of the basic biogenic motives will be discussed in this section, like hunger, thirst and sex.

5.4.1.1 Hunger Motivation

When there is a lack of food in the stomach, it causes hunger pangs. The stomach contracts and initiates a hunger drive. There are many reasons for hunger. Many studies have shown that after fasting, when the person uses too much of blood sugar or glucose, it causes hunger. Friedman and Stricker (1976) suggested that when there is a change in the metabolic functions of the liver, and food is less, then it initiates hunger. There are two areas of the *hypothalamus* that seem to be involved in hunger. Research has shown that when lateral hypothalamus is stimulated, it initiates eating behavior. On the other hand, if this area is damaged, then it causes the animal to stop eating (Epstein, 1960). Ventro-medial area of the hypothalamus is also involved in hunger motivation. It is known to be the inhibitory area for hunger drive. Epstein (1960) showed in his experiments that when the ventro-medial hypothalamus is damaged, then the animal does not know when to stop eating and they become over weight.

The eating behavior is also stopped by other factors. The smell of food, indigestion of food and, taste of food are secondary factors that may stop eating behaviour. Gibbs, Young and, Smith (1973) have shown in their study that when food reaches intestine it releases a hormone in our blood known as CCK or cholecystokinin. Thus, they showed that other factors also play important role in regulating hunger,particularly stop signals as *satiety* (the absence of hunger motivation) which signals the animal to stop eating anymore. Hunger motivation is also believed that it depends upon the levels or rates of use of dissolved nutritive substances flowing in the blood. If the levels fall below a certain point, known as *set point*, hunger drive is caused and food is absorbed to raise the blood levels of nutrients back to

the set point. Hence, both internal and external factors are important in regulating the eating behavior.

5.4.1.2 Thirst Motivation

It is believed that thirst and drinking are regulated by the body internally. When the mouth is dry, then only one feels thirsty. The Antidiuretic Hormone (ADH) plays an important role in regulating the water level in the body. ADH prevents the loss of water from the kidney. It has been suggested that the thirst drive and drinking behavior are instigated by the loss of water from the cells or the decrease in the volume of the blood. When there is a reduction in the level of water in the body fluids, then the water moves out from the cells into the fluids. This dehydrates the interior part of the cells. The osmoreceptors (nerve cells which generate nerve impulses when dehydrated) generate nerve impulses when they are dehydrated. These nerve impulses are mere signals that initiate drinking behavior. When thirst is caused by the loss of water from the osmorecpetors, it is known as *cellular-dehydration thirst.*

The loss of water from the body also causes a condition known as **hypovolemia**. In this condition, there is a reduction in the blood volume which causes a decrease in the blood pressure. This reduction in blood pressure causes the kidneys to release *renin*, an enzyme that helps in the formation of angiotension II. Angiotensin II is a substance that moves about in the blood and tends to stimulate drinking behavior.

Double-depletion hypothesis explains when both the conditions of hypovolemia and cellular dehydration are at work. Drinking often stops when the mouth and stomach signal that no more water intake is required. Also, when the osmoreceptors are hydrated, the blood plasma level reaches its normal volume.

5.4.1.3 Sex Motivation

Sexual drive depends upon the physiological condition of the body. It is also considered as a biological drive. There are various ways in which this drive varies from hunger and thirst drive. The sexual drive does not respond to any deficiency in the body or lack of some substance in the body. Thus, it is not initiated by any homeostatic imbalance or presence of any excessive hormones in the body. In males, the level of the male hormone *testosterone* is responsible for sexual drive. In females, the female hormone, *estrogen* is responsible for the sexual behavior. Hypothalamus regulates the hormone release.

Hunger and thirst drives are necessary for survival but sexual drives are not necessary for survival, though it is important for the species survival. There are various external stimuli that trigger sexual drives. This could be like the odors, smell or sight of the attractive partner may stimulate this drive. Though, the family upbringing and social norms may also play an important role in the expression of sexual behavior.

5.4.2 Psychogenic Motives

Psychogenic motives are also called general motives. These motives do not arise either because of learning or homeostatic imbalance. These are innate, tend to persist through out one's life and are often difficult to satisfy. These are motive to explore the environment, the motive to master the challenges and deal with the difficulties by being competent, and by self-actualization (by doing what one is capable of doing the best of his or her ability).

5.4.2.1 Exploration of the Environment

Exploration is a motive when any person or animal or organism actively moves around in his/her new environment curiously. We all have this desire to know more about a new place than a previously visited one and hence, indulge in exploring the area with inquisitiveness. Once the drive is satisfied, we have an urge to explore another avenue that is novel for us. Thus, we explore the environment because of curiosity. An active interest in new places or events or situations are pursued. Many scientists have made wonderful discoveries and invented new things, concepts,etc by pursuing their curiosity for the unknown. Both human beings as well as animals have a great interest for new situations. Some also explore for satisfying the sensory receptors. That is sensory stimulation also provides an impetus to get involved in various kinds of activities. This perhaps explains why we watch TV or listen to music or drive, etc. There is an inherent need for sensory stimulation and this changes once we get accustomed to the stimulus.

5.4.2.2 Competence Motive

Competence is the ability to master the challenges in the environment. It is also known as *effectance motivation*,a tendency to explore and influence one's environment (White, 1959). According to Susan Harter (1978), "competence motivation increases when a person successfully masters a task. This encourages the person to master more tasks".

5.4.2.3 Self-Actualization

This motive helps the person to achieve or become what one is capable of becoming. It enables a person to maximize his or her own potential. Maslow (1954) proposed a need hierarchy model with different needs at different levels. First, the lower level needs are satisfied followed by the higher level needs. Maslow's hierarchy of need starts with the *physiological needs* such as hunger, thirst and sex, which is followed by *safety needs* i.e., need for security, stability, and order. Once this level is satisfied, then the third level of needs are *belongingness and love needs*, where need for affection, affiliation and identification are developed. The next level needs are the *need for esteem*, that includes the need for prestige, success, and self-respect. The highest level of this hierarchy related to the need for *self-actualization*. This is at the top most level and not many people are able to reach the top most level of the need hierarchy.

Box 5.2: Extrinsic and Intrinsic Motivation

Extrinsic Motivation originates in factors outside the individual. Behaviour is motivated by rewards and punishments which are extrinsically determined.

Intrinsic Motivation is a term used to refer to the motivation for any behaviour that is dependent on factors that are internal in origin. It is usually derived from feelings of satisfaction and fulfillment and not external rewards.

5.4.3 Sociogenic Motives

The sociogenic needs are more complex as they are extrinsic needs that are learned in social groups, as peers, or family where one grows. These needs may vary from person to person, depending upon the personality type. There are many kinds of social motives and it is very difficult to suggest which is most important or which is least important. It is also very difficult to measure social motives. *Achievement motivation*, a type of sociogenic motive, refers to the need to achieve or accomplish on a task and surpass the other people. *Affiliation motivation* implies the need to make friends and seek co-operation with others. *Aggression motive* refers to

the need to fight and take revenge, to belittle or curse or ridicule the other. *Nurturance motive* is the need to take care of others or to help others when they are in a problem or sick. *Dominance motives* are displayed when a person tries to control or influence the other person, to become a leader. The *power motive* is the need to gain power or do things that make a person feel powerful and strong.

Box 5.2: Primary and Secondary Motivation

Primary motivation can also be termed as basic motivation and mainly includes the needs related to hunger, thirst, sleep, sex, avoidance of pain and so on. These mainly influence an individual's behaviour at a basic level and these needs are also related to the basic need for preservation of self.

Secondary motivation can be termed as learned motivation and these may differ from individual to individual. They are also related to the priorities and values of the individual. These will be further discussed under drive reduction theory.

Check Your Progress 2

1) Define biogenic motives, psychogenic motives and sociogenic motives.

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2) What is double-depletion hypothesis?

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3) What do you mean by competence motivation?

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5.5 THEORIES OF MOTIVATION

By this point in the text, you will now be able to define motivation and differentiate between biogenic and psychogenic motives. This section will now discuss the various theories of motivation:

5.5.1 Evolutionary Approach

The psychologists in the beginning were concerned with biologically determined and innate characteristics of behavior called *instincts.* Instincts are present both in animals and humans. Migration patterns, mating, nest-building, territoriality, etc are governed by instincts. Similarly, behavior in humans like, reproduction, is instinctual and responsible for sexual behavior (James, 1890; McDougal, 1908). In the beginning, William Mcdougall recognised 18 types of instincts. This approach could describe but not explain behavior.

5.5.2 Drive-reduction Model

The drive theory is one of the approaches to motivation. When there is a need, it creates psychological tension and physiological tension then that drives the organism to reduce the tension by fulfilling the need. This tension is known as *drive* (Hull, 1948). These theories are also called as the push theories of motivation as "the behaviour is pushed towards goals by driving force within the person or animal" (Morgan, King, Weisz & Schopler 1996, pg. 269).

Drive reduction model states that "lack of some basic biological need produces a drive to push an organism to satisfy that need" (Feldman, 2015 pg. 288). Drive was defined earlier in this unit and it can be explained as a tension or arousal that channelizes behaviour to fulfil a need. Drives can be of two types, primary and secondary. The examples of primary drives are thirst, hunger, sleep and sex that are mainly related to the physiological needs of an individual. Secondary drives are related to the previous experience and learning that lead to development of a need. For example, need for achievement in one's field of work. Thus, this secondary drive will then channelize their work related behaviour.

An important term that needs to be discussed under this model is homeostasis, which can be explained as "the process by which all organisms work to maintain physiological equilibrium or balance around an optimal set point" (Feist and Rosenberg, 2015, pg 398). It can also be explained as the tendency of the body to maintain an internal state that is balanced or steady (Feldman, 2015). Thus, whenever there is any deviation from the ideal state or the set point, then the adjustments will be made by the body to reestablish the balanced state or achieve the set point thus restoring the balance. Homeostasis helps operate the needs related to food, water, sleep, body temperature and so on.

Drive reduction theory adequately explains how behaviour is channelised by primary drives. However, it does not adequately explain behaviours that have goals to maintain or increase arousal. For example, it may not help in explaining behaviour of an adolescent who enjoys a roller coaster ride or rides his/ her bike in full speed. Thus, as such a behaviour that is thrilling and a behaviour related to curiosity cannot be explained with the help of this model.

5.5.3 The Optimal Arousal Model

As it was discussed under drive reduction model, that the model cannot be applied to explain the behaviour related to curiosity or behaviour that seek thrill. In such cases, the optimal arousal model can be used. This model is based on the work carried out by Yerkes and Dodson in 1908, referred to as the Yerkes- Dodson law (Feist and Rosenberg, 2015). The model states that "we function best when we are moderately aroused or energised and both low and high arousal/ energy levels lead to poor performance" (Feist and Rosenberg, 2015, pg 399). Figure 5.2 illustrates the relationship between performance and arousal.

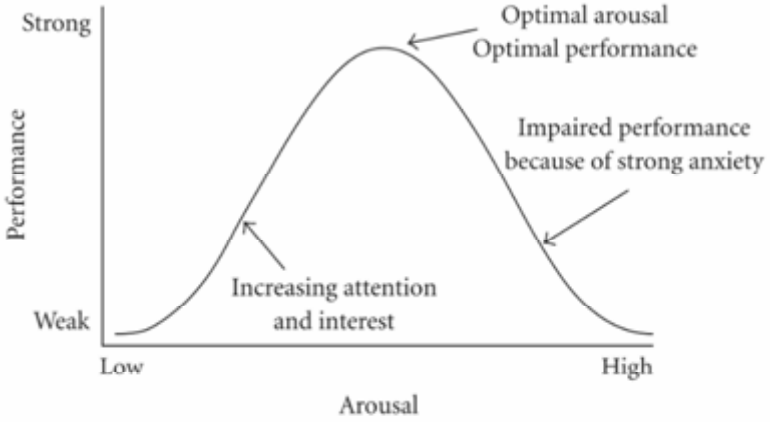

Figure 5.2: The Yerkes- Dodson law
Image Source: https://en.wikipedia.org

When the arousal is low or high the performance is also low, however, an optimal level of arousal leads to high performance. Thus, it can be said that individuals are motivated when certain situation is not very high or low in stimulation.

5.5.4 Incentive Theories

These can also be described as 'pull' theories (Morgan et al, 1996). These theories state that the motivation is as a result of desire to achieve external rewards or incentives. For example, a chocolate could serve as an incentive for a child to do his/ her homework in time, even though he/ she may not actually be hungry (that would be a cue that is internal). Though, these theories do not explain why an individual may desire to fulfil certain needs even when no incentive is provided.

Thus, it can be said that both, the drive reduction model and the incentive theories are relevant and can be considered together to explain what motivates certain behaviours. For example, when hungry, an individual will seek food (drive reduction model), however, he/ she will seek food that seems to be more appetising or appealing (incentive).

5.5.5 Cognitive Approaches to Motivation

This approach states that "motivation is a result of people's thoughts, beliefs, expectations and goals' (Feldman, 2015, pg 289). Thus, a student will be motivated to study for examination based on his/ her expectation whether studying will lead to obtaining good marks in examination. This theory also helps differentiate between the intrinsic and extrinsic motivation. Individuals are more likely to work on a certain task or towards achieving a certain goal when he/ she is intrinsically motivated as opposed to extrinsically motivated. And it may so happen that attempts to increase extrinsic motivation may lead to decrease in intrinsic motivation (Feldman, 2015).

5.5.6 Goal-setting Theory

Goal-setting theory (Locke & Latham, 1990) proposes that motivation can be influenced by goals. The theorists concluded from their study that people performed better on tasks when they were given some specific goals rather than when they were told 'to do their best'. This approach is found to work when the goals are specific and challenging but attainable. People perform better when they are given feedback about their performance.

5.5.7 The Hierarchical Model

This model was proposed by Maslow, often termed as Maslow's hierarchy of needs. In this model, the needs are placed in a hierarchical order. The model then states that the basic needs are to be fulfilled before the higher order needs are met. Maslow's hierarchy of needs can be explained with the help of a pyramid with basic needs at the bottom of the pyramid and the higher order needs at the top of the pyramid (see Figure 5.3).

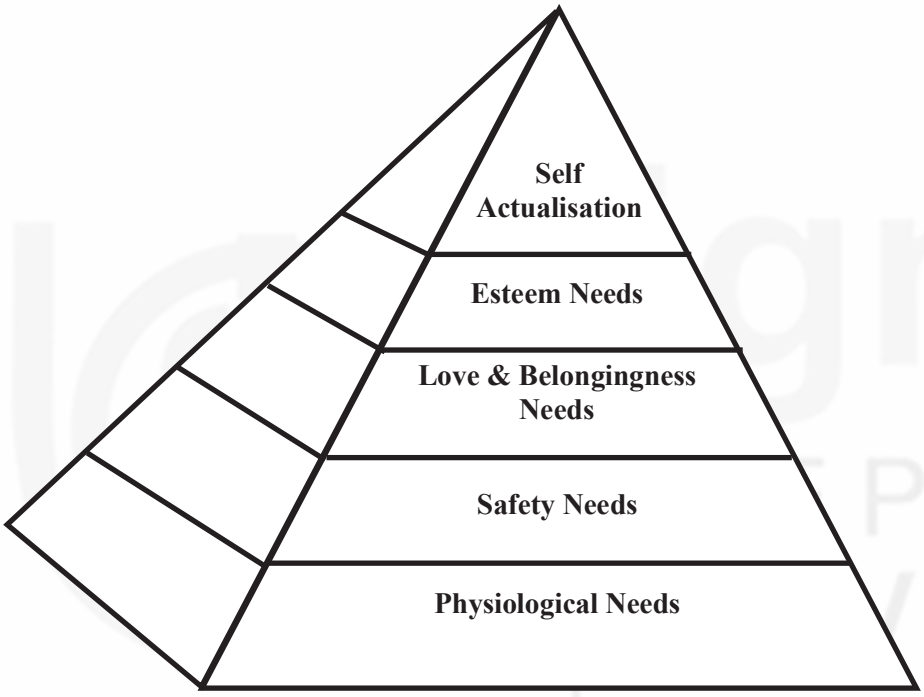

Figure 5.3: Maslow's hierarchy of needs

As shown in Figure 5.3, the basic needs are the physiological needs (related to the primary drive) namely, need for food, water, sleep and sex. This is followed by the safety needs that are related to the need for an environment that makes us safe and secure. These two needs can be termed as lower order needs and once these are fulfilled, then the individual will move on to the other higher order needs. The next need is that of love and belongingness, that is related to the give and take of affection. This need is followed by yet another higher order need, that is, esteem needs, that are related to the need for development of a sense of self worth. And the last need is that of self-actualisation, that is related to need for realisation of one's full potential (Feist and Rosenberg, 2015) or can also be termed as a state of self-fulfilment (Feldman, 2015). When self-actualization is achieved temporarily, there might be **peak** or **mystical experiences.** Self-actualizers know moments of intense ecstasy that can occur with virtually any activity.

5.5.8 Self-determination Theory

Closely related to the hierarchical model, is the self-determination theory proposed by Richard Ryan and Edward Deci (2000). The theory postulates that there are three innate and universal needs that helps the individual to gain complete sense of self and building healthy relationships with others. The three needs are *autonomy* which means controlling one's behaviour; *competence,* which means the ability to master challenging tasks; and *relatedness* refers to the sense of belongingness and forming secured relationships.

5.5.9 Self-theory of Motivation

Personologist Carol Dweck (1999) proposed that need for achievement is related to personality factors. The need for achievement is influenced by perception of self (beliefs about one's abilities and relationship with others). This affects success and failures of one's actions. This approach is closely related to *locus of control* (Rotter, 1966). When people presume that they have control over what happens in their lives, have internal locus of control. While people who think that their lives are controlled by factors like luck, fate, etc., have external locus of control.

5.5.10 Alderfer's ERG theory

The Existence, Relatedness and Growth (ERG) theory (developed between 1961 to 1978) by Clayton P. Alderfer is similar to the theory proposed by Maslow. However, the theory highlights only three levels in place of five levels. At the lowest level of the hierarchy are the existence needs and as the name suggests these are basic needs related to the physiological needs and the safety needs. The next level are the relatedness needs that are related to social relationships. The last level is that of growth needs and these are related to the need to achieve one's potential, develop competence and so on. The theory is mostly applied to workplace motivation to increase productivity and morale of the employees.

5.5.11 Herzberg's two-factor Theory

Frederick Herzberg's theory mainly focuses on two main factors that are hygiene factors and motivational factors and states that satisfaction and dissatisfaction arise from these two factors. Satisfaction and dissatisfaction are the two extremes and as such opposite of satisfaction is no satisfaction (and not dissatisfaction) and the opposite of dissatisfaction is no dissatisfaction (and not satisfaction). This theory mainly finds its application to work set up. The hygiene factors and motivational factors have been shown in Table 5.1.

Table 5.1: Hygiene and Motivational factors

Hygiene factors	Motivational factors
– Adequate workload and working conditions – Salary; – Good relationship with supervisor, peers and subordinates; – Security	– High salary and bonuses – Achievement/ promotion – Recognition; – Responsibility; – Advancement and growth

The hygiene factors determine the level of dissatisfaction and if these needs are taken care of, then dissatisfaction will be low in the individual. Though, this will not contribute to satisfaction in the individual and the motivational factors are required to ensure that the individual experiences satisfaction.

5.5.12 McClelland's Acquired Needs Theory

This theory was developed by David McClelland (1961, 1987) and it highlights the three basic needs: achievement, affiliation and power. See the three needs summarized in Table 5.2. **nAch, nAff,** and **nPow** are abbreviations used by McClelland.

Table 5.2: The three basic needs stated by McClelland

Need for achievement	This is related to achieving excellence, goals that are challenging, overcoming obstacles and difficulties, competition and persistence, need to master skills and so on. People high on *nAch* want to accomplish goals and set challenging goals for themselves. They also need *feedback* about their performance.
Need for affiliation	This is related to maintaining close and intimate relationship with others. People high on *nAff* want to be liked by others.
Need for power	This is related to having an influence, impact, control over others. People high on *nPow* would like to influence others and make an impact on them.

Thus, the above theories help us to understand the concept of motivation from different perspectives.

Check Your Progress 3

1) Explain the drive reduction theory of motivation.

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2) Explain Yerkes- Dodson law.

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3) List the lower and higher needs as explained by Maslow.

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4) Differentiate between need for achievement and need for power.

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5.6 FRUSTRATION AND CONFLICT

Till now, we talked about the process of motivation and various types of motives that play important role in our behaviour. Now, we will try to understand what happens when our motivated behaviour is blocked due to some reasons and what happens when we have to choose between two motives.

5.6.1 Frustration

When the goal-directed behavior is blocked due to some or the other reason it leads to a psychological situation known as *frustration*. Sources of frustration includes (i) environmental factors- it may include situations, people or any physical object that hinders the attainment of goal, (ii) personal factors- such as, lack of resources, ability or intelligence to reach your desired goal and, (iii) conflicts- it arises when you have to choose between different contradicting motives.

Frustration leads to manifestation of various types of behavioural and emotional reactions such as depression, anger, irritation, crying, avoidance, etc. Notably, in 1939, Dollard and Miller proposed "*Frustration-aggression hypothesis*" also known as "frustration-aggression-displacement theory". This hypothesis states that blocking of goal (frustration) is the cause of aggression or in other words aggression is the result of frustration.

Box 1.3

Research suggests that frustration is one of the reasons for aggression. But many people become depressed rather than being aggressive (Berkowitz, 1989) and people also become aggressive as it is a part of their role or job requirement.

5.6.2 Conflict

When you have to choose between contradictory motives, needs or desires, then it leads to conflict. Basically, there are four types of conflict: (i) approach-approach conflict (ii) avoidance-avoidance conflict (iii) approach-avoidance conflict, and (iv) double approach-avoidance conflict.

i) Approach-approach conflict: When there are two goals that are equally appealing,

then it leads to this form of conflict. In such a situation, the person is attracted to two goals that are positive at the same time. This is resolved by satisfying one goal and letting go the other goal. It is relatively easier to resolve (see Figure 5.4). For instance, watching movie with friends or going to a party with family members.

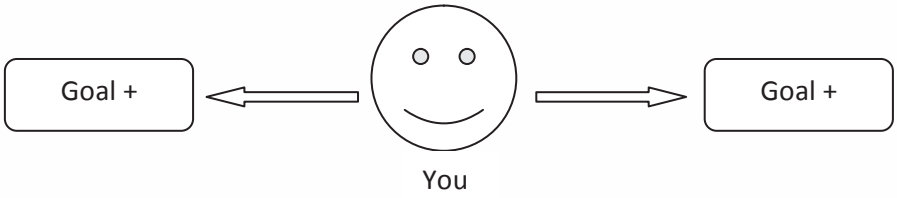

Figure 5.4: Approach-approach conflict

ii) Avoidance-avoidance conflict: When two goals are equally undesirable or unattractive then the person is caught in avoidance-avoidance conflict. The person is tempted to leave the conflicting situations and avoid either of the negative situations (see Figure 5.5). When the conflict is intense a person may simply 'leave the field' and refuse to choose between alternatives.

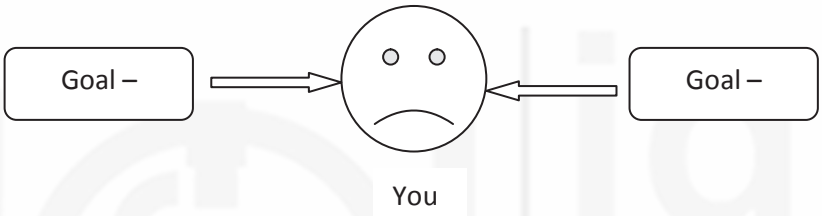

Figure 5.5: Avoidance-avoidance conflict

iii) Approach-avoidance conflict: In this form of conflict,the person is attracted to and also wants to avoid the same object or situation (see Figure 5.6). For instance, Farhat working in a company, is offered a job promotion (approach). However, to accept the promotion, she has to move to another city, away from family (avoidance).

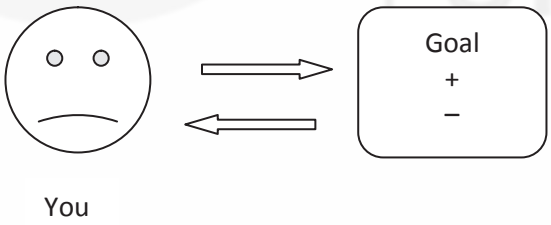

Figure 5.6: Approach-avoidance conflict

iv) Double approach-avoidance conflict: There is another form of conflict. It involves two or more goals that may be positive as well as negative at the same time. For example, if a person buys a house away from the city for the positive aspects like fresh air, open space, less congestion, but it also means that the person has to commute long distance for workplace and be away from city life. Thus, living in the city will have both advantages and disadvantages. Generally, it is resolved by opting for a more positive option (see Figure 5.7).

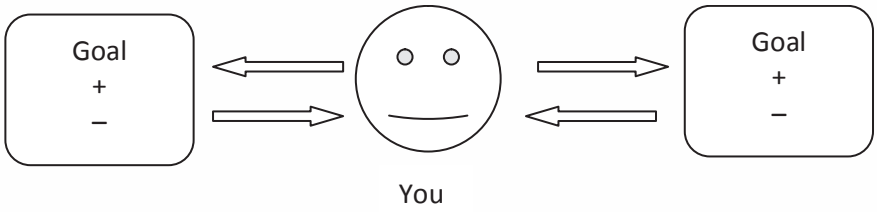

Figure 5.7: Multiple approach-avoidance conflict

Check Your Progress 4

1) What do you mean by frustration and what are its different sources?

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2) How conflict is caused and explains various conflicting situations?

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5.7 SUMMARY

Now, that we have come to the end of this unit, let us recapitulate all the major points that we have covered.

- Motivation is any internal or external force that activates and directs our behaviour.
- There are related terms like need (related to the biological states of cellular or bodily deficiencies that lead to drives), drives (a perception of state of tension that occurs when the body feels some kind of deficiency which creates a pressure to relive the tension) and incentives (this is external or is from the environment (as opposed to drive that are internal) and plays a role in motivating behaviours.
- There are broadly three types of motivation: biogenic, psychogenic and sociogenic.
- Biogenic motivations are basic biological needs such as hunger, thirst and sex. Sociogenic motives are extrinsic needs that are learned in social groups, as peers, or family where one grows. Whereas, psychogenic motives are those motives are innate needs such as need for competence or self-actualization.
- Motivational behavior is explained with the help of theoretical approaches. Theories like drive reduction model, the optimal arousal model, incentive theories, cognitive approaches to motivation, the hierarchical model, Alderfer's ERG theory, Herzberg's two-factor theory, McClelland's acquired needs theory, and self-determination theory are some of the important approaches.

- When goal-directed behaviour is blocked it leads to frustration. And when a person has to choose between incompatible goals then it leads to the situation of conflict. There are four types of conflict i) approach-approach conflict ii) approach-avoidance conflict iii) avoidance-avoidance conflict iv) double approach-avoidance conflict.

5.8 REVIEW QUESTIONS

1) If the lateral hypothalamus is destroyed, a rat will

   a) drink more water than biologically needed

   b) refuse to drink until forced to do so

   c) eat until it become obese

   d) refuse to eat until forced fed

2) If your body is dehydrated, but you are not thirsty, we would say that you have

   a) a drive but not a need

   b) a need but not a drive

   c) both a drive and a need

   d) neither a drive nor a need

3) The maintenance of steady states of temperature and blood pressure are examples of

   a) thermostasis

   b) homeostasis

   c) intrinsic motivation

   d) biological rhythm

4) What is the correct order of needs in Maslow's hierarchy?

   a) physiological; esteem; safety; self-actualisation; love and belonging

   b) self-actualisation; physiological; safety; love and belonging; esteem

   c) physiological; safety; love and belonging; esteem; self-actualisation

   d) self-actualisation; safety; love and belonging; esteem; physiological

5) The _____ describes the relationship between arousal level, task difficulty, and efficiency of performance

   a) Arousal theory

   b) Drive reduction theory

   c) Yerkes-Dodson law

   d) Inverted-U function

6) What is thirst motivation? Explain cellular- dehydration thirst.

7) Explain motivational cycle with the help of a diagram.

8) Explain sociogenic motive and its types.

9) What do you understand by conflict? Explain its causes.

5.9 KEY WORDS

Needs : These are related to the biological states of cellular or bodily deficiencies that lead to drives. For example, individuals need water, food and of course oxygen to survive.

Drives : It can be defined as the perceived states of tension that occur when our bodies are deficient in some need, creating an urge to relieve the tension.

Incentives : This is external or is from the environment (as opposed to drive that are internal) and plays a role in motivating behaviours. It could be an object or an event.

Self-actualization need : This motive helps the person to achieve or become what one is capable of becoming. It enables a person to maximize his or her own potential.

Drive reduction model : This model states that lack of some basic biological need produces a drive to push an organism to satisfy that need.

Homeostasis : The process by which all organisms work to maintain physiological equilibrium or balance around an optimal set point. It can also be explained as the tendency of the body to maintain an internal state that is balanced or steady.

Sociogenic motives : Extrinsic needs that are learned in social groups, as peers, or family where one grows. Need for achievement or affiliation are two examples of these motives.

Psychogenic motives : Innate needs such as need for competence or self-actualization.

Biogenic motives : Basic biological needs such as hunger, thirst and sex.

Frustration-aggression hypothesis : Aggression is the result of frustration.

Conflict : It is that situation in which you have to choose between contradictory motives, needs or desires.

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5.11 REFERENCES FOR FIGURE

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5.12 ONLINE RESOURCES

- For informationon motivation as a concept, visit
  - http://shodhganga.inflibnet.ac.in/bitstream/10603/77445/8/09_chapter_01.pdf
- For more understanding on types of motivation, visit
  - https://www.princeton.edu/~rbenabou/papers/RES2003.pdf
  - http://ijbssnet.com/journals/Vol_3_No_24_Special_Issue_December_2012/24.pdf
- For more understanding on theories of motivation, visit
  - https://www.tankonyvtar.hu/hu/tartalom/tamop412A/2011-0023_Psychology/030300.scorml
  - http://www.basicknowledge101.com/pdf/control/Motivation.pdf
  - https://nscpolteksby.ac.id/ebook/files/Ebook/Business%20Administration/ARMSTRONGS%20HANDBOOK%20OF%20HUMAN%20RESOURCE%20MANAGEMENT%20PRACTICE/19%20-%20Motivation.pdf
- For more information on Frustration-Aggression Hypothesis, visit
  - https://psFrychclassics.yorku.ca/FrustAgg/miller.htm

Answers of Multiple Choice Questions

1) (d), 2) (b), 3) (b), 4) (c), 5 (c)

UNIT 6 EMOTIONS*

Structure

6.0 LEARNING OBJECTIVES

After studying this unit, you will be able to:

- explain the concept of emotions;
- describe the nature and identify the types of emotions;
- differentiate between emotions, moods and feelings; and
- discuss various theories of emotions.

6.1 INTRODUCTION

Try to observe the people around you, especially their emotions. Are you able to tell when they are happy or when they are sad or angry? Most often we can say

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whether people are happy, angry, sad or even surprised based on their facial expressions or even vocal expressions. As a student of psychology, it is important that we discuss the concept of emotion as that may help us understand people in a better way. Motivation and emotion can be termed as two sides of a same coin (Mishra, 2016) and they both play a role in directing behaviours of the individuals. Both motivation and emotions are activated when issues are related to the wellbeing of an individual, survival and appetite (Feist and Rosenberg, 2015). For example, an individual may be driven to get involved in activities that are linked to his/ her wellbeing. When the individual is able to achieve certain goals, she/he will experience happiness and if she/he fails, sadness will be experienced.

Thus, both motivation and emotion are important processes of human behavior.As we have already discussed the concept of motivation in the previous unit, in this unit, we will explain the concept of emotions, types and related theories.

6.2 EMOTIONS: NATURE

Emotions have a great role to play in our lives. It involves feelings of pleasantness and unpleasantness. It can be expressed in various ways, like facial expressions on the face, like gestures, like volume and tone of speech, by the behavioral display or motives of a person. There is no moment in our life when we do not experience emotions. They can result from a variety of external or internal stimulations. Various events or situations in the environment may produce a variety of emotions as jealousy, guilt and shame. These emotions are more self-conscious in nature as they involve the component of morality. There are certain primary emotions which have an evolutionary perspective (Izard, 1971). Emotions are expressed according to the social display rules and have an impact on other people (Matsumoto, 1998).

Ekman (1980) in his seminal work on **facial expressions** proposed that there are six basic emotions that are universally recognized across cultures. These are *fear, anger, surprise, sadness, happiness,* and *disgust.* Though, now 'contempt' has also been added. The facial expressions have been studied by various researchers (Khosla, 2001). These emotional expressions are either posed or spontaneously recorded and then examined for details. Facial action coding system (FACS), has been developed by Ekman (1980) to decode the facial expressions using the information from the various muscles of the face. Facial expressions can vary in intensity of display too. The posed expressions are generally most intense representations of emotions while the spontaneous expressions are milder in occurrence. There are micro-expressions that occur for a fleeting moment and are generally, subtler to detect by the experimenter. These expressions are very useful to detect liars or deceivers. Charles Darwin talked about the **evolutionary perspective** of emotion. He proposed that primary emotions have an evolutionary basis that is part of our species heritage. People from different cultures are able to recognize different emotions from facial expressions. The social context in which the emotion occurs also plays an important role. Frijda (1969) suggests that while making judgments about emotions, we generally use facial expressions or non-verbal information, though learning does modify the expression of emotions. For example, there are social display rules that tend to mediate the emotional expressions in a particular culture. These display rules tend to regulate our emotional expression in more socially and culturally appropriate way. The basic emotions are largely determined by the oldest part of the brain, the limbic system, including amygdala, hypothalamus and thalamus.

6.2.1 Definition of Emotion

Emotion has been derived from a Latin term 'emovere' that means 'stirred-up state'. There are various definitions of emotion that are discussed as follows:

Feist and Rosenberg (2015, pg. 418) defined emotions as "*brief, acute changes in consciousness experience and physiology that occur in response to a personally meaningful situation*".

As stated by Gerrig and Zimbardo (2006, pg. 418) emotions are "*a complex pattern of bodily and mental changes that includes physiological arousal, feelings, cognitive processes, visible expressions (including face and posture) and specific behavioural reactions made in response to a situation perceived as personally significant*".

Kosslyn and Rosenberg (2013, pg. 259) defined emotion as *"a psychological state with four components, a positive or negative subjective experience, bodily arousal, the activation of specific mental processes and stored information and characteristic overt behaviour".*

Feldman (2015, pg. 312) defined emotion as "*feelings that generally have both physiological and cognitive elements and that influence behaviour".*

Mishra (2016, pg. 466) defined emotion as "*a state of being moved, stirred up or behaviourally aroused on experiencing an emotional situation and which involves external and internal physiological changes".*

One of the key points that can be highlighted from the above definitions is that there is a change.This change can be in the conscious experience or could be in terms of physiological arousal and even in cognitive processes. Changes can also be in the visible expression that is displayed on the face or in the posture of an individual. This change is as a result of some situation that is important for the individual. For example, a parent might display the emotion of happiness as his/ her child receives a gold medal. In this, the situation that the child is receiving the gold medal is personally significant for the parent and she/he may thus experience certain changes that could be in terms of physiological arousal, cognitive processes and feelings. There could also be changes in the facial expression of the parent.

6.3 TYPES OF EMOTIONS

There are various kinds of emotions that we experience and express. There are different sources of these emotional feelings which are experienced for a relatively longer period of time than moods that are more transient in nature.

Happiness: When we are able to achieve something that makes us feel pleasurable and elated. It is a feeling of joy that is experienced when we are content, gratified and satisfied with our life. It contributes to our state of mental health and well-being. It is often expressed in smiles or a positive behavior as laughing, and being more active and energetic.

Fear: Any situation that induces a feeling of terror or threat to one's wellbeing causes fear. Fear plays an important role in survival as it motivates the person to protect him or herself. There is an increase in heart rate, respiration rate and the body muscles become tense. The person is alert and tries to fight with the fearful situation or take flight from the fearful situation. The fearful situation is perceived as relatively less threatening if one is exposed to it again and again. Thus, the person is systematically desensitized to the fearful situation.

Sadness: Sadness is another emotion that is characterized by feelings of discontentment, grief, and unhappiness. The person may feel frustrated due to certain failures in life or personal loss and a condition of apathy may occur. The person feels dull, low, disinterested in things around him or her. The person feels hopeless and disappointed. If this continues for a longer period of time then it may also lead to depression. It may be displayed as lowered lips, crying or sulking behavior with drooping shoulders.

Anger: When we are unable to reach our goals, it causes frustration that provokes anger. Sometimes when people do things that are unjust or hurt us with verbal insults or physically hurting us, then it instigates one to get angry. There can be various reasons behind the feeling of anger and the expression of anger may also vary across age groups and gender. Men show more anger as compared to women. There are various techniques of therapy that help the person to modulate one's anger, control it and reduce the intensity with which it is experienced or expressed.

Surprise: Surprise is a very brief emotion that is generally very intense. It is a response to a stimulus that may be unexpected, may be pleasant or unpleasant and it leads to a state of startle. The person may display it by raised eye brows, or dilated pupils, loud scream or gasp, jumping behavior or opening of the mouth. The events that cause surprise are the ones that are remembered relatively better than the other events.

Disgust: When we are faced with a situation or environment that is unhygienic or repulsive in sight or evokes a smell then it produces disgust. Generally, in disgust the person shows a nose crunch and moves away from the annoying stimulus inorder to avoid experiencing the unpleasantness. Sometimes people may vomit or move away from a repulsive stimulus. Sometimes, when we see others engaging in behaviors that are amoral or distasteful, then we may display disgust, or if we see something very unpleasant or hurting another one or ugly to look at, it may evoke disgust.

Box 6.1: Basic Emotions

Basic emotions are a set of emotions that commonly appear in all the human beings. These are anger, disgust, happiness, fear, sadness and surprise. These emotions can be stated to be innate and are shared by all human beings.

Figure 6.1: Basic emotions
Image Source: https://managementmania.com/

Charles Darwin proposed that the actions that arise as a result of emotions or emotional behaviour are innate in nature and similar emotional states are expressed in terms of similar facial expressions across cultures. In fact, even persons with visual impairment may display similar facial expressions even if they have never observed emotional expressions in others. Humans experience a broad range of emotions. Researches on emotions have indicated that all the emotions are an outcome of combinations of certain basic emotions (Kosslyn and Rosenberg, 2013). Further, different researchers have proposed a slightly different list of basic emotions (Kosslyn and Rosenberg, 2013). This proposition with regard to basic emotions has been challenged as well as the basic emotions are not simple. For instance, Rozin, Lowery and Ebert in 1994 stated three types of disgust based on the facial expression (as cited in Kosslyn and Rosenberg, 2013 pg. 260). Though, certain emotions may be consistent across cultures, there are emotions that are influenced by the norms and practices of the cultures. Thus, the basic emotions have been considered as inborn, the influence of learning, social norms and practices cannot be nullified.

Check Your Progress 1

1) Explain the nature and concept of emotions.

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2) What is meant by the evolutionary perspective of emotions.

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3) List the basic emotions.

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6.4 FUNCTIONS OF EMOTIONS

From what has been discussed above, there must be no doubt in your mind that emotions are important. But it is also important to understand the functions of emotions, which are discussed as follows:

1) **Emotions prepare an individual for action:** Emotions serve as a link between the situation and the individual's reaction. For example, if an individual is crossing a road and suddenly sees a truck coming his/ her way, the emotional reaction that she/he would display is that of fear and it is linked with the physiological arousal.

2) **Emotions play a role in shaping of future behaviour of an individual:** Learning takes place as a result of emotions experienced by us. Thus for example, the situations that evoke negative emotions are avoided by us.

3) **Emotions help in effective interaction with others:** Emotions that are communicated verbally and non-verbally may help individuals interact with each other more efficiently. Emotions act as signals thus, helping individuals to understand what the other person is experiencing. Based on this, future behaviour of individuals may also be predicted.

Box 6.2 Self-conscious Emotions

Those emotions that require a sense of self as well as an ability in order to reflect on one's actions. Further, these emotions are as a result of whether the expectation in terms of social norms and rules are met or not. Examples of self-conscious emotions are embarrassment, guilt, pride, shame and humiliation (Feist and Rosenberg, 2015). The self-conscious emotions occur as a result of the extent to which an individual is able to meet his/ her own expectations, the expectations of others or social norms.

6.5 COMPONENTS OF EMOTIONAL PROCESS

Emotion can be termed as an episode that is complex as well as having multiple components (Nolen- Hoeksema et al, 2009). There are six main components of emotion process. These are discussed as follows:

1) **Cognitive appraisal:** The first component is cognitive appraisal. Here the situation is assessed based on the personal meaning. For example, if a cricket team wins, there will be a cognitive appraisal with regard to the personal meaning of the situation, whether the individual supports this team or not. If he/ she supports this team and he/ she is a diehard fan of this team, then the situation will be assessed as having personal meaning or is personally significant for the individual. The cognitive appraisal leads to the other components of emotion.

2) **Subjective experience:** This is related to the affective state or the feeling tone that is brought by the emotion (Nolen- Hoeksema, Freidrikson, Loftus & Lutz, 2009).

3) **Thought and action tendencies:** At this stage, the individual will display an urge to think in a particular manner or take certain actions. For example, when an individual is angry, he/she may act in a manner that is aggressive.

4) **Internal bodily changes:** There are physiological reactions mainly involving the autonomic nervous system. Thus, there could be changes in heart rate or the individual may start perspiring. For example, when a person is angry, she/ he may breathe faster.

5) **Facial expressions:** In this, there is movement in the facial landmarks like cheeks, lips, noses and so on (Nolen- Hoeksema et al, 2009). For example, when an individual is happy, he/ she will smile.

6) **Response to emotion:** This is related to how an individual copes and reacts with one's own emotions.

Any emotion is a result of these six components. To further highlight any emotion, it will thus have the physiological, cognitive and behavioural components. When an individual experiences anger, he/ she may experience physiological arousal in terms of sympathetic arousal. This also has a cognitive component as the individual may believe that she/he is in danger. Thus, the individual may display tendencies of avoidance that are related to the behavioural component. Similarly, when an individual is angry, she/he will experience sympathetic and parasympathetic arousal. The individual will

have a belief that she/he is being mistreated and thus will have attack tendencies (Rathus, 2008).

6.6 EMOTIONS AND MOOD

Emotions can be differentiated from mood. Mood can be defined as "affective states that operate in the background of consciousness and tend to last longer than most emotions" (Feist and Rosenberg, 2015, pg 418). Moods can make occurrence of certain emotion more likely than others. For example, a supervisor who is in irritable mood is more likely to get angry at an employee for coming late to work. The distinction between emotions and mood has been summarized in Table 6.1.

Table 6.1: Difference between Emotions and Mood

Emotions	Mood
Emotions have a cause that is clear. For example, a person may be amazed while looking at a beautiful monument	"Moods are free floating and diffuse affective states" (Nolen- Hoeksema et al, 2009, pg 465). For example, an individual may feel cheerful on a day and may feel irritated the next day.
They are brief and may last for few seconds or minutes	Moods are comparatively long lasting
Emotions are a multicomponent episode	Moods are mainly related to the experience that is subjective
Emotions can fit in certain categories that are discreet, like anger, joy and so on	Moods may vary with regard to pleasantness and arousal

6.7 EMOTIONS AND FEELINGS

A distinction can also be established between emotions and feeling, though both can be termed as affective processes (see Table 6.2).

Table 6.2: Difference between Emotions and Feelings

Table 6.2: Difference between Emotions and Feelings	
Emotions	**Feelings**
Emotions are comparatively more complex.	It is basically an affective process that is simple in nature.
Any emotional experience is preceded and accompanied by feelings. For example, feeling of pleasure will lead or will be accompanied with the emotion of happiness/ joy.	In feeling, emotional experience may or may not occur. For example, an individual may experience feelings of pleasure or pain without experiencing any emotions.
Emotion is an affective process that is much more active.	Feeling is process that is comparatively less active.
Emotion is both subjective and objective.	Feeling is subjective in nature.
Emotions are of different types, for example, anger, joy, jealous and so forth	Feelings are mainly categorised in to pleasure and pain.
Physiological changes are experienced	Physiological changes may not be noticed.

Check Your Progress 2

1) List the six main components of emotion process

   a) .....

   b) .....

   c) .....

   d) .....

   e) .....

   f) .....

2) Differentiate between emotions and mood.

Emotions	Mood

3) List the functions of emotions.

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6.8 THEORIES OF EMOTIONS

There are many theories of emotion, mostly with different ideas to emphasize upon. The early theories are based on ideas related to bodily states.The recent theories are based on cognitive approach. Let us look at the main theories of emotions.

6.8.1 James-Lange Theory

American Psychologist William James (1884, 1890, 1894) and Danish physician Carl Lange (1885) developed this theory which proposed that felt emotion is the perception of bodily changes. That is, we experience the bodily changes as emotions. We perceive the situation that will produce emotion, then we react to the situation

and then we observe our reactions. So, the emotion that we feel, takes place after the bodily changes have taken place.

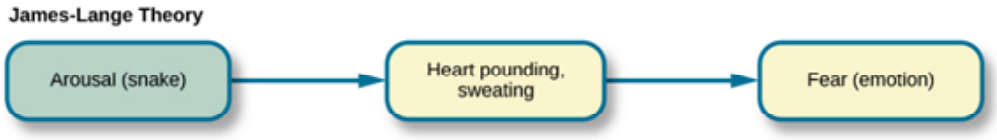


Figure 6.2 James-Lange Theory
Image Source: https://courses.lumenlearning.com/

6.8.2 Cannon-Bard Theory

Physiologists Walter Cannon (1927) and Philip Bard (1934) developed another theory which proposed that the emotion that we feel depends upon the activity of the lower brain areas. It suggests that the felt emotion and the bodily changes that occur in response to the emotion are independent of one another, rather both occur simultaneously. This theory proposes that we first perceive the situation that may produce an emotion. This is followed by the activation of the hypothalamus which sends impulses to the internal organs of the body and the muscles that produce the expression of emotion. The impulses are also sent to the cerebral cortex where the emotion is experienced.

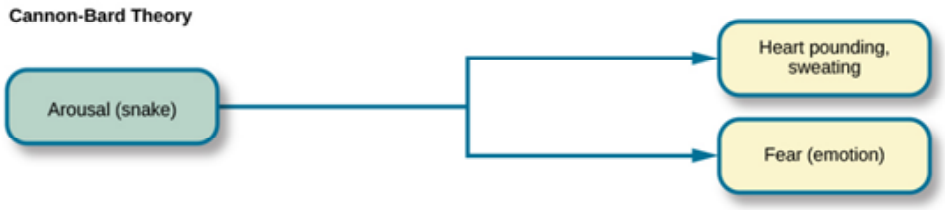


Figure 6.3 Cannon-Bard Theory
Image Source: https://courses.lumenlearning.com/

6.8.3 Schachter-Singer Theory or Two-Factor Theory

Schachter and Singer (1962) proposed that the emotion that we feel results due to our interpretation of the bodily arousal. The sequence of events is that first a potential emotion evoking situation is perceived, this arouses the bodily reactions. We interpret these bodily reactions as an experience of the emotional state. Thus, cognition and thinking determines emotion.

Box 6.3 : The classic Schachter and Singer Experiment

An experiment was carried out in 1962 on a sample of 184 participants (male college students), who were informed that they were receiving an injection of a vitamin to observe its effect on visual skills. The participants were then given either placebo (a saline solution having no side effects) or epinephrine (adrenalin) by a doctor. Epinephrine is a drug that produces responses that are similar to those that occur when intense emotional reactions are experienced (for example, increase in heart rate, blood sugar levels, increased breathing, increase in the blood flow to brain and muscles and so on). The individual injected with epinephrine may experience trembling, rapid heart beats, flushing and so on.

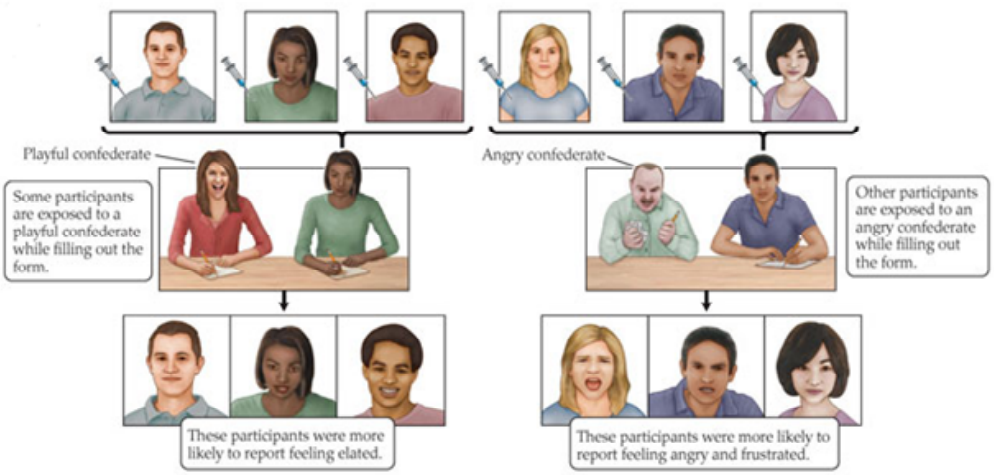
The participants were subjected to one of the four conditions:

a) Participants who were given epinephrine but were not told about its effect. [Adrenalin ignorant]

b) Participants who were given epinephrine (though they were told that they were injected with a vitamin) and were told about the effects (of the vitamin) and thus they were prepared. [Adrenalin Informed]

c) Participants who were given epinephrine (though they were told that they were injected with a vitamin) but were misinformed about the effects (of the vitamin) and were told that they would experience headache and numbness in feet. [Adrenalin misinformed]

d) Participants who were given placebo. [This served as a control group]



The classic Schacter and Singer Experiment

Image Source: https://2e.mindsmachine.com/figures/11/11.02.html

The participants were then placed individually in a situation along with a confederate who behaved in either of the two ways. The confederate was either happy and excited or was angry and hostile. The research was carried out with an objective to the emotional reaction of the participants towards the behaviours displayed by the confederates.

The results indicated that participants based their explanation with regard to the physiological arousal experienced by them to the behaviour displayed by others and the environmental cues. Thus, it can be said that this theory proposes a cognitive perspective of emotions.

Figure 6.4 Schachter and Singer Two-factor Theory

Image Source: https://courses.lumenlearning.com/

6.8.4 The Facial Feedback Hypothesis

Charles Darwin (*Expression of Emotions in Man and Animals,* 1898) stated that facial expressions are universal within a species and not influenced by culture. On the similar idea, the facial feedback hypothesis (Zajonc & McIntosh, 1992) postulates that facial expressions provide feedback to the brain concerning the specific emotion being expressed, which not only reinforces the emotion but also causes the emotion. Facial feedback hypothesis strongly supported James-Lange theory.

6.8.5 Cognitive-Mediational Theory of Emotion

Lazarus (1970) emphasized upon the role of appraisal of the incoming information. *Mediation* here means that the cognitive appraisal mediates or comes in between the stimulus and response to the stimulus. The appraisal of information involves

cognition where in the information from the environment is perceived and evaluated, bodily responses from our body are observed, our past experiences and similar situations from our memories are analysed, compared, integrated to evaluate the given situation. This appraisal then causes the emotion that we feel. Hence, appraisal plays a very important role in the experience of emotions.

Figure 6.5: Lazarus' Cognitive Theory
Image Source: https://courses.lumenlearning.com/

6.8.6 Opponent-Process Theory

The focus of this theory is that "an emotional reaction to a stimulus is followed automatically by an opposite reaction, repeated exposure to a stimulus causes the initial reaction to weaken and the opponent process (opposite reaction) to strengthen" (Baron, 2005 pg. 398). Thus, the theory states that the law of physics that every action is followed by a reaction is also applicable to emotion. The theory has found its application to understand drug addiction. As an individual starts to use drugs, she/he may initially experience intense pleasure. However, with repeated use of drugs there is a decrease in the intensity of pleasure and the reactions related to withdrawal become stronger. Thus, the individual now consumes drugs in order to avoid the negative feelings she/he may experience as a result of not consuming drugs, rather than for feelings of pleasure.

Check Your Progress 3

1) Provide the basic assumptions of the following theories:

Theory	Details
The James-Lange theory	
The Cannon Bard theory	
The Schachter-Singer theory	
The Opponent Process Theory	
Cognitive appraisal theory of emotion	

6.9 MEASUREMENT OF EMOTIONS

Measuring emotions is in a way difficult because it is a phenomenon that is multifaceted and constitutes behavioural, expressive, physiological reactions, as well as subjective feelings, and every instrument that supposedly measures emotion actually measures one of these components (Desmet, 2005).

1) **Non-verbal instrument:** Instruments that can be categorised here mainly measure the expressive or physiological aspect of emotions. As we have studies in this unit, that indicate that any emotion is accompanied with certain expressions. Thus, emotions can be measured in terms of facial expressions as well as vocal expressions. Facial expressions could be captured by taking photographs or with the help of video recordings that can then be analysed. One such tool is Facial Expression Analysis Tool by Kaiser and Wehrle. Facial Action Coding System (FACS) can also be used to study the muscular movements in face that can be observed. Similarly, vocal instruments can also be used as certain emotions could be associated with vocal cues pattern.

Emotions can also be measured on the basis of their physiological component. One of the prominent physiological measures that can be used to measure emotions is polygraph. Polygraph measures the minute changes that occur in the nervous system of an individual. The minute changes are recorded in terms of electrical signals that are recorded on a roll of paper that moves. As stated by Kosslyn and Rosenberg (2013, pg. 271), polygraph is "a machine that is used to detect lying by monitoring the activity of the sympathetic and parasympathetic nervous systems, particularly changes on how easily the skin conducts electricity, breathing, and heart rate". The procedure that is followed in polygraphs is that the sensors are first attached to the individual and then the person is asked various questions and the bodily responses of the individual can be monitored as one gives the responses. Polygraph has found its use mainly in areas of forensic and criminal psychology, criminology, law enforcement and so on. In this context, there are four main ways in which the questions are asked.

a) The first way in which the questions are asked is the *relevant/ irrelevant techniques* in which, for example, a crime related question is asked which is followed by a question that is neutral and then the bodily changes during the responses to these two types of questions is monitored. The assumption here is that the bodily responses will differ when an individual is telling a lie.

b) The next technique is that of *control question technique*. In this a comparison question is asked which is expected to elicit an emotional reaction that is similar or equivalent to that in crime related questions.

c) Yet another technique is *guilt knowledge test* where indirect questions are asked that are more likely to answered by individuals who are guilty. Further, the questions asked have multiple choices.

d) The fourth technique is the *guilty action technique*, where the responses of the individuals are observed as they are provided with statements regarding actions that they may have committed.

Thus, polygraph may be used not only to measure emotions but also in a way to detect lying. Though, there are a number of issues with regard to whether polygraph can be effectively used in detecting lying.The main advantages of the non-verbal instruments are that there is no use of language (thus they are culture fair) and they are comparatively less subjective. Though, there are a number of disadvantages as well, as it may not be possible to measure more complex emotions and mixed emotions, and thus could be used effectively only with basic emotions.

2) **Self-Report Questionnaires:** Emotions can be measured with the help of self-report questionnaires as well. An individual can be asked to provide responses to a questionnaire. Such measures are mainly related to the subjective component of emotion and as such the subjective feelings can be measured only with the help of self-report. Questions that could be asked are like 'What are your feelings? Are you feeling sad?' and so on. Further, rating scales could also be used. Rating scales can be effectively used for emotion as well as mixed emotions. An example of self-report questionnaire is the Positive and Negative Affect Schedule (PANAS- X). Eleven emotions are assessed by this questionnaire, namely, "fear, sadness, hostility, guilt, shyness, fatigue, surprise, joviality, self-assurance, attentiveness and serenity" (Eysenck, 2013, pg. 72).

Though, there are numerous advantages of using self report questionnaires to measure emotions, there are a number of limitations as well to this measure. There is a disadvantage of social desirability where the individual may provide responses that seem to be desirable than what he/ she actually feels. Further, such measures are verbal and thus the use of language may not be adequate to actually capture the emotions experienced by the individual.

6.10 SUMMARY

Now that we have come to the end of this unit, let us summarize all the major points that we have covered in this unit.

- Emotion is a psychological state with four components, a positive or negative subjective experience, bodily arousal, the activation of specific mental processes and stored information and characteristic overt behaviour.
- There are various kinds of emotions that we experience and express. A set of emotions that commonly appear in all the human beings are known as basic emotions. These are anger, disgust, happiness, fear, sadness and surprise. These emotions can be stated to be innate and are shared by all human beings.
- The social context in which the emotion occurs also plays an important role. According to Frijda (1969) while making judgments about emotions we generally use facial expressions or non-verbal information, though learning does modify the expression of emotions.
- Emotions play very important role in our life. Emotions have three important functions. It prepares an individual for action, plays a role in shaping future behaviour of an individual, and helps in effective interaction with others.
- There are six main components of emotional process. These six components are: cognitive-appraisal, subjective experience, thought and action tendencies, internal bodily changes, facial expressions, and response to emotion.
- Mood can be defined as "affective states that operate in the background of consciousness and tend to last longer than most emotions" (Feist and Rosenberg, 2015, pg. 418). Moods can make occurrence of certain emotions more likely than others.
- The major theories to understand the phenomenon of emotions, are James-Lange theory, Cannon-Bard theory, Schachter-Singer theory, facial-feedback hypothesis, opponent-process theory, and cognitive-appraisal theory.
- Emotions can be measured by (i) non-verbal instrument, and (ii) self-report questionnaires.

6.11 REVIEW QUESTIONS

1) According to the theory of ....., emotional experiences arise from physiological arousal.
   a) James-Lange
   b) Schachter-Singer two-factor
   c) Cannon-Bard
   d) Lazarus
2) People from different cultures can recognise which facial expression?
   a) fear
   b) anger
   c) disgust
   d) all of these
3) Which theory states that we are afraid because we run or are angry because we strike?
   a) Schachter and Singer
   b) James-Lange
   c) Cannon-Bard
   d) Cognitive
4) Moods
   a) are the most extreme forms of various emotions
   b) are subtle emotional undercurrents
   c) reflects base physiological changes
   d) reflects only positive emotions
5) What do you understand by emotions? Explain various components of emotions.
6) Differentiate between James-Lange theory of emotion and Schachter -Singer theory of emotion.
7) Define emotion and discuss its types.
8) Explain opponent-process theory of emotion.
9) Explain how emotions can be measured.

6.12 KEY WORDS

Emotion : Subjective state of being often described as feeling.

James-Lange Theory of Emotion : Physiological arousal leads to emotional experience.

Cognitive Theory of Emotion : Our emotions are the result of our appraisal of the stimulus.

Feelings : Defined as an affective process that is much simple in nature than emotional process. It is

subjective in nature and physiological changes related to it may not be noticed.

Evolutionary perspective of emotion : Proposed by Charles Darwin,primary emotions have an evolutionary basis that is part of our species heritage. People from different cultures are able to recognize different emotions from facial expressions.

James-Lange Theory of Emotion : According to this theory, emotion is the perception of bodily changes.

Cannon and Bard's Theory of Emotions : This theory suggests that we first perceive the situation that may produce an emotion. This is followed by the activation of the hypothalamus which sends impulses to the internal organs of the body and the muscles that produce the expression of emotion.

Schachter and Singer Theory of Emotions : According to this theory, the emotion that we feel results due to our interpretation of the bodily arousal. The sequence of events is that first a potential emotion evoking situation is perceived, this arouses the bodily reactions. We interpret these bodily reactions as an experience of the emotional state.

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6.15 ONLINE RESOURCES

- For more on concept of emotion, visit
  - http://www.indiana.edu/~p1013447/dictionary/emodefs.htm
  - http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199235018.001.0001/oxfordhb-9780199235018-e-2
  - https://pdfs.semanticscholar.org/838f/c631b95738f45d97124cc3809f6fcbd92b07.pdf
  - https://pdfs.semanticscholar.org/fe58/786f82c0bbb1ee8a37c4d1f3ca3deb844c1f.pdf
- For information on theories of emotions, visit
  - https://courses.lumenlearning.com/waymaker-psychology/chapter/emotion/
  - https://courses.lumenlearning.com/boundless-psychology/chapter/theories-of-emotion/
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- For more on measurement of emotions, visit
  - https://www.ocf.berkeley.edu/~eerlab/pdf/papers/2009_Mauss_Measure_of_emotion.pdf
  - https://www.magnus.nl/wp-content/uploads/2012/03/papermeasuring.pdf
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Answers of Multiple Choice Questions

1) (a), 2) (d), 3) (b), 4) (b)

BLOCK 4

PERSONALITY AND INTELLIGENCE

UNIT 7 PERSONALITY*

Structure

7.0 LEARNING OBJECTIVES

After reading this unit, you will be able to,

- know the definition of personality;
- explain the nature of personality;
- compare and summarize the various theories of personality; and
- describe the various methods to assess personality.

7.1 INTRODUCTION

Personality has always been a topic of discussion among the common people, but defining it and outlining its nature has always been a difficult task for everyone including psychologists. When we make statements like, "she is a good doctor", or "I really like M.S. Dhoni". Then, do we really judge the competence of the doctor's medical knowledge or her professionalism? Do you like M.S. Dhoni because he plays very well or because he is really efficient in leading his team or due to his down-to-

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earth attitude? So, what do we actually look for while describing someone's personality? How do we actually define it?

The word *personality* has been taken from the Latin word **persona**-the mask used by actors to represent characters in Graeco-Roman theatre play. As the character changed, the mask of the actor also changed. So, does this mean that the word personality refers to our ever-changing persona? Yes, to some extent. Our behaviour is not always constant or predictable. Sometimes, we behave as predicted, sometimes we behave quite differently in a familiar situation, and sometimes our behaviour becomes completely unpredictable. Due to our ever changing yet stable behaviour, there is a widespread confusion over the concept of personality. Thus, it may be said that personality is an individual's unique and relatively stable patterns of behavior, thoughts, and emotions (Nelson & Miller, 1995; Zuckerman, 1995) In this unit, we will discuss the definition, nature, and various theories of personality. We will also look at the ways psychologists measure personality.

7.2 DEFINITION AND NATURE OF PERSONALITY

Personality refers to the distinctive attributes of a person that characterize him or her. It is to understand what it makes people unique and different from each other. According to American Psychological Association, "Personality refers to individual differences in characteristic patterns of thinking, feeling and behaving." It further states that, "the study of personality focuses on two broad areas, one is understanding individual differences, in particular personality characteristics, such as sociability or irritability. The other is understanding how the various parts of a person come together as a whole." Personality is also defined as "an enduring characteristics that may change in response to different situations" (Schultz and Schultz, 2013, p.8).

There are special qualities of the person, his or her traits. These traits could be the way the person interacts with other people, how he or she speaks, and the behavioral responses. The traits are based on the observations that we make of how people behave in different situations. These are those characteristics that also help us to predict how people will behave when faced with a similar situation. Hence, these are relatively consistent behavioral styles. Traits represent the thoughts, feelings and behaviors that help to describe the people as accurately as possible. Traits could be selected according to job specification such as punctuality, sincerity or a social trait such as honesty, intelligence, wittiness etc.

Traits are also used to categorize people into various types such as "introvert" or "extrovert" or a "leader" and so on. The type tends to classify people according to some common group of traits that are meaningful in predicting behaviors. The concern here is how to assess the traits and what is the reliability of the traits over a period of time. People also modify behaviors according to situations and social circumstances. In such a position then what traits are to be considered representative of the people's personality is difficult to ascertain. But our behavior is a result of stable internal characteristics that are unique to the individual (personality) and situational factors (social and environmental factors) that surround us. This perspective is known as *interactionist perspective,* which is at present, widely accepted by most of the psychologists.

7.3 THEORIES OF PERSONALITY

The early theories of personality were concerned with physical appearances. German physician Franz Joseph Gall (1758–1828) forwarded the idea that personality could be measured by bumps on the skull, which was known as *phrenology.* William Herbert

Sheldon (1898–1977) proposed that personality could be determined by 'body types', namely *ectomorphs (*lean and thin people*), endomorphs* (high body fat and rounder physique) *and mesomorphs* (well-built and muscular). This approach was known as *somatology.* Both the ideas, phrenology and somatology were rejected because of unscientific methodology. Recent researches in personality psychology are scientific and have offered new perspectives to the understanding of personality. This section will describe the major theories of personality.

7.3.1 Freud's Personality Theory

Sigmund Freud, a physician by profession, was the major contributor of psychoanalytic theory of personality. He developed his theory while doing clinical practice with patients. "Unconscious mental processes" is central to his theory. It refers to those desires, needs, and motivations for which we are not aware. Further, according to Freud, aspects of human behaviour such as aggression and sexual desires also plays an important role in our personality.

In order to explain how our *psyche* (mind) works, Freud proposed,

- *A topographic model of the psyche* (explains how our mind is organised)
- *A structural model of our personality*
- *Psychosocial Stages of Development*

A topographic model of the psyche

In view of Sigmund Freud, our mind can be divided into three levels; conscious, preconscious and unconscious. Freud published this idea in *The Psychopathology of Everyday Life* in 1901. According to him, our *conscious mind* is that part which deals with the current information. That is, all the thoughts, feelings and actions of which you are aware at the very moment are part of the conscious mind. *Preconscious or subconscious mind* deals with all those information for which you are not currently aware but can become only if you pay attention. The last level of mind is *unconscious*. This part of mind stores those socially unacceptable needs, desires, motivations and feelings for which you are unaware of. According to him, this unconscious part of mind plays a vital role in influencing our actions.

A structural model of our personality

Freud proposed that our personality consists of three elements namely, id, ego, and superego. Before explaining in detail, it is important to mention here that id, ego, and superego are just concepts and they do not have any physical or physiological basis.

Id: This part of personality operates unconsciously. It deals with basic instincts, biological needs, and aggressive impulses. It is the most primitive part of human personality present since birth. From id, other parts of the personality (ego and superego) develop. It works on *pleasure principle*-tendency to avoid pain and seek pleasure. The aim of id is to gratify one's need immediately without considering the moral values of the society and the individual. *Eros* and *thanatos* are the two driving forces of id (*Eros* is the god of love in Greek mythology). According to Freud, in the context of id, Eros is the life force. It is responsible for our life instinct and survival, which includes sexual desire, reproduction desire, and pain avoidance. The counterpart of Eros is *Thanatos*-the death force or instinct (*Thanatos* is the god of death in Greek mythology). It is responsible for negative feelings like, violence, aggression, and hate. The aim of thanatos is to balance the drive of Eros by driving

us towards death and destruction. When personality is dominated by id, then the individual tends to become more impulsive. Such people will do what they want irrespective of time, place and situation, just like a child.

Ego:. The part of the personality responsible for the reality check is known as ego. Ego works on *reality principle*, delaying id's gratification until an appropriate and more realistic situation is not found. For instance, a 10-year-old child wants to eat a scoop of ice-cream kept in the refrigerator. But the child knows that eating ice-cream without seeking permission from parents will be punished. Thus, the ego restricts the child for instant need gratification.

This part of personality emerges from id and its main objective is to strike a balance between id's impulsive needs and the reality of this world. It is the decision-making component of our psyche and works on logic only. In the words of Freud, "ego is that part of the id which has been modified by the direct influence of the external world"(Freud, 1923). If ego would not be able to resolve the conflict between the impulsive demands of the id and realistic demands of this world, then it would lead to the development of anxiety and stress. To ward off this anxiety, individual will be motivated to use unconscious *defense mechanisms* (we will talk about this in the later section).

Superego: It is the moral master or moral guru of our personality. Let us continue the same example referred above. Whether that 10-year-old child will ask permission from parents or not for eating a scoop of ice cream depends on the development of her/his superego. Since seeking permission is morally correct behaviour, it will indicate the presence of superego in the child. Role of the superego is to internalise the moral and ethical value of society through the process of socialisation. It controls the impulsive urges of the id and pursues ego to choose morally appropriate behaviour instead of only realistic behaviour. This part of our psyche develops between the ages of three to five years. Further, according to Freud, our superego consists of two systems: (i) conscience and (ii) ideal self. The *conscience*'s role is to punish or reward ego, through the feeling of pride or guilt, depending on its behaviour. For example, if ego gives in id's demand and breaks the moral code of conduct, superego will make you feel guilty about your behaviour. The second system, the *ideal self* is idealised picture of your own self, also does the job of making you feel guilty or pride, depending on your behaviour.

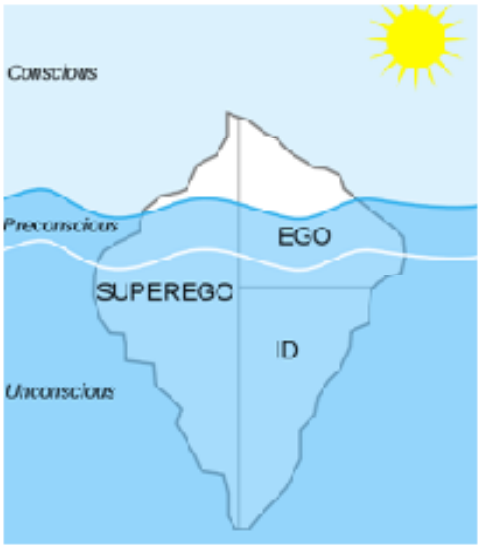

Figure 7.1: Diagram of Freud's psyche theory
Image Source: https://commons.wikimedia.org/

Ego Defense Mechanisms

One of the roles of ego is to protect the person from anxiety and stress. So, when anxiety and stress from the forbidden desires and motives become overwhelming, we tend to use some psychological strategies, known as ego defense mechanisms. According to Freud, the sole aim of employing these ego defense mechanisms is to protect our psyche from anxiety. A brief description of eight important defense mechanisms have been described in Table 7.1.

Table 7.1 A Summary of Ego-defense Mechanisms

Mechanism	Description
Repression	Unconscious denial of impulses or memories that are too frightening or painful
Rationalization	Reinterpret behaviour in a logical or socially desirable manner so that what we do seems to be rational.
Reaction formation	Unacceptable feelings or impulses are controlled by establishing behaviour patterns which are directly opposed to them.
Projection	Ascribing one's own undesirable qualities to others.
Intellectualization	Attempting to analyse problem in abstract, intellectual terms away from feeling, affect and emotion.
Denial	Denying that an unpleasant reality exists
Displacement	Transference of wishes or desires from their original object or person to another object or person.

Freud proposed a five-stage model of development of personality. According to him, the core aspects of one's personality developed by the age of five remain unchanged throughout life. Further, he stated that to move from one stage to another, a child needs to resolve conflicts of each stage successfully. Otherwise, it will lead to *fixation*-a continuation of an early mode of satisfaction in later life (The Cambridge Dictionary of Psychology, 2009). For example, individual fixated at an oral stage may have drinking or smoking habits. In the following section, we will briefly talk about five stages of psychosexual development.

Stage I: Oral Stage (birth to 18 months)

Mouth is the source of pleasure during this stage. Children completely depend on their caregivers especially mother. They drive pleasure and understand the world around them through sucking and swallowing. Over gratification or under gratification may lead to the fixation at this early oral stage resulting into the development of over-eating behaviour, drinking or smoking in adulthood. Freud called such people as *oral-incorporative or oral-ingestive*. Later during this stage, children experience pleasure from chewing and biting. Unable to resolve the psychological conflict of this stage may develop the habit of nail biting and object chewing in adulthood. Freud further pointed out that these people are more critical and sarcastic in nature. He referred such people as *oral-aggressive or oral-sadistic*.

Stage II: Anal Stage (18 months to three years)

During this stage, children face the demand of their society for the first time to control

and delay the expulsion of urine and faeces. Children experience pleasure in this stage from their bowel and bladder movement. Freud believed that too harsh or too lenient toilet training may cause fixation at this stage, resulting into either being messy, lesser self-control but generous (called as *anal expulsive*) or being tidy, orderly but mean (called as *anal retentive*).

Stage III: Phallic Stage (three to five years)

Genitals become the erogenous region during this stage. Phallic word comes from the Greek word *Phallos* which means penis. Children knowingly or unknowingly touch their genitals for pleasure. During this stage, they understand the difference between males and females. Freud proposed that male child experiences *Oedipus complex*, which involves sexual feeling towards their mother, feeling of rivalry for the father, as well as a threat of getting punished by the father for having a desire for mother. The counterpart of Oedipus complex is *Electra complex*, experienced by female child. It involves the sexual attraction for father, feeling of rivalry for mother and a threat of getting punished by the mother for having this feeling towards father. Successful resolution of this complex develops mature sexual identity. According to Freud, by the end of this stage personality is formed completely.

Stage IV: Latency Stage (six to twelve years)

The sexual energy during this stage is channelised towards education, sports and social activities. This leads to no or little interest for the opposite gender.

Stage V: Genital Stage (thirteen years to adulthood)

The sexual energy returns again in this stage. Successful completion of previous stages will help in developing a mature intimate relationship with the opposite sex. Whereas, unresolved issues of previous psychosexual stages will start exhibiting during adulthood, leading to difficulty in establishing healthy intimate relationship with the opposite sex.

Freud devised *psychoanalysis* to treat psychological disorders.

7.3.1.1 The Neo-Freudians: Followers and Defectors of Freud

A number of theorists followed Freud's work. Some theorists initially worked with him but later defected and developed their own theories. To differentiate their work from Freud and to get due recognition, they called themselves as *neo-Freudian* or *post-Freudian*, *neo-analytic* or *psychodynamic*. Some of the prominent names include Adler, Horney, Fromm, Jung, and Erikson. Since, it is not possible to cover all the theorists, the focus will be given to the theories of Adler and Jung.

Alfred Adler: Individual Psychology

Alfred Adler (1870-1937), an Austrian medical doctor, gave importance to the social context in the development of personality as well as the interpersonal relationships. He suggested that everyone strives to attain glory, power, superiority and overcome all obstacles of life. People develop their own life style to make their life meaningful. Adler's theory (1954) is known as *individual psychology*. He believed that experiences of early childhood shape one's personality. If encouraged during childhood, it would motivate the child to feel capable and act in a cooperative way throughout their life. Whereas, if discouraged the child may misbehave and indulge in unhealthy competition or withdrawal behaviour. He proposed that there is a need to understand one's personality within one's social context. According to Adler, instead of any

instinct (as proposed by Freud), an innate force motivates us to perform the behaviour. He named this force as the *striving for perfection*, an innate desire that motivates individuals to achieve their full potential.

Inferiority and Superiority Complex

As a child, Adler explained that we feel weak, dependent, less capable and thus, inferior to others (older siblings, parents, and caregivers). This feeling of inferiority is innate and natural. If a child decides to overcome the feeling of inferiority, then she/he would strive for achievement or success. Thus, overcoming the feeling of inferiority is essential for optimal development. If this feeling is not compensated, then it would lead to inferiority complex and when overcompensated, it would lead to a superiority complex.

Sibling rivalry and birth order

Adler introduced the term *sibling rivalry* to explain how competition for parents' love and affection between siblings lead to rivalry and thus, shaping one's personality. According to Adler, arrival of a newborn might lead to a feeling of dethronement and sibling rivalry. Here, dethronement refers to the feeling of being replaced from the focus of attention and love by the new sibling.

He also proposed that your *birth order* also affects your personality. Later, numerous studies have confirmed his proposition about birth order. According to him, firstborn children are usually responsible, obedient and intelligent. The second born, master's their skill in social adjustment. They are generally, trusting, accepting and other-centered. And, the third born child exhibits strong security, high self-esteem but less competitiveness. Since, the last born child is never dethroned, remains the baby of the family throughout their life.

Carl Jung: Analytical psychology

Carl Gustav Jung (pronounced as "yoong"), (1875-1961) was a Swiss psychiatrist and a close friend of Sigmund Freud. He emphasized the idea that we need to study different cultures as it will provide the essence of humanity. Jung's personality theory is known as the *analytic theory* or *analytical psychology* (1933). He proposed that everyone has a personal unconscious that is composed of one's own experiences which have been repressed due to some reasons. He proposed that everyone has an ability to balance the conscious and unconscious forces.

Jung extended Freud's idea of the unconscious. Freud considered unconscious as an essential part of one's personality. It is a storehouse of repressed memories, aggressive motives, and sexual desires. Even though the basic characteristic of the Freud's unconscious is similar across different individuals but its content is highly personal in nature. Jung deviated from this view and proposed the idea of *collective unconscious,* that is the unconscious shared by all humans. According to him, due to the evolutionary process and common ancestors we all carry some common past. Collection of this ancestral past is part of our unconscious known as the collective unconscious. According to him, the collective unconscious serves as the foundation for personality. This collective unconscious consists of all the archetypes and concepts which represent experiences that are primitive and from our ancestral heritage. For example, the conceptions about rebirth, God, evil and so on. The elements of our collective unconscious have been termed by Jung as *archetypes*. It is shared by all humans and have some overarching qualities. He described various types of archetypes, some of these are as follows:

The self-knowing about the wholeness of one's own identity

The persona-not genuine self that we show to others

The anima-feminine side of the men

The animus-masculine side of the female

The shadow-the darker side of our personality, consisting of aggressive urges, biological instincts, and the feeling of inferiority.

Check Your Progress 1

1) Write briefly about the first two stages of psychosexual development.

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2) Explain the terms id, ego and superego.

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3) What do you understand by collective unconscious?

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4) What do you understand by sibling rivalry?

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7.3.2 Behaviouristic Approach to Personality

Behaviourist psychologists were the main critics of psychoanalytical theory of personality. They were against the idea that human personality can be understood using psyche and unconscious contents. John B. Watson was the founder of behavioural approach but B. F. Skinner was the most influential behaviourist. According to behaviourist theorists, personality is an abstract and hypothetical concept. Describing it in terms of internal mental processes is grossly incorrect. Stimulus-response (S-R) relationship and role of reinforcement in the behavioural process have always been the focus of study among behaviourists. According to them, to understand personality, one needs to understand the S-R relationship and role of reinforcement first. So, according to them, personality is a collection of reinforced responses performed for different stimulus. There are basically three major theories of learning proposed by behaviourists: classical conditioning, instrumental conditioning, and

observational learning. One of the most important tenets of behaviourism is that 'what we are is the result of our learning' and this learning occurs through reinforcement and observation. Since, every human has different life conditions, therefore their S-R learning pattern is also different from each other. Due to this reason, we differ from each other in personality.

Watson claimed that human behavior could entirely be, determined by careful manipulation of stimulus and response. In the words of Watson, "*Give me a dozen healthy infants, well-informed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select-doctor, lawyer, artist, merchant-chief and yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations and the race of his ancestors".*

7.3.3 Humanistic Approach to Personality

Also known as the "third force" or "third approach" in psychology, humanistic approach came into existence as a reaction against the pessimistic approach of psychoanalysts and behaviourists towards human behaviour. Abraham Maslow and Carl Rogers are the two leading theorists of *humanistic personality theory*. Humanistic approaches tend to delve into the self to understand how personality evolves. Maslow and Rogers emphasize on the way we think about our behaviour, becoming aware of it, our feelings, our attitudes and how these aspects influence the way we behave. They gave importance to the concepts as self-concept or self-image which constitutes of feelings, perceptions, attitudes and evaluating the self as an object (Hall and Lindzey, 1970).

Carl Rogers

Carl Rogers (1902-1987) was a counselling psychologist and Maslow's colleague, who extended the humanistic approach to personality. Like Maslow, he also viewed humans as good and their behaviour as goal-directed talked about client centered theory where he gave importance to the total organism, that is the person. The phenomenological field of the person consists of his experiences from which his self-concept develops. He suggested that when a child grows, she/he indulges in various behaviors, some which are approved and some which are disapproved. Those that are disapproved, the child considers to be unworthy and hence excludes form one's self-concept or tends to deny them. The person strives to overcome the discrepancy between the ideal image and his/her true self image. This is often used in psychotherapy. He developed his theory by observing the behaviour of his clients. He noticed that the idea of "self" always plays an important role in his client's life. Therefore, his theory revolves around the concept of self. According to him, there are basically two types of self; one is ideal self and other is real self. *Ideal self* is one's concept of self that she/he wants or desires to become. Whereas, *real self* is one's inner concept of what we really are. Roger proposed that if there is congruence between one's ideal and real self, then it will help in achieving a state of self-actualisation, which is the state of highest potential a person can achieve. He called such people as *fully functioning person*. On the contrary, if there is no congruence between these two versions of self, then it will lead to state of anxiety and stress. Roger also mentions about the importance of external environment in achieving congruence in self-concepts. If an individual is receiving *unconditional positive regard*, only then, she/he will be able to value one's true worth and can achieve self-actualisation. *Unconditional positive regard* refers to the warm acceptance of one's self by significant others without any condition.

Box 7.1: Empathy

The word was first used in German as "einfuhlung" or in-feeling in the last century. It was primarily used in the context of aesthetics ('feeling into' things like forms, shapes, and art objects), an area of Philosophy. The meaning of the word and its application has been changing over the period of time. Empathy is one of the core conditions, proposed by Carl Rogers that a counselor should display in order to show acceptance of the client, and valuing them as a human being of worth.

Maslow's theory of self-actualization

Abraham Maslow (1908-1970) emphasized upon the positive behavioral attributes of the person. He was more optimistic about the trends in human existence. Each individual is unique and one goes through different levels of needs to self-actualization. Each individual has a basic need to maximize his or her own potentials to the best of their ability, thus emphasizing the innate tendency towards personal growth. He called this state of achievement as '*self-actualization*'. Therefore, in his pursuit to understand human personality, he studied many *self-actualisers,* or people, according to Maslow, who have achieved the state of fulfilment by reaching the highest level of capability. Some of the famous names Maslow studied, include Albert Einstein, Eleanor Roosevelt, Thomas Jefferson and Abraham Lincoln. According to him, since early theorists have focused their attention on the darker aspects of human personality, therefore, the true nature of humans cannot be understood. He emphasised that in order to understand the true nature of human, we need to shift our focus to the optimistic nature of the individual. His hierarchy of needs consist of five types of needs, as illustrated in Figure 7.2. In order to achieve higher order of needs, one needs to fulfil the lower needs first.

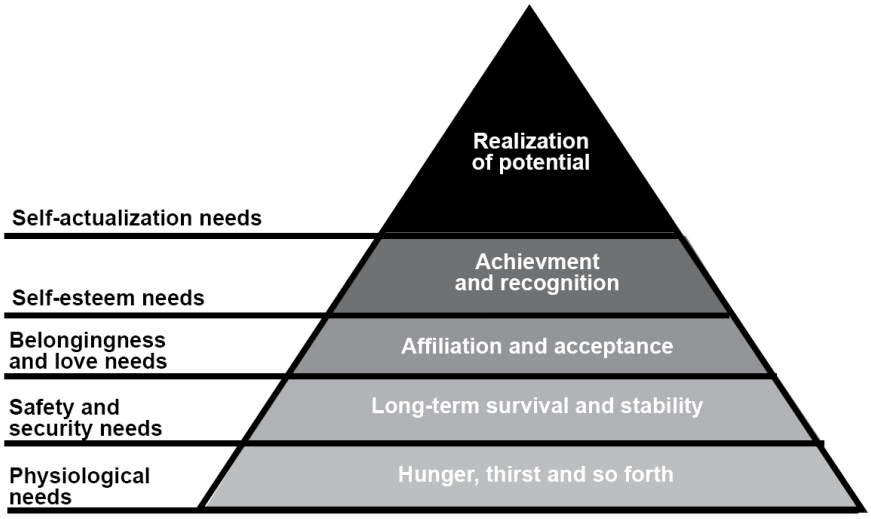

Figure 7.2: Maslow's Hierarchy of Needs

Maslow observed that those who had taken efforts to self actualize had certain distinctive traits as they were more open to experience things selflessly, vividly with full concentration (Maslow,1967). They were more in harmony with themselves, their inner being. They were more spontaneous, autonomous, independent, devoted to their goals, related to few loved ones, and resisted conforming to the cultural norms.

Box 7.2: Characteristics of Self-Actualizing People

1. More efficient perception of reality
2. Acceptance of oneself, others and nature
3. Spontaneity, Simplicity, Naturalness
4. Problem Centered
5. Detachment : The Need for Privacy
6. Autonomy: Independence of Culture and Environment
7. Continued Freshness of Appreciation
8. Mystical or Peak experiences
9. Profound interpersonal relations
10. Social interest
11. Creativeness
12. Resistance to enculturation
13. A democratic character structure
14. Discrimination between means and end.
15. Philosophical sense of humour

7.3.4 Trait Theories of Personality

A group of theorists believed that our personality is a combination of traits that determine our behaviour. By identifying and studying them, we can predict the personality of other people. Before moving forward, one needs to understand the concept of trait-labels used to identify the characteristic way of behaving. Often traits are viewed as continuous dimension such as the trait of 'extroversion-introversion'. Individuals who are extrovert in nature tend to be friendly, out-going, talkative and often adventurous. Whereas, those who are high on introversion tend to be less friendly, reserved and less adventurous. As shown in Figure 7.2, an individual may fall along any point on the continuum and his/her behaviour will be in accordance with that location.

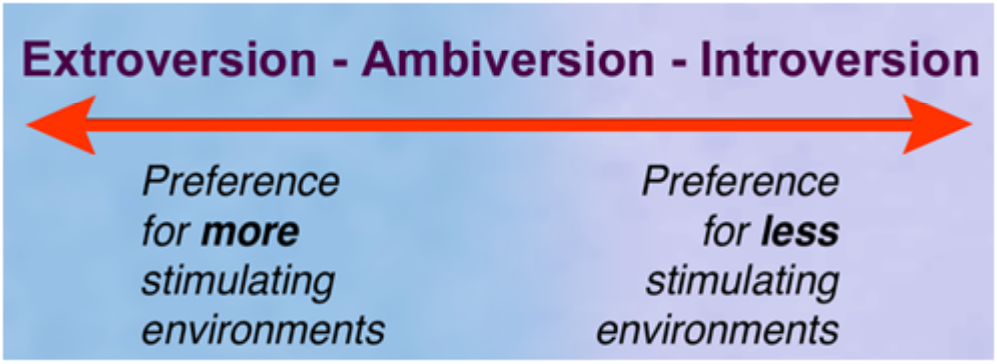

Figure 7.3: Extrovert-Introvert Spectrum
Image Source: https://commons.wikimedia.org/

History of defining personality by trait can be traced back to the times of Hippocrates. However, in recent times, some of the famous names of the trait theorists include Gordon Allport, Raymond Cattell, Hans Eysenck, Robert McCrae, and Paul Costa.

7.3.4.1 Allport's Trait Theory

Gorden Allport (1897-1967) and his colleague Henry Odbert listed 17953 words in English language that refer to personality and that could describe people. This psycholexical study (1936) became the empirical and conceptual base of Five-Factor Theory at a later stage. Based on their investigation (Allport reduced the listed words to 4500 trait like words), they proposed a trait theory of personality. According to their theory, three types of traits govern our personality. They named these three categories of traits as cardinal traits, central traits, and secondary traits. Allport organized these traits in a hierarchy.

Cardinal Traits: These are the dominant traits of one's personality. They stand at the top of Allport's trait hierarchy and are the master controller of one's personality. These traits may dominate personality to such an extent that the person may become known for those traits only. Such as Mother Teresa for altruism and M.K. Gandhi for his honesty. According to Allport, these traits are rare i.e., very few people have personalities dominated by cardinal traits, a majority of the people have personality composed of multiple traits.

Central Traits: They come second in the hierarchy. According to Allport, every person possesses 5-10 central traits in varying degrees. They can easily be noticed and are responsible for shaping our personality. Traits such as intelligent, loyal, dependable, aggressive etc.

Secondary Traits: These are less relevant traits of personality. These are basically situational or circumstantial traits. For instance, an aggressive child may not speak much in front of his/her teacher. These can be numerous in number and are responsible for behaviours incongruent to individual's usual behaviour. According to Allport, these traits are "aroused by a narrower range of equivalent stimuli and they issue into a narrower range of equivalent responses".

7.3.4.2 Cattell's Trait Theory

Using factor analysis (a statistical procedure), British psychologist Raymond B. Cattell (1905-1998) factor analysed Allport's list of 4,500 English adjectives. He came up with the following sixteen trait dimensions of human personality:

Table 7.2: Cattell's Source Traits (factors) of Personality

Factor	Low Scores	High Scores
A	Reserved	Outgoing
B	Less intelligent	More intelligent
C	Stable, ego strength	Emotionality/Neuroticism
E	Submissive	Assertive
F	Sober	Happy-go-lucky
G	Expedient	Conscientious
H	Shy	Venturesome
I	Tough-minded	Tender-minded
L	Trusting	Suspicious
M	Practical	Imaginative

N	Forthright	Shrewd
O	Placid	Apprehensive
Q_1	Conservative	Experimenting
Q_2	Group-dependent	Self-sufficient
Q_3	Undisciplined	Controlled
Q_4	Relaxed	Tense

Cattell identified 'source traits' as the most important, and 'surface traits' as the less important traits. Cattell also identified between *common traits* and *unique traits*. A common trait is posessed to some degree by everyone, for instance, intelligence. Unique traits are possessed in different degrees. For istance, attitude and interests. Cattell further distinguished between *ability*, *temperament*, and *dynamic* traits. Ability traits determine how well we can work towards goals. Temperament traits determine how we react to people and situations depending upon emotions and feelings. Dynamic traits define one's motivation, interests and ambition and are the driving force of behaviour.

Cattell further proposed *constitutional* traits and *environmental mold* traits. The former are source traits that depend on our physiological characteristics. While the latter are source traits that are learned from social and environmental interactions.

In order to measure 16 source trait dimensions, Cattell along with his colleagues (Cattell, Eber &Tastuoka, 1977) developed a questionnaire, later known as the Sixteen Personality Factor Questionnaire (16PF).

7.3.4.3 Eysenck's Trait Theory

Hans Eysenck (1916-1997) was a contemporary psychologist of Cattell. Even though he was a behaviourist, he believed that our personality is largely innate and genetically based. He also used factor analysis to understand the underlying personality traits. Initially, he proposed that our personality is comprised of two major personality dimensions: Extroversion Vs. Introversion; and Neuroticism Vs. Stability. According to his theory, different combinations of these dimensions lead to the development of different personalities. Later, he added the third dimension to his model and named it as Psychoticism Vs. Socialisation.

Extroversion-Introversion dimension refers to the degree to which one seeks external or internal stimulation. People who are extroverts are social, seek adventurous and prefer company when in stress. Whereas, people who are introverts are shy, enjoy their own company and turns inward when in stress. Neuroticism Vs.Stability refers to a dimension that describes people in the context of their emotionality and maladjusted behaviour. Individuals who are high on neuroticism, tend to be emotionally unstable, moody and maladjusted. Whereas, people at the opposite end of the neuroticism dimension, tend to be calm. In the last dimension, Psychoticism Vs. Socialisation, people who are high on psychoticism tend to be aggressive, egocentric, anti-social and impulsive. Whereas, people who lie on the socialisation end, are altruistic, empathetic and conventional.

7.3.4.4 McCrae and Costa's Five Factor (Big-Five) Theory

McCrae and Costa believed that all human personality traits can be reduced to five factors only: *Openness to experience, Conscientiousness, Extraversion,*

Agreeableness, and *Neuroticism*. Acronym as OCEAN or CANOE, these factors or dimensions were the results of factor analysis of Cattell's original list by McCrae and Costa (1992). These dimensions are stable across time and are cross-culturally shared. Brief descriptions of these factors are given below:

Openness to experience: Such people love novelty and creativity. They have a curious mind and have an appreciation for art. They are an independent thinker and prefer to do a variety of things instead of routine activities.

Conscientiousness: People high on this factor are more goal-directed, self-disciplined, hard-working, honest and competent. They prefer planned activity instead of spontaneous behaviour.

Extraversion: Seeks external stimulation.

Agreeableness: People who score high on agreeableness have a tendency to be cooperative and compassionate. Such people are generally helpful and trustworthy.

Neuroticism: People high on this factor are worrisome, insecure and self-pitying people. Whereas, people who score low on neuroticism are self-satisfied and secure.

7.3.5 Indian Approach to Personality

The Indian intellectual tradition has a deep understanding of the human nature and there are conceptual frameworks which are connoted as 'theories of personality' in modern psychology (Paranjpe, 2016). In the Indian context, *svabhava* is the Sanskrit word that is used to reflect the unique and stable characteristics of the person. Another word used is *prakriti.* It is a term that is derived from *Samkhya* system. It reflects the inherent features of all events as well as humans. Prakriti has three *gunas,* namely, *sattva,* which means enlightenment, *rajas* meaning energy and movement, and *tamas* refers to darkness and inertia. *Bhagavad-Gita* refers to three types of personality based on gunas and is referred as *guna theory*. The three types of personality that emerge are :

1) Sattvik: When sattva guna dominates, people tend to be emotionally stable. The inherent desire is to be good and caring.

2) Rajasik: People tend to be active and emotional when rajas guna dominates. Rajas dominant person is full of attachment. Enthusiasm, interest and activity are some qualities of this guna.

3) Tamasik: When tamasik guna dominates, the person tends to be sluggish and ignorant, but the positive manifestation of tamas guna is willingness to work hard.

Check Your Progress 2

1) What is Maslow's view on personality?

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2) What are the three types of traits explained by Allport?

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3) List the five factors of Big-Five Factor Theory.

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4) List three types of personality according to Indian approach.

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7.4 ASSESSMENT OF PERSONALITY

Personality can be assessed using different techniques. Clinical psychologists/ psychologists use personality tests to measure anxiety and personality disorders, industrial psychologists use tests to select employees in the jobs or school counselors use tests to understand the personality problems in children so that they can be helped. According to APA, "personality assessment is a proficiency in professional psychology that involves the administration, scoring, and interpretation of empirically supported measures of personality traits and styles in order to:

- Refine clinical diagnoses;
- Structure and inform psychological interventions; and
- Increase the accuracy of behavioral prediction in a variety of contexts and settings (e.g., clinical, forensic, organizational, educational)".

The above definition of personality assessment by APA suggests that it is a specialised knowledge which requires an assessor to have knowledge related to psychometric properties of the test instruments, theories of personality, knowledge of administration and interpretation. There are various measures to assess personality which can be broadly categorized as following:

7.4.1 Paper and Pencil Tests

The paper-pencil tests are the most popularly used measures to assess personality. These could be in various forms. One type is a **self-report inventory** or **questionnaires,**where simple questions pertaining to personality attributes, are asked and the respondent is required to answer to either of the two or three options given as "Yes" or "No" or "Cannot say". There is no right or wrong answer and there is no time limit. The items on the test may have face validity, that is, it may be apparent

to the respondent that their personality is being assessed. **Minnesota Multiphasic Personality Inventory** is the most popularly used inventory to diagnose clinical patterns in personality and for vocational and personal counselling. It was developed by Hathaway and McKinley in 1943 and has been revised a number of times. The latest is MMPI-2 for non-clinical and clinical population, like adolescents, addicts, etc. The statements refer to various personality attributes which the person has to endorse as "true" or "false" or "cannot say". On the same premise, **Jodhpur Multiphasic Personality Inventory** (Joshi & Malik, 1983) has been constructed in India, which makes assessment of psychoneurosis, psychosis, psychosomatic disorders, and validity indices.

The **California Personality Inventory** (Gough, 1969) is another measure which assesses non-deviant or normal personality traits such as self-acceptance, achievement, dominance, to name a few. **Edwards Personal Preference Schedule** measures the dominant motives or needs of the people (Edwards, 1954). Another inventory that is widely used by clinical psychologists is **Millon Clinical Multiaxial Inventory** (Millon, 1987,1997). **NEO Personality Inventory** (Costa & McCrae, 1989) is an important objective test that is based on Five-Factor Model of Personality (refer to the last section). It measures the five dimensions of personality which are considered to be the basic aspects of personality. **Myers-Briggs Type Indicator** (Myers & McCaulley, 1985) is an inventory based on Jungian theory of personality. It assesses the individual on the basis of sensation, thinking, feeling or intuition.

Inventories or the paper-pencil tests have their own limitations. First, the responses given, could be as a result of high level of *social desirability*, or where the respondent tries to make an impression. Second, the assessment can be distorted because of *acquiescence effect*. It is a tendency of a person to answer in affirmative (yes) to the items in an inventory, regardless of the content of the item. Lastly, the inventories can be administered to literate people only.

7.4.2 Projective Techniques

The projective techniques are subjective in approach unlike inventory. Projective techniques help in overcoming the shortcomings of paper-pencil tests in measuring the persons' personality. Influenced by Freuds' emphasis on unconscious, projective tests probe the invisible part of personality. These techniques use a standardized set of ambiguous or open-ended stimuli, which the respondent has to interpret according to what she/he perceives in them. In this way, needs, fears and values are projected onto the stimulus when asked to describe it. They can be incomplete sentences as in **Rotter's incomplete sentences blank** (Rotter,1950) which is easy and simple and helps in assessing the overall adjustment of the person or giving vocational guidance. The **Thematic Apperception Test** (TAT) developed by Henry Murray & Christina Morgan (1935) consists of 20 different cards containing ambiguous pictures, which are presented to the participant. The participant is asked to make up a story about the picture and the hero, the purpose, the feelings involved and the conclusion to the story is given. When the participant writes the story, she/he tends to identify with the characters and the story reveals self-perceptions, feelings and the perception towards life. The ink blots (some black, others using colour) test that is **Rorschach test** is another (Rorschach, 1921) widely used technique to assess personality. Each inkblot is on one card and the person is asked to show what they see in the ink blot and where they see it, what, or what it reminds them of. The more details that the respondent gives, the more information the psychologist gets to interpret the personality. This is scored objectively with the help of standard scoring manual (Exner, 1993) where each part of the ink blot is given numbers.

Box 7.3

Figure 7.4: An illustration of TAT card

The major limitation pf projective technique is that they are highly subjective in their approach and thus, have low validity and reliability as compared to objective methods of assessment.

7.5 SUMMARY

Now that we have come to the end of this unit, let us summarize all the major points that we have covered.

- The study of personality focuses on two broad areas: one is understanding individual differences in particular and personality characteristics, such as sociability. The other is, understanding how the various parts of a person come together as a whole.
- The psychoanalytic theory of personality proposes three important concepts. First, that the structure of the personality has three components as id, ego and super ego. Second, the dynamics of personality where the conscious and unconscious motivation and ego-defense mechanisms help to manage the personality. Third, there are different psychosexual stages of development during which different body zones and motives predominate and their effects are seen in the personality in adulthood.
- Many theorists followed Freud's work. Some theorists who initially worked with him but defected later to develop their own theories. To differentiate their work from Freud and to get due recognition, they called themselves as *neo-Freudian* or *post-Freudian*, *neo-analytic* or *psychodynamic*. Some of the prominent names include Alfred Adler, Koren Horney, Erik Fromm, Carl Jung, and Erik Erikson.
- Behaviourist psychologists were the main critics of psychoanalytical theory of personality. They were against the idea that human personality can be understood using psyche and unconscious contents. John B. Watson and B. F. Skinner were the most influential behaviourist theorists.
- Humanistic approach to personality came into existence as a reaction against the pessimistic approach of psychoanalysts and behaviourists towards human behaviour. Abraham Maslow and Carl Rogers are the two lead theorists of humanistic approach. Humanistic approaches tend to delve into the self to understand how personality evolves.

- Trait theories of personality postulate that our personality is a combination of traits that determine our behaviour. By identifying and studying them, we can predict the personality of other people.
- The Indian perspective on personality proposes personality types according to 'gunas'. Rajsik, tamsik, sattvik are three personality types.
- Personality can be assessed using different methods. Broadly, these techniques can be categorized into paper and pencil tests and projective techniques.

7.6 KEY WORDS

Personality : It refers to individual differences in characteristic patterns of thinking, feeling and behaving.

Trait : Trait(s) represent the thoughts, feelings and, behaviors that help to describe the people as accurately as possible.

Cardinal Traits : These are the dominant traits of one's personality. They stand at the top of Allport's trait hierarchy and are the master controller of one's personality. These traits may dominate personality to such an extent that the person may become known for those traits only.

Central Traits : According to Allport, every person possesses 5-10 central traits in varying degrees. They can easily be noticed and are responsible for shaping our personality, such as intelligent, loyal, dependable, aggressive etc.

Secondary Traits : These are less relevant traits of personality. These are basically situational or circumstantial traits.

Id : This part of personality operates unconsciously. It deals with basic instincts, biological needs, and aggressive impulses.

Preconscious or subconscious mind : Deals with all those information for which you are not currently aware but can become only if you pay attention.

Fixation : Refers to a continuation of an early mode of satisfaction in later life.

Collective unconscious : It refers to the unconscious shared by all humans.

7.7 REVIEW QUESTIONS

1) Id is to "just do it" as superego is to
   a) "wait till later"
   b) "do your own thing"
   c) "don't do it"
   d) "oh sit on it"

2) The concept of traits is used to account for personal characteristics that are

   a) biologically determined

   b) relatively permanent and enduring

   c) situation specific

   d) shared by a group

3) .....theory maximised and ..... theory minimised the role of unconsicious.

   a) trait; humanistic

   b) psychoanalystic; behaviourist

   c) psychoanalytic; humanistic

   d) trait; behaviourist

4) Psychologists who believe that people grow and develop throughout their lives and that people are inherently good are

   a) psychoanalysts

   b) radical behaviorists

   c) social learning theorists

   d) humanists

5) Discuss Five-Factor Model of Personality.

6) Why is the unconscious so important in Freud's theory of personality?

7) Explain any five defense mechanisms given by psychoanalytical theory of personality.

8) Discuss the methods of assessment of personality.

9) Explain humanistic view of personality.

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7.9 REFERENCE FOR FIGURE

Diagram of Freud's psyche theory. Retrieved October 6, 2018 from https://commons.wikimedia.org/wiki/File:Structural-Iceberg.svg

Extrovert-Introvert Spectrum. Retrieved October 6, 2018 fromhttps://commons.wikimedia.org/wiki/File:ExtrovertIntrovertSpectrum.png.

7.10 ONLINE RESOURCES

- For information on Psychodynamic theory, visit
  - https://courses.lumenlearning.com/suny-hccc-ss-152-1/chapter/freuds-psychodynamic-theory/
  - http://journals.iupui.edu/index.php/advancesinsocialwork/article/view/140
  - https://nobaproject.com/modules/the-psychodynamic-perspective
- For more on Behaviourist Theory of Personality, visit
  - https://www.simplypsychology.org/behaviorism.html
  - https://chasqueweb.ufrgs.br/~slomp/edu01011/watson-behaviorist.pdf
  - https://plato.stanford.edu/entries/behaviorism/
- To learn more about Trait Theory of Personality, visit
  - http://www.ep309.org/faculty/LAMBJEN/Chapter6/trait_theories_of_personality.pdf
  - http://www.ufrgs.br/psico-laboratorio/textos_classicos_3.pdf
  - https://courses.lumenlearning.com/boundless-psychology/chapter/trait-perspectives-on-personality/

Answer to Multiple Choice Questions

1) (c), 2) (b), 3) (b), 4) (d)

UNIT 8 INTELLIGENCE*

Structure

8.0 LEARNING OBJECTIVES

After reading this unit, you will be able to,

- explain the nature and concept of intelligence;
- discuss nature vs. nurture debate of intelligence;
- compare and summarize the various theories of intelligence;
- identify the different ways to measure intelligence; and
- describe different types of intelligence tests.

* Dr. Arti Singh, Academic Associate of Psychology, IGNOU, New Delhi and Dr. Meetu Khosla, Associate Professor of Psychology, Daulat Ram College, University of Delhi.

8.1 INTRODUCTION

Figure 8.1: Indian Wonderkid: Priyanshi Somani
Image Source: https://www.indiatimes.com/culture

'Priyanshi Somani born on 16th November 1998 is a mental calculator and she was the youngest participant of the Mental Calculation World Cup held in 2010 and also won the overall title and make India proud. She is the only participant who has done 100% accuracy in addition, Multiplication, Square Root till date in all the Five Mental Calculation World Cups'.

Source: https://www.indiatimes.com/culture/

What made the child prodigy, in the above example, different from other children of her age? Is she born intelligent or has been trained to become efficient in solving mathematical problems? Many psychologists have developed theories to describe such intelligent behaviour. In this unit, we will be discussing the concept of intelligence, various theories of intelligence and methods to assess intelligence. After reading this unit, try to identify factors that could describe such child prodigy most accurately and discuss with your friend.

8.2 CONCEPT AND DEFINITION OF INTELLIGENCE

Intelligence involves a number of abilities together. It is the ability to understand the incoming information and make sense out of it. It is the ability to acquire new skills and use the existing knowledge to complete a task or deal with a situation. Intelligence includes the capacity to understand novel stimuli, learning language and communicate with others, being aware of the environment, have the ability to reason, plan, and solve the problems creatively. According toWechsler (1944), "Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment." Intelligence from Indian perspective is conceptualised as adaptive potentiality of a person in different domains of life. It is not limited to cognitive domain only. This adaptive potentiality consists of a range of skills that help one to oovercome the life problems, to grow and become what one wants to be (Srivastava & Misra, 1997). There are individual differences in intelligence. These differences influence the capacity of the people to cope with

their daily life issues. Those who score less than 70 on IQ (Intelligence Quotient) tests are considered as people with intellectual disability (ID). The level of ID also varies. This limits their capacity to perform daily life functions, or do simple tasks, and are poor on academic and life skills. They are generally groomed in social and vocational skills. There are sex differences in intelligence. Women and girls have been found to be better on verbal tasks while men and boys have been found to be better on performance tasks. Differences in intelligence have also been related to the intellectually stimulating home environment.

8.2.1 Nature Vs. Nurture Debate in Intelligence

Why some people are more intelligent than others? Why siblings from the same family have a different aptitude and intelligence level?

To answer these and other similar questions, psychologists' resort to nature vs. nurture debate. This debate involves whether differences in human intelligence is the result of nature or nurture? But before explaining further, what exactly is meant by nature and nurture?

Nature- It refers to the genetic factors that we have inherited from our parents, such as height or skin colour.

Nurture- It refers to all those environmental factors that can impact us, such as rearing process, family, socioeconomic conditions, social support, cultural factors, and anything that does not come from within the person.

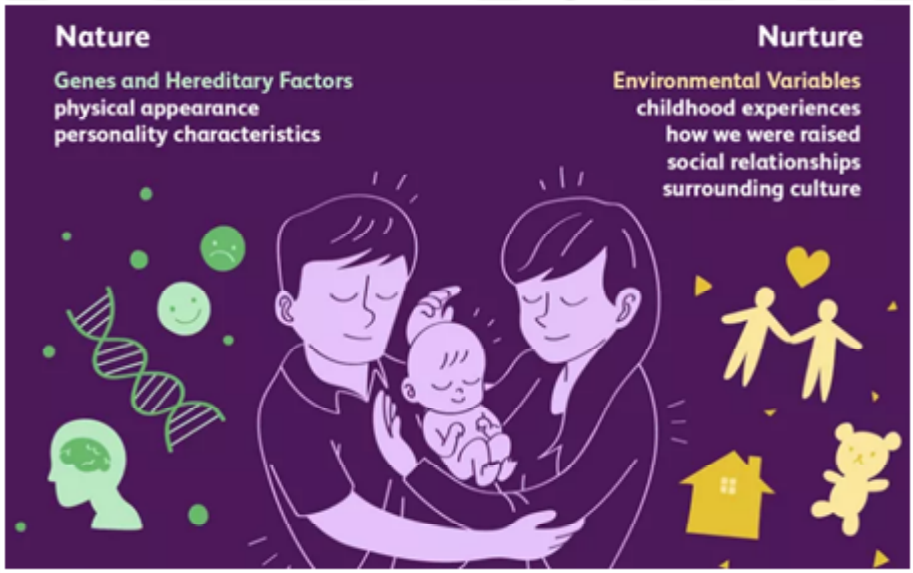

Figure 8.2: Nature Vs. Nurture Debate
Image Source: https://www.verywellmind.com/

The debate over the relative importance of hereditary Vs. environmental factors is one of the oldest yet unresolved debates. People who believe that our intelligence is purely controlled by our hereditary factors are known as *nativists*. Those who support this view, regard differences in human behaviours as a result of different 'genetic makeup'. Supporters of the other end of this debate spectrum are known as *environmentalists* or *empiricists*. Advocates of this view believe that people differ from each at the level of intelligence due to their experiences or environmental conditions. One of the well-known and prominent supporters of this view is John Locke. He equated human mind to *tabula rasa*-a blank slate, which gradually fills with our life experience. Figure 8.3 illustrates the nativists Vs. empiricists taken by different approaches of psychology.

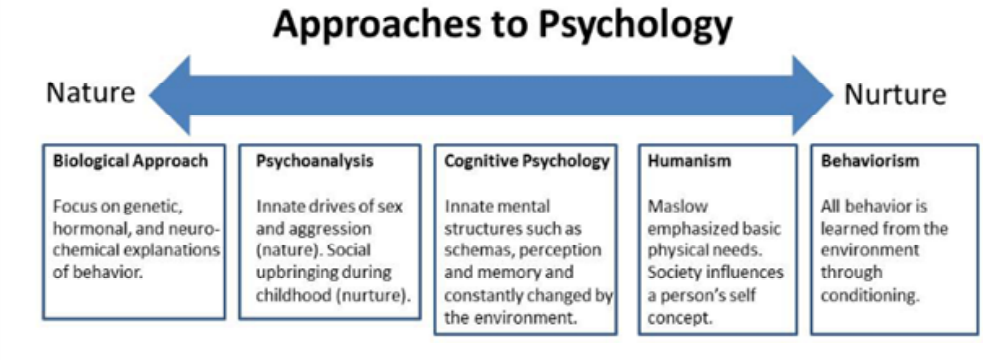

Figure 8.3: Nativists Vs. Empiricists taken by different approaches of psychology
Image Source: https://www.simplypsychology.org/

However, contemporary view on this debate suggests that defending any extreme side would be a catastrophe in explaining human behaviour and individual differences. Recently, many studies have suggested that both genetic and environmental factors play a vital role in shaping intelligence. For example, height as a physical trait has been found to be influenced by both genetic and environmental factors. If parents of a child are tall, and if she/he may have inherited these genes for tall height then whether the child will be tall or not, depends on received nourishment. If the child has not received proper nourishment then her/his genes of tall height would not manifest and she/he will remain shorter than her/his parents. You will also find many examples of nature-nurture interaction in your textbooks on abnormal psychology or psychopathology, where the roots of all mental disorders have been explained with the help of both genetic predisposition and environmental factors.

There is a substantial amount of evidence to support the role of genes (heredity or nature) in explaining individual differences in intelligence. These are based on studies of identical twins that have been reared apart. The rationale behind such research is that if identical twins possess same level of intelligence, irrespective of different environments, then it is attributed to the twins identical genes. If identical twins who are reared apart are more similar in their intelligence levels than non-identical twins who are reared apart, provides a strong support for genetic endowment of intelligence. Thus, there is evidence of differences in cognitive ability as inherited. There are researchers that conclude that role of environment is small in shaping one's intelligence (Jenson, 1973). The *flynn effect* (James Flynn, 1987) suggests the importance of environment on IQ. Culture is the critical part of one's environment. Flynn effect is described as massive IQ gains, nearly three points per decade. In the US, the average IQ increased at about 22 points between 1932 and 2002. The Flynn effect has not been studied in India. Though, some limited IQ data points towards low IQ scores in India. Thus, the environmental factors like malnutrition, disease and illiteracy have led to lower average intelligence scores among general population and this prevents people reaching their genetic potential in IQ.

Check Your Progress 1

1) Define intelligence.

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2) Explain nature vs. nurture debate over intelligence?

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8.3 THEORIES OF INTELLIGENCE

Intelligence has been defined in a particular way but there are differing opinions about the concept of intelligence. Thus, there are several theories that describe and explain intelligence with different perspectives. One group of theorists focuses upon the organization of mental abilities as factors that constitute intelligence. The other group looks at the nature of the intellectual processes.

8.3.1 Spearman's Theory of Intelligence

Charles Spearman's (1904) theory of intelligence is known as two-factor theory. Spearman noticed that children who perform well in one subject tend to have good marks in other subjects also. This observation led him to propose that there is a common factor which affects all of your activities. Using a statistical method called as "factor analysis", he proposed that all cognitive activity or mental activity consists of two factors namely, "general" or "g" factor and "specific" or "s" factor. So, intelligence is a sum of "g" factor and "s" factor. The g-factor theory or general-factor theory states that intelligence is composed of a general intelligence. The g factor refers to the broad spectrum of mental faculties that influences the performance on a wide variety of cognitive abilities. The s factor is the single or unique factor. It proposes that all cognitive abilities are related to one another. Hence, the general intelligence is responsible for acquiring knowledge, abstract reasoning and adapting to novel situations.

8.3.2 Thurstone's Theory of Intelligence

L.L. Thurstone (1938) emphasized that intelligence involved seven clusters of Primary Mental Abilities (PMA). His approach was very different from that of Spearman's. He suggested that the differences that were observed in the performance of intellectual tasks could be attributed to different independent abilities. These abilities included:

i) *Word Fluency(W):* Ability to think or use words rapidly, such as in the task of anagrams.

ii) *Verbal Comprehension(V):* Ability to understand the meaning of the word, concept or ideas correctly. Vocabulary tests assess verbal comprehension.

iii) *Spatial Visualization(S):*It is the ability to manipulate patterns and forms of objects in space visually.

iv) *Perceptual Speed(P):* Tendency to perceive details quickly in every stimulus accurately.

v) *Numerical Facility(N):* One's ability to solve a numerical problem quickly and accurately.

vi) *Reasoning(R):* Ability to observe facts and making a general rule out of it.

vii) *Associative Memory(M):* Ability to memorise and recall quickly and accurately.

All the above clusters were originally said to be functionally independent of each other, it was actually found that they were intercorrelated. This supported Sperman's idea of a 'g' factor.

8.3.3 Sternberg's Theory of Intelligence

Robert Sternberg (1988a, 1997b) developed the 'Triarchic theory of intelligence'. According to the theory, there are three types of intelligence. First is the *contextual intelligence*, second is the *creative intelligence* and third is the *analytical intelligence*. *Contextual intelligence* or practical intelligence refers to the ability to adapt to the environment or situational demands. It involves applying knowledge and information to your real world and thus adapting successfully to the situation. Here, adaption involves both adapting to your existing environment and/or ability to modify your environment to fulfill your needs. People who are high on this intelligence are street smart and often successful in their life.

Creative intelligence is the ability to develop new ideas of ways of solving a problem or tackling a situation. *Experiential intelligence* or creative intelligence is the ability to develop novel ideas or solutions. People high on this intelligence are creative. They have the ability to use previous experiences in making new inventions.

The analytical intelligence involves the ability to think abstractly and appraise the situation. *Componential intelligence* is also known as analytical intelligence, is measured by a traditional intelligence test. People high on this form of intelligence, often score high on traditional Intelligence Quotient (IQ) tests. Such individuals have high critical and analytical abilities and usually perform well in academic tasks and school. They are also good at mathematical and verbal skills.

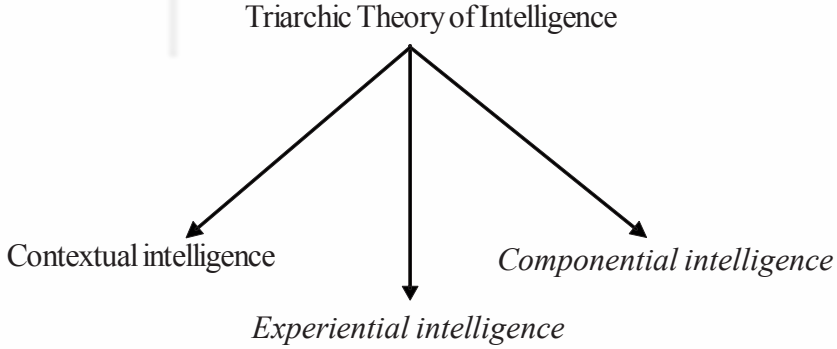

Figure 8.4 Triarchic theory of intelligence

8.3.4 Gardner's Theory of Intelligence

Howard Gardener (1993b, 1999a) refuted the classic view of intelligence as a capacity for logical reasoning. He proposed that there is no one form of intelligence but a number of intelligence work together. According to him, intelligence is the "ability to solve problems or fashion products that are of consequence in a particular cultural

setting or community" (1993). Initially, he proposed seven distinct types of intelligence namely,

1) *Linguistic:*People who are high on this type of intelligence have good linguistic abilities i.e., they can easily articulate and express their thoughts by choosing the most appropriate words. They can easily play with the words. Poets and writers have a higher level of linguistic abilities.

2) *Musical:*People high on this are knowledgeable and sensitive to music. They can manipulate musical pattern to create different music. People carrying this intelligence are good signers, play musical instruments and good music composers.

3) *Logical-mathematical:* This involves having the ability to think critically and on abstract problems. Such people have a scientific aptitude and are good with numbers and abstract problems. Scientists have a higher level of this intelligence.

4) *Spatial:* This intelligence is related to one's ability to manipulate and use visual images or mental images. Navigators, pilots, architects, and painters have high spatial intelligence.

5) *Bodily-kinesthetic:* It is the ability to control and train your body or a part of it for construction of products and problem-solving. People serving in the military, intelligence agencies, sports person, actors and, dancers have higher levels of bodily-kinesthetic intelligence.

6) *Intrapersonal:* Being aware of one's own feelings, emotions, needs, and motives are having intrapersonal intelligence. Philosophers and spiritual leaders are high on intrapersonal intelligence.

7) *Interpersonal:* Your ability to understand other person's behavior, motive, and feelings. People high on this intelligence use their understanding of other people to develop a comfortable bond with other people. Counselors, politicians, teachers, social workers are high on interpersonal intelligence.

Later, he added another type of intelligence. *(8) Naturalist:* It refers to being sensitive to different features of nature. They have compassion for nature and are usually nature lovers. Wildlifers and botanists possess a higher level of this intelligence.

Each individual has a unique combination of these eight types of intelligence, which explains the individual differences. Gardner and his colleagues proposed that the typical paper-pencil tests for intelligence do not measure many aspects of intelligence such as interpersonal ability. For instance, many students performed poorly on the intelligence test but become great leaders because of their refined interpersonal qualities. Thus suggesting, that intelligence is more than merely mathematical, verbal and analytical abilities, measured by the traditional intelligence test.

8.3.5 Cattell's Theory of Intelligence

Raymond Cattell (1963) proposed the notion of fluid and crystallized intelligence. *Fluid intelligence* is the capacity to reason and solve new problems. There is no influence from any knowledge from past experiences, rather the person innovates new logical methods to resolve the problem. *Crystallized intelligence* is the ability to use skills, knowledge and past experiences. It involves the intellectual learning that one has accumulated throughout the life span. This intelligence is expressed in the form of one's vocabulary and general knowledge.

Box 8.1: Non-cognitive Intelligence: Emotional Intelligence and Social Intelligence

Emotional Intelligence

In the early 1990s, John Mayer and Peter Salovey introduced and defined one of the most important non-cognitive intelligence: Emotional Intelligence (EI). In the *Handbook of Intelligence (2000),* they defined emotional intelligence (EI) as "*the ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion, and regulate emotion in the self and others"* (Mayer, Salovey, & Caruso, 2000, p. 396; see also Mayer & Salovey, 1997). Although Mayer and Salovey were responsible for introducing this term (EI) to the world of psychology, it was Goleman's (1995) bestselling book *Emotional Intelligence: Why it can matter more than IQ*, which made this term more common.

Social Intelligence

The second type of non-cognitive intelligence is known as Social Intelligence (SI). Thorndike (1920) was the first psychologist to use this term to describe the skill of understanding and managing other people wisely. Goleman has defined SI as 'being intelligent not just *about* our relationships but also *in* them'. According to Mayer and Salovey, emotional intelligence is a part of social intelligence. Due to this reason, Bar-on (2006) has proposed that these two terms are related to each other and may represent the component of the same construct. He further pointed out that in his theory of intelligence; Gardner's (1983) conceptualisation of *personal intelligence* is also a combination of intrapersonal (emotional) intelligence and interpersonal (social) intelligence. Based on above assertions, he pointed out that it would be more accurate to club these two terms (SI and EI) into one construct. He named this new construct as "*emotional-social intelligence*" or "*ESI*". According to Bar-On model, "emotional-social intelligence is a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands".

8.3.6 PASS Theory

Das, Naglieri, and Kirby (1994) proposed Planning, Attention, Simultaneous, and Successive (PASS) Theory, which primarily includes four types of competence:

1) Planning process is important when the individual makes a decision about how to solve a problem or carry out an activity. It involves goal-setting and monitoring feedback.

2) Attention allows a person to attend selective stimuli and ignore others.

3) Simultaneous process helps in perceiving the stimuli as a whole and integrates stimuli into groups.

4) Successive processing integrates the stimuli into a specific serial order.

PASS model helps in understanding various cognitive processes like, reasoning, imagery, language, and memory.

8.3.7 Theory of Technological Intelligence

Culture has an influence on intelligence. Vygotsky emphasized the role of sociocultural factors in providing people to live, grow and understand the world around themselves. Thus, Vygotsky forwarded the view that culture promotes intellectual development.The higher order mental functions are culturally determined. Technological intelligence is the type of intelligence among people of advanced countries. Such intelligence reflects the skills of attention, observation, analysis, performance, speed, and achievement orientation.

8.3.8 Theory of Integral Intelligence

When we discuss intelligence from the Indian perspective, it is the integral intelligence that is reflected. As the name suggests, it is a holistic perspective of intelligence that incorporates and integrates both cognitive and non-cognitive processes (Srivastava & Misra, 2007). The main competencies of integral intelligence, thus identified are cognitive competence, social competence, emotional competence and entrepreneurial competence. Both heredity and environment play a role in intellectual development. According to Sri Aurobindo, ultimate aim of intelligence is a direct cognizance without the mediation of senses and hence, without the distortions brought by the ego (Baral & Das, 2004).

Check Your Progress 2

1) What is two-factor theory of intelligence?

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2) Explain triarchic theory of intelligence.

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3) What do you understand by fluid and crystallized intelligence?

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4) Differentiate between integral intelligence and technological intelligence.

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8.4 ASSESSMENT OF INTELLIGENCE

Alfred Binet and Theodore Simon were attributed with the first attempt to measure intelligence scientifically. In 1905, they developed first intelligence test known as Binet-Simon Intelligence Scale. Later in 1908, they coined a term *Mental Age (MA)* to measure the intellectual ability of a person in comparison to his or her fellow age group, and *Chronological Age (CA)* refers to a person's biological age. According to Binet, if a child has MA more than her/his CA, then she/he will be classified as bright. If the child scores two MA years below than her/his CA, then she/he should be identified with intellectual disability.

In1912, William Stern suggested the concept called *Intelligent Quotient (IQ)*. It referred to a score derived by dividing MA with CA and multiplying the result with 100.

IQ = (MA/CA) X 100

So, if MA equals CA, then IQ will be 100.

If MA is less than CA, IQ will be less than 100.

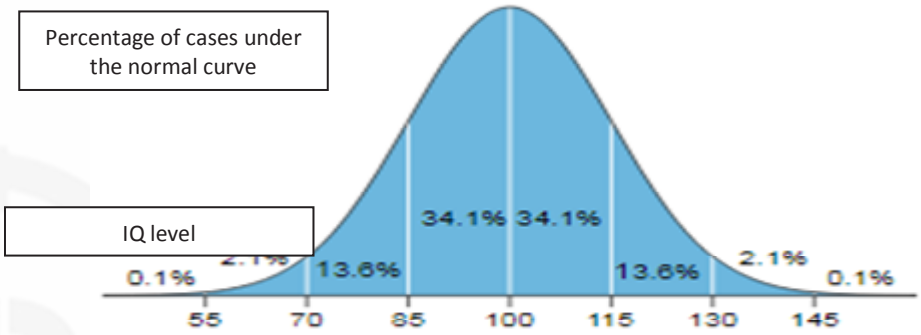

Figure 8.5 :Normalised distribution of IQ with the mean of 100 and stranded deviation 15
Image Source: https://commons.wikimedia.org/

In this normal distribution (see Figure 8.5), following scores suggest different types of intellectual abilities:

IQ Range	Descriptive Label
Above 130	Very Superior Intelligence (gifted)
120 to 129	Superior Intelligence
110 to 119	High Average Intelligence
90 to 109	Average Intelligence
80 to 89	Low Average Intelligence
71to 79	Borderline Intellectual Functioning
55 to 70	Mild Mental Intellectual Disability
40 to 54	Moderate Intellectual Disability
25 to 39	Severe Intellectual Disability
Below 25	Profound Intellectual Disability

8.4.1 Types of Intelligence Tests

Intelligence tests have been classified on a number of criteria, such as tests based on the number of participants who can attempt the test, tests based on items used in the test and whether the test can be used across different cultures or not.Figure 8.6 illustrates the classification of intelligence tests.

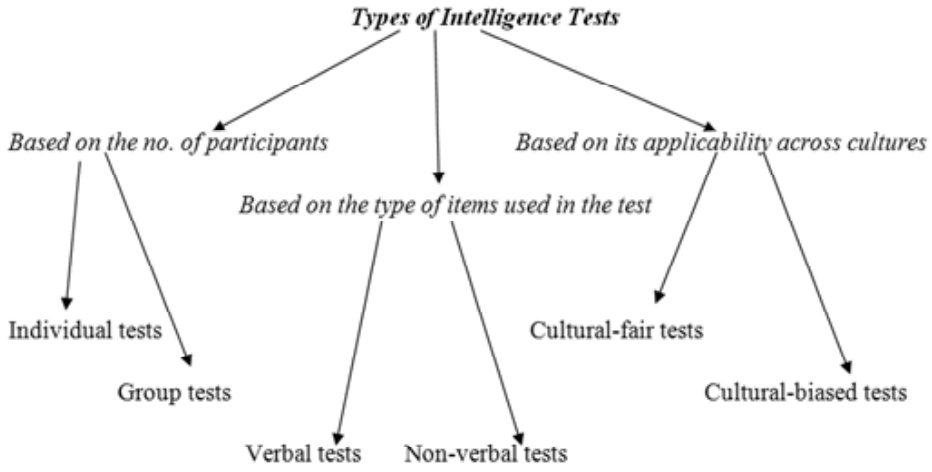

Figure 8.6: Types of Intelligence Tests

8.4.1.1 Individual and Group Intelligence Tests

A) Individual Tests

An individual test is one that is administered to one individual at a time. There are many standardised individual tests such as The Kaufman Scales, Stanford-Binet Scale and, Wechsler Intelligence Scales. We will limit our discussion with two most famous intelligence tests i.e., Stanford - Binet Test and Wechsler Intelligence Tests.

Stanford-Binet Scale of Intelligence

Binet-Simon intelligence test was the first intelligence test, developed by Binet and Simon (1905). It was one of the popular intelligence tests among psychologists. Later this test was revised and adapted by an American psychologist Lewis M. Terman who was working at Stanford University. After validating it on the American population, he renamed the original scale as "Stanford-Binet Scale". In 2003, the fifth version of the Stanford-Binet Scale, Fifth Edition (SB5) was introduced with 10 subtests measuring following five factors:

- Fluid reasoning
- Knowledge
- Quantitative Reasoning
- Visual-Spatial Processing
- Working Memory

Other than scores with reference to these five factors, SB5 gives two distinct scores, namely Verbal IQ, and Nonverbal IQ. The instrument has 10 subtests. The SB5 can be used for people within the age range from two years to 85 years old individuals. On American sample of 4800 individuals, the reliability of the three IQ scores was found to be in .90 and that of the subtests, ranging from .70 to .85 (Roid, 2002).

Box 8.2: First Intelligence Test

Origin of the Stanford - Binet test

The Stanford-Binet Test traces its roots to the Binet-Simon Scale, French device for identifying levels of intelligence. The Binet-Simon Scale was developed by Alfred Binet and his student Theodore Simon. French education laws were in flux at the time and Binet was approached by a governmental commission. The commission wanted a device to detect children that possessed notably below-average levels of intelligence for their age. Because Binet and Simon could not come up with a solitary identifier of intelligence, they devised a construction that takes into consideration the age of a child and competences at that point in life. From this data, they developed a baseline from which intelligence could be measured.

The Binet-Simon Scale quickly garnered accolades from the psychology community and others. A general consensus quickly developed that this test provided a meaningful way of ascertaining intelligence levels.One of the reasons the Binet-Simon Scale became accepted and highly regarded so rapidly is the fact that it was designed to be adaptable to different languages and cultures.

Stanford University and the Binet-Simon Scale

The work of Binet and Simon was quickly picked up by Lewis M. Terman, a psychologist at Stanford University. Terman became one of the first to develop a derivation of the test for people in the United States. His version of the test was christened the Stanford–Binet Intelligence Scale. Terman's first publication of the U.S. version of the test appeared in an article entitled "The Measurement of Intelligence: An Explanation of and a Complete Guide for the Use of the Stanford Revision and Extension of the Binet-Simon Intelligence Scale."

Source: https://stanfordbinettest.com/history-stanford-binet-test

The Wechsler Scales

The Wechsler scales were developed by Dr. David Wechsler. He developed three scales; for adults, for school-age children, and one for preschool children. All three of his tests contain several subtests from verbal as well as nonverbal domain and they can measure intelligence and cognitive abilities. He developed his first test (Wechsler- Bellevue scale) in 1939 when he was working in Bellevue hospital.He devised a new formula for calculating IQ from his scales. As we know, the usual formula of IQ is,

IQ = Mental Age/Chronological Age × 100

According to Wechsler,

IQ = Attained or Actual Score / Expected Mean score for Age

Box 8.3: Do You Know?

Wechsler wass a Romanian-American psychologist who was born on Jan 12, 1896, in Romania. His family relocated to the states in New York when he was just a boy. He earned a Master's Degree from Columbia University in 1917. By 1925, he earned a Ph.D. It was Robert S. Woodworth that first took a chance on the young psychologist. Woodworth was a big shot in the United States Army, and he was overwhelmed by the number of soldiers that were experiencing mental issues after the war. Working alongside Charles Spearman and Karl Pearson, Wechsler was to develop testing to help the army screen new draftees. However, things took a very different turn.

Figure 8.7: David Wechsler
Source: https://wechsleriqtest.com/#

Wechsler dedicated himself to the study of memory loss in soldiers from WWI. His curiosity built a foundation to test the very intelligence of his patients. Studying the brain

was a fascinating undertaking, so he expanded his test to include children. He felt the very formation of the intellect could help him resolve the current problems with memory loss.

What he found was mind-blowing. The IQ of a person is directly predisposed to the atmosphere in which they live. Biological and environmental influences can dictate a person's intellect. Wechsler knew that many factors affected intelligence and cognitive ability, but he also found that persistence had a sizable effect too. He realized that one test would not accommodate all age groups, so he developed a series that would be used for all ages.

Source: https://wechsleriqtest.com/#

There are three versions of Wechsler's intelligence scale:

i) **WPPSI – Wechsler Pre-School & Primary Scale of Intelligence:** This scale can be administered on children from 2 years and 6 months to 7 years and 7 months. It was introduced in 1967 and originally designed for children between 4 years and 6.5 years old. It consists of 14 subtests measuring three indices, viz., verbal, performance and full-scale IQ. Currently, it is in fourth revision known as WPPSI-IV.

ii) **WISC – Wechsler Intelligence Scale for Children:** This test can be administered on children from 6 to 16 years old. This test was developed from the Wechsler-Bellevue Intelligence Scale and was first introduced in 1949. This test is often used in schools and other educational setups with the aim to identify gifted children as well as children with learning difficulties. The most recent version of the test is the WISC-V, which was released in 2014.

iii) **WAIS – Wechsler Adult Intelligence Scale:** This test is used for adolescents from 16 years of age through adulthood to measure general intelligence, by administering many subtests. Each of the test is an indicator and estimator of intelligence. The current version of the test is the WAIS-IV which was launched in 2008.

The recent editions of Wechsler Intelligence Scales that are adapted for India are Wechsler Adult Intelligence scales Fourth Edition, India (WAIS-IV, INDIA), Wechsler Abbreviated Scale of Intelligence - Second Edition, India (WASI-II INDIA). Wechsler Memory Scale - Third Edition, India (WMS-III INDIA).

WAIS IV INDIA : It is an adapted and standardized for India. It is an advanced measure of cognitive ability for adolescents and adults. It provides subtests and composite scores that represent intellectual functioning in specific cognitive domains as well as composite scores for general mental ability (Full Scale IQ). It is also used to assess learning difficulties and giftedness. It is a highly reliable and vaild tool.

B) Group Tests

A group test is one that can be administered to more than one person at the same time. Thus, making the tests quick in administration. There are many intelligence tests which can be considered as group tests such as Multidimensional Aptitude Battery (MAB; Jackson, 1984), Cognitive Abilities Test (Lohman & Hagen, 2001), Culture Fair Intelligence Test (1940) and, Raven's Progressive Matrices (1938,1992). As an example, we will discuss only Raven's Progressive Matrices briefly.

Raven's Progressive Matrices (RPM)

Raven's Progressive Matrices (RPM) was developed by John C. Raven in 1983. It is a non-verbal test of inductive reasoning, designed to measure Spearman's g factor or general intelligence. It consists of 60 multiple choice items and can be administered on children from 5 years-old to the older adults. The test contains visual geometric designs with a missing piece and the task of the test taker is to choose the missing part of the matrix from six to eight given alternatives. Raven constructed three different forms of tests: Standard Progressive Matrices (SPM), Coloured Progressive Matrices (CPM) and, Advanced Progressive Matrices (APM). SPM is suitable for average individual between the ages of 6 and 80 years. CPM is availabe for younger children and for special groups who cannot be tested on SPM. APM is available for above average adolescents and adults.

8.4.1.2 Verbal and Nonverbal Tests

A) Verbal Tests

Verbal intelligence is the ability to use and solve problems using language-based reasoning. Verbal tests are those which require the use of language for successful performance in it. Verbal intelligence is the ability to comprehend and solve language-based problems. Initially, approximately all intelligence tests were based on language only but later it was realised that such tests are of no use for people who were illiterate, young children who have not acquired the language abilities fully and people with speech difficulties. To overcome the limitation of these verbal tests, many psychologists came up with a number of non-verbal intelligence tests. Moreover, many verbal standardised tests such as Wechsler scales and Kaufman scales now also have some non-verbal test components.

B) Non-Verbal Tests

A nonverbal test of intelligence measures one's ability to analyze visual information and solve problems without necessarily using words. Nonverbal tests are also known as performance tests as they generally require a construction of certain patterns. Some of the famous nonverbal tests are Koh's Block Design Test, Cube Construction Tests, and Pass along Tests. Raven's Progressive Matrices (1938, 1986, 1992, 1995) is also a well-known nonverbal intelligence test which has been discussed in the previous section.

8.4.1.3 Culture-Fair Tests and Culture-Biased Tests

A) Culture-Fair Tests

Every culture is unique in terms of their values, language, expectations, demands and environmental experiences. A child reared in the US will be very different in many respects with a child been brought-up in Indian sub-urban area. Due to this reason, for assessing individual belonging to different cultures, psychologists came up with tests which are free from any cultural biases. Some of the famous culture-fair tests are The Culture Fair Test (Cattell, 1940), Raven's Progressive Matrices (Raven, 1938, 1986, 1995), The Leiter International Performance Scale-Revised (Roid & Miller, 1997) and, Draw-a-Man Test (Goodenough, 1926). All these and other culturally fair tests are non-verbal in nature. Now, we will discuss an example of culture-fair intelligence test-Draw-a-Man test (Goodenough, 1926).

Draw-a-Man Test

This test was initially developed by Goodenough (1926). Later, it was revised by

Goodenough and Harris in 1963, known as Goodenough-Harris Drawing Test. Based on the projective technique, this test requires a test taker (children only) to make three pictures on three separate papers. They are asked to draw a man, women and themselves without giving any further instructions. Interestingly, instead of artistic skill, emphasis is given on the child's ability to observe accurately and think conceptually.

B) Cultural-Biased Tests

Many psychologists have attempted to develop culture-fair intelligence tests by making it non-verbal in nature. However, it was realized that the impact of culture cannot be eliminated completely from these tests even after making it nonverbal completely. Due to this reason, only the term 'culture fair' is used in place of 'culture free' tests.

8.5 SUMMARY

Now that we have come to the end of this unit, let us summarize all the major points that we have covered.

- Intelligence includes the capacity to understand novel stimuli, learning language and communicate with others, being aware of environment, have the ability to reason, plan, and solve the problems creatively.
- Charles Spearman proposed the 'Two Factor Theory of Intelligence'. He used factor analysis and correlation analysis to find out the two important factors of intelligence i.e., the general 'g' factor and specific's' factor.
- Thurstone suggested that intelligence is a composite of seven distinct primary mental abilities (PMA). Using improved statistical techniques, he developed a new factor model of intelligence. These factors were called as primary mental abilities.
- Howard Gardner (1983) proposed the theory of multiple intelligences. According to him intelligence is not a single entity, rather it consists of eight types of intelligence.
- Robert J. Sternberg formulated the 'triarchic theory of intelligence' which theorizes that intelligent behaviour consists of three major components or subtheories. The subtheories are (1) componential or analytical intelligence, (2) contextual intelligence or the practical intelligence and, (3) experiential or creative intelligence.
- Cattell proposed two types of intelligence, fluid and crystallised. Das, Naglieri, and Kirby (1994) proposed Planning, Attention, Simultaneous, and Successive (PASS) Theory.
- Intelligence in the Indian perspective is known as integral intelligence.The higher order mental functions are culturally determined. Technological intelligence is the type of intelligence reflected among people from advanced countries.
- There are different ways to measure intelligence.Intelligence tests have been classified on a number of criteria, such as tests based on the number of participants who can attempt the test, tests based on items used in the test and whether the test can be used across different cultures.

8.6 KEY WORDS

Intelligence : It is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment.

G-factor : Known as 'general-factor', this is an innate cognitive activity that influence all other kinds of mental activities. It remains constant throughout one's life.

S-factor : Known as 'specific-factor". It represents our performance on a specific or particular mental activity. It is learned and one can have many s-factors.

Mental age : It is a measure of person's intellectual development relative to people of his/her age group.

Crystallized intelligence : A type of intelligence which consists of the knowledge a person has already acquired and the ability to use that knowledge whenever required.

Fluid intelligence : The type of intelligence we use when dealing with novel situations and problems.

Verbal Comprehension : The ability of reading comprehension, define and understand words, concepts, ideas; verbal reasoning

Spatial Relations : It involves the ability to visualise and manipulate different geometric patterns, forms and imaginary objects in space.

Emotional Intelligence : It is the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions.

8.7 REVIEW QUESTIONS

1) Which of the following is part of Wechsler's definition of intelligence?
   a) naturalistic intelligence
   b) iconic memory
   c) ability to deal effectively with the environment
   d) spatial and kinesthetic abilities
2) Which of the following is one of Gardner's types of intelligence?
   a) executive skills
   b) music
   c) ethics
   d) creativity

3) The person responsible for the development and design of the first useful individual test of intelligence is
   a) Freud
   b) Terman
   c) Binet
   d) Wechsler
4) The distribution of IQ scores
   a) is approximately normal or bell-shaped
   b) shows that most people score between 80 and 100
   c) reveals a difference in the average for men and women
   d) falls off abruptly above 100
5) Define intelligence.
6) Discuss nature vs. nurture debate over intelligence.
7) Explain Spearman's and Thurstone's theory of intelligence.
8) Explain Triarchic theory of intelligence.
9) Differentiate between mental age, chronological age and intelligence quotient. How are these concepts related to each other?
10) Differentiate between culturally-fair intelligence tests and culturally-biased intelligence tests.

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8.10 ONLINE RESOURCES

- For more information on Theories of Intelligence, visit
  - http://www.gcbtcollege.in/studymaterial/Intelligence%20Theories.pdf
  - https://scottbarrykaufman.com/wp-content/uploads/2012/09/Kaufman-Kaufman-Plucker-in-press.pdf
  - http://www.psych.purdue.edu/~willia55/120/10.IntelligenceMM.pdf
- For more on Measurement of Intelligence, visit
  - https://psychaanalyse.com/pdf/THE_MEASUREMENT_OF_INTELLIGENCE.pdf
  - https://journal-archieves26.webs.com/107-124.pdf
  - http://shodhganga.inflibnet.ac.in/bitstream/10603/46917/6/06_chapter%202.pdf
- For interesting articles on Nature Vs. Nurture debate on Intelligence, visit
  - http://pzacad.pitzer.edu/~dmoore/publications/2013_moore_nature-nurture.pdf
  - https://pdfs.semanticscholar.org/184d/cab8a5d45c7b2728e570985127c64c7fae81.pdf
  - https://www.canford.com/MainFolder/Documents/Prospective-parents/Academic/Blog-posts/Nature-vs-Nurture.pdf
  - http://lib.oup.com.au/secondary/science/Psychology/1and2/Oxford-Psych-1and2-Ch8-nature-vs-nurture.pdf

Answer to *Multiple choice questions*

1) (c) 2) (d), 3) (c), 4) (a)

BLOCK 5

GUIDELINES FOR PRACTICAL

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1.0 INTRODUCTION

The BA Programme offered by the University will introduce you to the laboratory component in the courses offered by the Discipline of Psychology. To complete the course BPCC-131 Foundations of Psychology, you must complete one Tutor Marked Assignment, attend practicum sessions (sessions are mandatory), write the term end examination for theory and practical components separately.

Laboratory component is of 2 Credits. In this, you will learn how to administer tests and conduct experiments in a controlled condition, that is in a laboratory setup at your Study Centre. The test and experiments will be carried out on a human participant and you will be the experimenter or test administrator. At times, this situation may also be reversed as during the course you will carry out practical amongst your classmates. The tests and experiments are related to various topics that you have read or about to read in the theory component of BPCC 131. While doing lab work, you will be directly supervised by your academic counsellor. You will follow a standard procedure for administration/ conduction, scoring and interpretation of the result and findings. You will also learn about ethical issues as they apply in laboratory work.

As you must have learned that psychology is a science of human behaviour. It aims at understanding various phenomena of human mind and behaviour. The purpose of understanding is description, explanation, prediction and control of behaviour and the application of various techniques for the betterment of life. But how these goals are achieved? These goals are achieved through scientific research as a first step and then the research results are applied in real life settings. Psychologists have developed certain methods and procedures over the years to understand behaviour. These methods are studied in the branches of psychology especially devoted to the experiments, methods and research in psychology. The first such branch is *Psychometrics* which literally means measurement of psychological variables. It includes everything related to the measurement of psychological constructs. The more specific branches are Experimental Psychology and Psychological Testing. Experimental psychology, as the name suggests, is focused more on experimentation in psychology. Psychological testing is more focused on psychological tests developed to study various mental abilities, personality traits, and other related aspects of behaviours. Psychological tests are scientifically designed instruments for psychological measurement of constructs.

Experiments in psychology make use of different instruments/apparatus to study different cognitive, affective or behavioural aspects such as sensation, perception, attention, memory, learning and other such processes. They mainly focus on studying the cause and effect relationship between independent and dependent variable. The participant has to be active during the experiment as she/he not only performs on a task but is also vigilant in observing one's own mental activities while performing the task and reporting it to the experimenter. This is also known as 'introspective report'.

On the other hand, psychological tests can be classified into various types on the basis of administration, time limit, nature of items. This will be described in detail in later section. Psychological tests can be used in different settings like schools, hospitals, organisations and welfare organisations. They can also be used for research purpose. They are not only used to diagnose mental disorders, but may also be used to select individuals for different jobs, to determine career choice and grades, etc. Tests are also used to assess personality and adjustment pattern. Tests are administered in a standardized manner and includes assessment of some mental process, trait or characteristic. The main characteristics of a good test are that it should be reliable,

valid, possess good norms and should be appropriate for the persons's age, cultural, linguistic and social background. A good psychological test is always a standardized test, which means that the test follows a uniform and systematic procedure of administration and scoring. It also has a manual in which the reliability, validity and the norms are provided.

As part of this course, you will learn the administration of tests related to personality and also experiments based on cognitive processes, like perception and learning. As an experimenter/test administrator, you will make use of different apparatus and test materials (test booklet, manual, and scoring keys) to study different aspects of human behaviour.

2.0 PRACTICAL IN BPCC-131 (2 CREDITS)

The following practicals are to be conducted:

TEST:

1) Eysenck Personality Inventory

   Or

2) 16 PF

EXPERIMENT:

1) Muller-Lyre Illusion Experiment

   Or

2) Experiment on bilateral transfer

Two practicals are to be conducted in psychology laboratory. From the above four, one test will be administered and one experiment will be conducted and written in proper format (as mentioned in the guidelines) in the Practical Notebook. The Practical Notebook should include a title page (format given in Appendix I) and a certificate (Appendix II). This notebook is to be assessed by the concerned academic counselor. Actual conduction of practical and reporting it in practical note book (internal assessment) carries 70% weightage and the Term End Examination of Practical including viva-voce (external assessment) carries 30% weightage.

3.0 PROCEDURE TO BE FOLLOWED BY THE ACADEMIC COUNSELLOR

For Experiments in Psychology

1) You may refer to some of the books given as follows:

   - Experimental Psychology by L. Postman & J. P. Egan
   - Experiments in Psychology by S. M. Mohsin
   - Experimental Psychology with Advanced Experiments (2Vols.) by M. Rajamanickam

2) Explain the experiment in detail to the learners.

3) Introduce the experiment in terms of:

- Historical background
- Hypothesis/es
- Independent and dependent variables
- Control and experimental conditions
- Administration
- Scoring

4) After the introduction of the experiment, demonstrate to the learners how to conduct the experiment.

5) The demonstration will include the following:

   - Preparation for the experiment, for instance, keeping the material (instrument/ apparatus, stimulus words/ list, stopwatch) ready.
   - Establishing rapport with the participant, making him/her feel comfortable
   - Explaining the experiment (procedure, time limit, precautions)
   - Taking informed consent for undergoing the experiment and informing the participant that the experiment findings will remain confidential.
   - Taking permission to record the session, wherever applicable.
   - Explaining the instructions to the learners.
   - Clearing all doubts in the mind of the participant about the experiment.
   - The experiment is conducted on the participant.

6) Explain the scoring procedure to the learners.

7) Explain how to discuss the data.

8) Ask learners to conduct the experiment on each other in pairs and monitor the same.

9) The learners will now conduct the experiment and do the scoring.

10) The learners will have to write a report of the experiment in the practicum notebook which will be evaluated by the academic counsellors.

For Psychological Tests

1) Go though the manual of the test thoroughly.

2) Explain the test in detail to the learners in the class.

3) Introduce the test in terms of:

   - History of the Test
   - Author
   - Development of the test
   - Features of the test (e.g. no. of items, dimensions, reliability, validity)

- Administration
- Scoring
- Interpretation

4) After the introduction of the test, demonstrate to the learners how to administer the test.

5) The demonstration of administration will include the following:

   a) Preparation for the test, for instance, keeping the test material (test booklet, answer sheet, stopwatch) ready.

   b) Establishing rapport with the participant, making him/her feel comfortable

   c) Explaining the test (procedure, time limit, precautions)

   d) Taking informed consent for undergoing the test and informing the participant that the test findings will remain confidential.

   e) Taking permission to record the session, wherever applicable.

   f) Reading the instructions for test administration from the manual and showing it to learners as to from where they have to read the instructions.

   g) Clearing all doubts in the mind of the subject about the test administration.

   h) The participant takes the test.

   i) Taking the answer sheet from the participant after completion of the test. .

6) Explain the scoring procedure (as given in the manual) to the learners.

7) Explain how to interpret the data.

8) Ask learners to administer the test on each other in pairs and monitor the same.

9) The learners will then administer, score and the results.

10) The learners will have to write a report of the experiment in the practicum notebook which will be evaluated by the academic counsellors.

4.0 IMPORTANT INFORMATION FOR THE LEARNER

1) **Practical Counselling Sessions**: You are advised to contact your Study Centre with regard to schedule of counseling sessions for the Practical. You may also visit the website of your Regional Centre, where the schedule of sessions is displayed. Unlike counseling sessions of other courses in the programme, the sessions organized for lab work are mandatory. Thus, you should attend all the sessions and, in these sessions, your academic counselor will teach you how to conduct and administer experiments and tests. You will clarify all your doubts arising from your academic counselor. There is weightage given to attendance in evaluation also (refer to evaluation scheme, under 'Evaluation'). The number of counselling sessions allocated for practicum course are 02 sessions (01 session is of 03 Hours duration).

2) **Writing of Practical Notebook**: As mentioned above, you will be conducting and administering experiment and test. You will thus, record the procedure of experiment/test in the practical notebook. The notebook should be handwritten,

in the format mentioned at point No.3, and checked by the academic counselor under whose guidance you have conducted practical.

3) **Format for Writing Practical Notebook**

The academic counsellor will introduce the following format which you have to follow while preparing the practicum notebook.

- **Title**: This heading will mention the 'title' or 'name' of the practical e.g: 16 PF / Muller-Lyre Illusion.
- **Aims/ Objectives**: This section will consist of the main objectives or purpose of the practical. For example, if you are administering '16 PF' test, then the basic objective of the test will be: 'To assess the personality of the participant using 16 PF'.
- **Hypothesis/es (written in case of experiments only)**: A tentative statement about the cause and effect relationship between the independent and dependent variables, is to be mentioned.
- **Introduction**: Here, the historical background of the test/ experiment is mentioned. The concept is defined and discussed. For example, in case of 16 PF, the historical background of 16 PF is described. The concept of personality is defined and the theories related to it are discussed, with a special focus on Cattell's personality theory.
- **Description of the Test/ Experiment**: Under this, the details with regard to the test is mentioned, like author of the test, basic purpose of the test, number of items, dimensions/ factors included in the test, time limit, reliability, validity, and scoring. For experiment, a brief information with regard to experiment is mentioned.
- **Material Required**: The material required for the administration of the test (or experiment) is mentioned. For example, in case of 16 PF, the test booklet, answer sheet, scoring key, pencil, eraser are required.
- **Participant's Profile**: This will consist of all the detailed information about the participant, like, name of the participant (optional), age, gender, educational qualification and occupation.
- **Procedure and Administration**: The following sub headings are included here;

Preparation: The material required for conduction of the test/ experiment, like, test booklet, apparatus or instrument, answer sheet, stopwatch, instruments, are kept ready.

Rapport: You have to mention that rapport was created with the participant and that she/he was well informed about the details of the test/ experiment.

Instructions: Instruction as given in the test manual/ experiment are included here.

Precautions: Precautions, if any, to be considered while administration of the test/ experiment are mentioned under this sub-heading.

Introspective Report: After completion of the test/ experiment by the participant, an introspective report is to be taken, that is, the participant's feeling and constraints faced by him/her while undergoing the test/ experiment is mentioned under this sub-heading in first person.

Scoring and Interpretation: After the participant completes the test, the answer sheet is to be scored with the help of the scoring key and the data is to be interpreted with the help of the norms given in the manual. The scores can then be mentioned and interpreted under this heading. For experiments, the findings are to be analysed and mentioned here.

Discussion: You have to discuss the obtained results based on the interpretation. It may be further analysed in the light of the introspective report. In case of experiments, the results may be supported by existing studies conducted in the field.

Conclusion: Under this heading, you have to conclude the findings of the test or the experiment.

References

The books, websites and the manual referred to by the learner are mentioned in American Psychological Association (APA) format.

References (APA Style)

References have to be written in APA format. These should be alphabetically listed.

Books

Anastasi, A. (1968). *Psychological Testing*. London: MacMillan Company.

Journal Article

Dennision, B. (1984). Bringing corporate culture to the bottomline. *Organizational Dynamics*, 13,22-24.

Book Chapter

Khan, A.W. (2005). Distance Education for Development. In: Garg, S. et.al. (Eds.) Open and Distance Education in Global Environment: Opportunities for collaboration. New Delhi: Viva Books.

Websites

http://www.mcb.co.uk/apmfirum (accessed on 2.3.2011)

4) You will keep the photocopy of the practical notebook before submitting it at the study centre. Acknowledgement (Appendix 3) may also be taken while submitting the notebook.

5.0 EVALUATION

1) **Term End Examination (TEE) Form and Exam Fee:** You will have to deposit separate exam fee for the TEE of Practical. The exam fee is Rs.150. Kindly check the latest fee amount applicable from www.ignou.ac.in.

2) **TEE**: Total marks for Practicum Examination will be 100 marks (Internal assessment is 70 marks and External assessment is 30 Marks). Internal assessment refers to actual conduction of Practical and reporting them in the practical notebook in the prescribed format. External Assessment refers to conduction/ administration of Practical on exam day and appearing in Viva- Voce. TEE for the practical will be organized at the Study Cente.

3) **Conduction of TEE**: You will conduct the practical and submit practical notebook

to the academic counsellor and get it corrected before the Practical Term End Examination. You will bring notebook at the time of examination. The examination will be conducted at the respective study centres. The duration of the examination will be of 3 hours. During the examination, you will conduct the practical and submit the answer sheet. The practical will be allotted to you by the way of lottery system. You will then collect the test material and start conducting the practical. You need to bring one participant on the day of exam, on whom the test/ experiment will be conducted. Once you finish conducting the practical, write the findings in the answer sheet. This will be followed by viva-voce. The participants may leave after the conduction of practical is over.

The practical answer sheets will be evaluated by the external examiner and the viva-voce will also be conducted by the external examiner.

Dates for Term End Examination of Practicum

Admission Cycle	Date Range for TEE of BPCC 131
July	1 July to 14 August
January	1 January to 15 February

The date for Practical TEE of BPCC131 will not appear in the datesheet provided by SED, IGNOU. For this, please contact your respective study centres.

4) **Passing Marks for Practicum**: Minimum passing marks in the course is 35. There is no re-evaluation in TEE of Practical.

5) **Scheme of Evaluation**: The following evaluation methodology will be followed for TEE:

INTERNAL	Marks	EXTERNAL	Marks
Attendance	05	Conduction	20
Conduction of test/experiment	30	Evaluation of answer script	10
Practical Notebook	15	Viva-Voce	20
TOTAL	**50**	**TOTAL**	**50**

External evaluation will carry 30% weightage and internal evaluation will carry 70% weightage.

6.0 A BRIEF GUIDE TO PRACTICAL

Principles of psychological testing

We all are familiar with the term testing. We grow up taking various tests at our school, tests for our physical fitness, or tests for our selection in sport teams or tests for recruitment, and the like. You must have also attempted tests in some magazine or newspaper which rates you on friendship scale – how friendly you are to others or an interest test – what do you want to do in leisure time or what do you want to be in life, or how active you are in taking initiatives etc. the list can go on. One very common example of test is appearing for examination in school. This type of test is called achievement test. In achievement test previous learning or what has been learnt is measured. This is only one type of various tests under the umbrella of testing. But if you

think about psychological testing, your mind will take you to the topics like intelligence, personality, attitude, creativity, learning, and memory etc.

Here, we will briefly explain what a psychological test is and its types; and then we will discuss principles related to administration, scoring, interpretation and report writing.

Psychological test

In general terms, test is any procedure used to measure a factor or assess some ability. Included in this are intelligence test, which yields IQ (Intelligence Quotient) measures, aptitude test, which measure potential in some area, various personality tests which assess aspects of personality style, belief systems and attitudes. More specifically, a psychological test can be defined as 'a standardized instrument designed to measure objectively one or more aspects of a total personality by means of samples of verbal or nonverbal responses, or by means of other behaviours' (Freeman 1965: 46).

Thus, a psychological test

- Is a standardized instrument
- Objectivity is one of the characteristics of a standardized instrument.
- Measures one or many psychological attributes- mental ability, personality, interest, attitude, aptitude, etc.
- Measurement is done through verbal or non-verbal responses.
- Sample of behaviour may be observed or studied through psychological tests.
- The test results are given in terms of scores or categories.

A brief overview of the early developments in testing:

Scholars date the history of testing back to 2200 BCE with the examination of Chinese officials to determine their fitness for office. This rudimentary type of testing was refined during Han Dynasty around 202 BCE - 200 CE. Five topics were tested: civil law, military affairs, agriculture, revenue and geography. The system of Chinese examination took its final shape in 1370 when proficiency in the Confucian classics was emphasized. But the established system was abolished in 1906. Psychological testing is believed to have started with the work of Francis Galton on individual differences. The concept of individual differences is a basic concept underlying psychological testing. Francis Galton (1822-1911) was the first scientist to undertake systematic and statistical investigation of individual differences. He demonstrated that individual differences exist in human sensory and motor functioning, such as reaction time, visual acuity and physical strength. James McKeen Cattell extended Galton's work. Cattell also coined the term mental test in 1890. Before Galton, there were other important works in the history of psychology, but difference in human abilities was not focused upon until the work of Galton. Weber (1795-1878) experimented on weight discrimination, vision, hearing and the two point-point threshold. Fechner (1801-07) contributed significantly in the understanding of relation of mental processes to physical phenomena (for example, how the change in the intensity of sound will affect the auditory perception). Wilhelm Wundt (1832-1920) who established the first psychological laboratory in 1879 in Leipzig, Germany, was working on the measurement of mental processes years before. In 1862 he experimented with thought meter to measure the speed of thought.

Thus, psychological testing developed from two lines of enquiry:

- One based on the measurement of individual differences by Darwin, Galton and Cattell
- The other, based on the work of the German psychophysicists - Weber, Fechner and Wundt.

Modern psychological tests were constructed in response to the needs of classifying people with mental health disability. The Seguin Form Board Test (1866) was developed by O. Edward Seguin (1812-1880) to educate and evaluate children with intellectual disability. An important breakthrough in the creation of modern tests came at the turn of the twentieth century with the publication of intelligence test by Alfred Binet and T. Simon in 1905. With the time more developments were seen in the field of testing with a range of testing devices like personality tests, performance tests, aptitude tests, interest inventories, educational achievement and multifactor tests etc.

As a learner of psychology, it is suggested to read more on the development of psychological testing–how it was started, what were the landmarks in the history of psychological testing. Here, we are giving a brief overview of the early developments:

Table 1: A Summary of Early Landmarks in the History of Testing

2200 BCE.	Chinese begin civil service examination
1862 CE	Wilhelm Wundt uses a calibrated pendulum to measure the 'speed of thought'
1884	Francis Galton administers the first test battery to thousands of citizens at the International Health Exhibit
1890	James Mckeen Cattell uses the term mental test in announcing the agenda for his Galtonian test battery
1905	Binet and Simon constructed the first intelligence test
1914	Stern introduces the concept of IQ or intelligence quotient- the mental age divided by chronological age
1916	Lewis Terman revises the Binet-Simon scales, publishes the Stanford-Binet. Revisions appear in 1937, 1960, and 1986.
1917	Robert Yerkes spearheads the development of the Army Alpha and Beta examinations used for testing World War I recruits
1917	Robert Woodworth develops the Personal Data Sheet, the first personality test
1920	Rorschach Inkblot test published
1921	Psychological Corporation- the first major test publisher-founded by Cattell, Thorndike and Woodworth
1927	The first edition of the Strong Vocational Interest Blank published
1939	Wechsler-Bellevue Intelligence Scale published. Revisions published in 1955, 1981 and 1997.
1942	Minnesota Multiphasic Personality Inventory published
1949	Wechsler Intelligence Scale for Children published. Revisions published in 1974, 1991

Adapted from: Psychological Testing by R J Gregory 2004: 51

Types of Tests

Tests can be categorized on the basis of administration, the behaviour they measure, mode of response and on the basis of the structure of the test. On the basis of test administration, there are two types of tests: Individual tests and Group tests. The tests which can be given to one person at a time are known as **individual tests**. **Group tests** can be administered to more than one person at a time by a single examiner. If we categorize tests according to the type they measure, these tests are put under a broad category: ability tests. **Ability test** measures skills in terms of speed, accuracy or both. For example, in the test of mathematical ability, the more problems you solve accurately within the time limit, the more will be your score. Ability is a broad term which encompasses aptitude tests, intelligence tests and achievement tests. **Achievement tests** measure previous learning, like how much has been learnt in English in one year by six grade learners can be measured by term end examination. **Aptitude tests** measure potential for acquiring a specific skill, for example how much can be learnt by a person in music if s/he is given specific training is the person's musical aptitude. **Intelligence tests** measure a person's general potential to solve problems, to adapt to changing circumstances and to benefit from experience. All the above three types of tests are inter related; sometimes these tests are included under the tests of human ability. Personality tests measure traits, temperaments and dispositions. **Personality tests** can be categorized on the basis of the structure of the test. Whether the test is clearly structured like a questionnaire or it is semi-structured or uses unstructured stimulus. Unstructured or semi- structured tests are commonly known as **projective tests**. The test stimulus in projective tests is ambiguous, like ink-blots in Rorschach inkblot test.

On the basis of time constraint in the test, if the test has simple items and has a time limit, then it is a **speed test**. On the other hand, a **power test** may have a generous time limit but with difficult items. Tests may also be classified on the basis of nature of items or content of items used. In this category, a test may be a verbal test, nonverbal test, performance test, or non-language test. A verbal test is a paper- pencil test. In non-verbal test, language is only used in instructions, figures and symbols are used in items. In a performance test, the human participant performs on a task rather than answering questions. Such tests do not use language in the test, but instructions may be given by using language, gestures, or pantomime. In non-language test, the test does not use any form of written, spoken or reading communication. Instructions are usually given through gestures and pantomimes. Such tests are administered to people or children who cannot communicate in any language. Test may also be objective and subjective. In **objective test** there is a specific response to be given (True/False) and the scoring process is free of personal judgement or bias. **Subjective test** consists of items such as essay questions or responding to inkblots, where there is less specific response. The scoring may thereby, be influenced by personal attitude of the scorer. Tests can also be classified as achievement tests, attitude tests, interest tests and personality tests.

It should be clear to you by now, that psychological tests are mainly used to assess individual differences in various human abilities and personality. The most common uses of tests are classification, diagnosis and treatment planning, self-knowledge, program evaluation and research. We will discuss two tests in later sections.

Basic Principles of Psychological Testing

By principles of psychological testing we mean the basic concepts and fundamental ideas that underlie all psychological tests. Reliability, validity, test administration and standardization are some of the fundamental concepts, that we will discuss here.

a) **Reliability**

Reliability is consistency. The reliability of a test is its ability to yield consistent results. A good test should be reliable – that is, it should give similar results whenever a person takes it. It should give similar results even if different persons administer and score it. Reliability is not an all or none matter, it is a matter of degree. 'In more technical terms, reliability refers to the degree to which test scores are free of measurement errors' (Kaplan and Saccuzzo 2009: 22). The British Psychological Society Steering Committee on Test Standards says that reliability is a reflection of 'how accurate or precise a test score is' (1999: 4). Measures of reliability are usually based on correlation coefficients. A correlation coefficient ranges from +1.0 to -1.0. It is the measure of the strength of association or similarity between two sets of scores obtained by the same person or group. In psychological tests, perfect reliability does not exist usually.

There are several different ways of assessing reliability: item-total correlations, test-retest reliability, split half reliability, factor and principal component analysis and inter-rater reliability. The choice of method depends on the needs of the investigator. In *test-retest reliability method*, the same test is administered twice to the same group and coefficient correlation is calculated for the scores on both the test. *Alternate forms reliability* is estimated with the help of alternate form of the same test. The investigators sometimes develop alternate form of the test which has same content and covers the same range and level of difficulty. Both forms of the test are administered on the same group and the test scores are correlated to find out the reliability of the test. It is also called equivalent or parallel forms reliability. *Split-half reliability* is estimated by correlating the scores obtained from equivalent halves of a test administered once to a representative group. In the item total correlations, the investigator calculates the correlation between scores on each item of the test and the total score on the test. *Inter-rater reliability* is calculated when the measured behaviour is rated by observers. Ratings of different observers are correlated to measure the correlation coefficient. The Table below gives a brief overview of the methods of reliability,

Method	**No. of Forms**	**No. of Sessions**	**Sources of error variance**
Test-Retest	1	2	Changes over time
Alternate forms (immediate)	2	1	Item sampling
Alternate Forms (delayed)	2	2	Item sampling Changes over time
Split Half	1	1	Item sampling Nature of split
Item total	1	1	Item sampling Test heterogeneity
Interscorer	1	1	Scorer differences

Source: *Robert J Gregory (2004: 111)*

There are different statistical methods used to assess reliability: Cronbach's alpha, Kuder-Richardson (KR-20), Pearson correlation and Guttman's coefficient and factor analysis. You can read more about reliability and validity on http://psychology.wadsworth. com/book/ gravetterwallnau5e/index.html)

What should be the accepted level of test reliability or when do we say that the particular test should be used as it has good reliability index? "There is no such fixed criterion for a good psychological test. Some authors suggest that reliability should be at least .95. But in the words of Guilford and Fruchter (1978), 'There has been some consensus that to be a very accurate measure of individual differences in some characteristics, the reliability should be above .90. The truth is, however, that many standard tests with reliability as low as .70 prove to be very useful. And tests with reliability lower than that can be useful in research."

b) **Validity**

A valid test is one that measures what it is supposed to measure. 'A test is valid to the extent that inferences made from it are appropriate, meaningful and useful.' (Standards for Educational and Psychological Testing, 1999).The first essential quality of a valid test is that it should be highly reliable. If a test yields inconsistent results, (i.e. it is not reliable) it can not be correlated with any criterion (some behaviour or personal accomplishment etc.). But high reliability does not guarantee high validity of the test. The relation between reliability and validity can be discussed with the following example: 'Sir Francis Galton's sensory and motor measures could never have been valid if they had not been reliable… Yet even though some of Galton's measures turned out to be very reliable, later evidence showed that they were not valid measures of intelligence. The measures yielded similar scores time after time, but those scores were poorly correlated with validity criteria such as school grades and teacher ratings of intelligence.' (Morgan, King, Weisz and Schoplar,1997: 520).

There are several different types of validity. One or more methods can be selected depending on the needs of the measure. Different ways of measuring validity have been grouped into three categories: Content validity, Criterion-related validity, Construct validity. *Content validity* is 'an estimate of validity of a testing instrument based on a detailed examination of the contents of the test items; contents here means the actual constituent material of the test item' (Reber and Reber, 2001: 781). Content validity depends on the judgment of experts on the relevance of the items used in the instrument. *Criterion related validity* is assessed by determining the relationship between test scores and some independent criterion. Gregory has included two different approaches under criterion related validity- concurrent validity and predictive validity (2004: 124):

- In concurrent validity, the criterion measures are obtained at approximately the same time as the test scores. For example, the current psychiatric diagnosis of a patient would be an appropriate measure to provide validation evidence for a paper-and-pencil psychodiagnostic test.
- In predictive validity, the criterion measures are obtained in future, usually months or years after the test scores are obtained. For example, a college entrance exam that is accurate in predicting the subsequent grade point average of examinees would possess criterion related validity.

Construct validity is 'a set of procedures for evaluating the validity of a testing instrument based on the determination of the degree to which the test items capture the hypothetical quality or trait (i.e. the construct) it was designed to measure. For example, if a test is supposed to provide a measure of intelligence one should ask: what traits or qualities (or constructs) actually characterize intelligence? Do the test items actually tap such constructs?' (Reber and Reber 2001: 781). Face validity is dependent on whether the test looks valid to test users, examiners and examinees. Gregory comments that face validity is important for social acceptability of the test but is irrelevant for psychometric purposes.

c) **Norms**

Suppose someone gets 50 marks on an intelligence test. This score has no meaning in itself. In psychological testing the scores obtained first from a test are called raw scores. These scores are simply overall score of the performance on the test, like the number of problems solved in an intelligence test. These initial scores are converted to some form of standard scores based on a norm group. 'A norm group consists of a sample of examinees who are representatives of the population for whom the test is intended' (Gregory 2004: 81). For example, if a test is designed to study the value system of twelfth graders, the test will be given to large number of such age group (rural- urban, rich - middle class - poor etc.) to determine the distribution of raw scores. On the basis of collection of scores, the test developer will provide derived scores. These scores are known as norms. Norms can be in the form of percentiles ranks, stanines, stens, age norm, grade norms or standard scores.

A percentile expresses the percentage of scores in a sample that fall below it. A score at 50th percentile indicates that 50% of the scores fall below it. Percentile should not be confused with percent. Percentile is a comparative score. It tells where your scores places you in particular sample (norm group) whereas percent tells the number of questions answered correctly. 50% expresses how much was attempted correctly on an intelligence test and this 50 percent can be placed at the percentile of 50, 90, or 80 depending on the performance of the sample. Percentile 1 is the lowest rank and 100 percentile is the highest rank.

Standard score is any derived score based on standard deviation. It is more commonly known as z-score. It expresses the distance from mean in standard deviation units. T-score is a variant of standard score. It was suggested by McCall (1922). In case of standard score, the value of mean is taken zero whereas in a T-score the value of mean is 50 and standard deviation of 10.

Stanine (or standard nine) scale was developed by the United States Air Force during World War II. In stanine scale all raw scores are converted to single digit system ranging from 1 to 9. Sten scale (standard ten) was proposed by Canfield (1951). It is ten unit scale with 5 units above and 5 units below the mean. Age norms express the level of performance with reference to age. Grade norms express the level of performance with reference to grade level.

There are many such norms developed for different tests, as mental age and I.Q. Learners will know more about them while using various tests with different norms.

Test Administration and Scoring

Test administration can be either individual or group. The administration of a test should be according to a uniform and specified set of instructions. This is the first principle of test administration. 'A test is considered standardized if the procedures for administering it are uniform from one examiner and setting to another' (Gregory 2004: 54). If a test is not administered according to the specified set of instructions, there will be no uniformity in the administration of the test. The result of such a test will not be reliable. Test administration should follow the guidelines given in the manual. Some important points that the investigator should know before administering a test are given below:

- Every psychological testing procedure, as we already said, has a purpose and rationale.

Before using a test, tester should see whether the test fulfills the purpose at hand. The question that one needs to ask is, why do I use this test, what is the purpose of using this

test? If all the questions are satisfactorily answered, then one should proceed and use the particular test. But if the use of the test is not rationalized on any ground - purpose, population, or context of using the test - the test should not be used.

- Before using a test, examiner must be familiar with the materials, instructions and the procedure to be followed in the test.
- An examiner should be sensitive to disabilities in the examinees. Disabilities related to hearing, vision, speech or motor control may affect test performance. In case of unrecognized disabilities, serious errors of interpretation may occur.
- Examiners should allot proper time for the entire testing process: setup, reading instructions and actual test taking by the examinees. Allowing too much time for a test is equally erroneous as allowing less time.
- Instructions should be read out in a clear and loud voice. Examiners must stop to answer the questions if the instructions are not clear to examinees.
- The physical conditions (testing room) should be suitable for the test. The conditions such as illumination, temperature and humidity should be taken into consideration before the test. The testing environment should be pleasant, quiet and well illuminated with proper writing desk (in case of a test where answer sheet is required to be filled up).
- Establishing rapport is the first thing that examiners are advised to do when giving a test to an individual or a group. 'Rapport is a comfortable, relaxed, unconstrained, mutually accepting interaction between persons' (Reber and Reber 2001: 597), especially between an examinee and an examiner. It is essential requirement to motivate examinees to cooperate during testing. It is more important in individual testing and particularly when examinees are children. Failure in establishing rapport may cause anxiety, hostility, and uncooperative behaviour in examinees.
- The scoring of the test should follow the pattern as specified in the test manual. If scoring is not numerical, the method of interpretation should also follow the guidelines as given in the test manual.
- Thus, a psychological test is a standardized instrument in the sense that it provides well defined procedure and instructions, the items used in the test are reliable and valid and the test depicts scores in terms of standardized scores. At present, when we have access to computer assisted test administration and scoring, the accuracy and precision in administration will require proper training and practice of the examiner both on technical and human grounds.

Report Writing

After administration of a psychological test, the findings are to be presented in the form of a report. Report should be written clearly. The report should be properly divided into sections and subsections and the findings should be tabulated wherever required.

The report should be written in passive voice. For example, instead of writing 'I gave the test booklet to the examinee', one should write, 'the test booklet was given to the examinee'. The report should be written in a standard format.

Being Qualified and Trained in Psychological Testing

There are two aspects of being trained in psychological testing:

- Having technical and theoretical knowledge of psychological testing and its applications
- Having skills necessary for the application of psychological testing, for example communication skills, being a good observer and empathetic listener, etc.

The above aspects are briefly discussed as follows:

a) **Technical and Theoretical Knowledge**

Some basic components of this knowledge are:

i) Knowledge of test construction

ii) Efficiency in application

iii) Knowledge and efficiency in scoring and interpretation

i) **Knowledge of test construction**

Today testing is required in every field: schools, industries, selection agencies, hospitals, special education centers, rehabilitation centers and various other organisations. A psychologist may face the task of choosing a test from the available tests or developing a test as the situation demands. In both the situations knowledge of test construction is mandatory. If one needs to select a test, one should have the knowledge of basics of test construction. How the test is developed? Whether it has proper norms or it is standardized, what is the method of scoring, etc. All this information requires technical knowledge about the test construction process. Otherwise, decision of choosing will be fraught with biased assumptions. The theoretical knowledge pertains not only to the selection of test, but also to the construction of tests. One might face such a situation when no test is available, or the available test is outdated, or not suitable culturally. Suppose you are required to make an index of happiness of people in your country or your state or city. How to prepare such an index? You come to know that one such procedure is available in some other country. But the definition of happiness may differ from one country to the other. At one place, it may be family which is primary source of happiness to persons, but at the other, it may be secure future and material prosperity. Thus, one might decide to prepare a questionnaire to study the level of happiness.

ii) **Efficiency in application**

Which measure one should choose if one is find out whether a child has learning disability or not. One might need a range of procedures – paper pencil test (test of learning and intelligence), observations, interviews with the child, parents and teachers. Which test one should choose -verbal or non-verbal, some qualitative approach or quantitative or both, whether the test is fit for the cultural background. These decisions need not only theoretical knowledge but insight on the part of the investigator which comes with knowledge, practice and experience.

iii) **Efficiency in Scoring and Interpretation**

Scoring procedures in testing are developed through rigorous statistical procedures. While using psychological tests, one is required to have sound knowledge of statistical principles applied in psychological testing. How the reliability and the validity of the test has been calculated? How the norms of the test have been developed? Knowledge of these technical aspects helps both in construction, selection, revision and adaptation of a test. Interpretation is an essential aspect after scoring which also involves explaining the significance of the scores. What does it mean for a person who gets IQ score of

94? To fulfill all these purposes, an appropriate explanation is an essential requirement from the part of the investigator.

b) **Developing Skills**

The work of a psychologist is more like an artist. She/he needs to observe, listen, feel and then say something as less as possible. Observation here is not only a method used to study a specific problem. It should be developed as a habit. How to see things: people talking to each other in buses, trains, or offices; youngsters chatting outside a mall, people writing their views in newspapers and magazines, people behaving with each other- in families, in offices, in traffic, nothing should go unnoticed. It need not be a deliberate exercise once it is developed as a habit. 'A psychologist should be a good writer', said a wise man. Yes, whatever you observe pen it down. Psychology is a science in the methods it uses, but it is essentially an art in its application. This art will develop gradually when you observe and contemplate and develop the habit of writing things systematically. After observation, another important skill is communication skills. Psychologists working as therapists, counsellors, trainers or psychometricians require communication with others. Communication is a chain of events from the speaker to the Listener. The chain of events involves

Production (Encoding) → Transmission (Decoding) → Reception

Thus, communication involves other mind, a message (information) a code (language) and a channel (written-visual, spoken-auditory) through which information is transmitted. A psychologist should learn to be a good listener before learning to be a good speaker. She/he should learn where and when to speak and where not to. Being just a listener is not sufficient; a psychologist should be an empathetic listener. She/he should feel what others are feeling.

Psychologists should be sensitive to the cultural differences. Various behaviours have their roots in the cultural milieu of a person. The way people talk, greet, their eating habits and sometimes their sensitivity to their surroundings is affected by the environment they live in. If a psychologist is not sensitive to the cultural and environmental factors, there will be no meaning of the inferences drawn from observations and testing, and ultimately will be harmful for the individuals and society at large.

Knowledge of ethical principles during testing is also expected from a trained psychologist. Ethical guidelines for testing issued from time to time are called ethical principles and code of conduct. Psychologist should comply with these principles to avoid any mistake in research and testing. In general, we can phrase principles of ethical treatment as,

1) Right to safety
2) Right to respectful treatment
3) Right to confidentiality
4) Right to be informed – technically called informed consent – an examinee should be informed about the nature of the test, risk involved, purpose, and use of information of the test beforehand and only if she/he agrees the examiner should proceed with testing. Examinee should also get informed about the results of the study and use of the test findings.

All the above rights of examinees should be respected during testing and research. In a nutshell, a psychologist should take responsibility of working with humans or animals very honestly that will serve the purpose well for both the examiner and the examinee.

We will discuss specific tests in detail, in section below. As already mentioned, you will learn more as you apply these test in the field. Select only one from the tests described below. The two tests included in the syllabi are Eysenck Personality Inventory and 16 PF.

1) **Eysenck Personality Inventory**

You have learned the concept of personality, different theories of personality as well as various ways to measure the construct in Unit 7 on Personality.

Personality refers to organized, consistent and general pattern of behaviour of a person across situations which help understand his/her behaviour as an individual. There are a number of theories that explain and describe the concept of personality. There are two main trends in the area of personality assessment: use of unstructured projective techniques (for example, Rorschach test) and structured approaches such as self-report inventories and behaviour ratings. Personality inventories are questionnaires that assess personality. 'Personality inventories are questionnaires on which individuals report their reactions or feelings in certain situations. Responses to subsets of items are summed to yield scores on separate scales or factors within the inventory' (Hilgard and Atkinson 2003: 459). Several personality inventories are based on preexisting theories. Some examples of theory guided inventories are Edward Personal Preference Schedule (EPPS), Personality Research Form (PRF) (both based on Murray's need press theory of personality) and Myers-Briggs Type Indicator (MBTI) (based on Carl Jung's theory of personality types). Apart from theory based inventories, factor-analytic approaches contribute in developing theories based on the initial test findings. With factor analysis, psychologists identify personality dimensions that can define personality. Cattell has identified 16 personality factors using factor analysis.

About the test: Hans Eysenck (1953) arrived at two personality factors: introversion -extraversion and emotional instability (neuroticism) - stability. The third dimension added later is - Psychoticism - Socialisation. The three dimensions are defined below: (Hilgard & Atkinson 2003: 454)

- Introversion-extroversion refers to the degree to which a person's basic orientation is turned inward toward the self or toward the external world.
- Neuroticism (stability-instability) is a dimension of emotionality, with moody, anxious, temperamental and maladjusted individuals at neurotic or unstable end, and calm, well adjusted individuals at the other.
- Psychoticism is characterized by solitary, troublesome, cruel, lacking in feeling of sympathy, hostile to others. The person is sensitive seeker. He likes unusual and strange things.

The three dimensions are studied as Psychoticism (P), Extraversion (E) and Neuroticism (N) by Eysenck Personality Questionnaire (EPQ-R), which is the final revision of Eysenck's personality inventory in 1975. EPI was designed as a measure of introversion-extroversion by Eysenck in 1957 and revised many times. The 1975 revised edition was designed by H J Eysenck and S B G Eysenck. The questionnaire consists of ninety questions. These questions are carefully selected out of many items after factor analysis. The EPQ consists of four scales - three scales for the dimensions of personality and the fourth is Lie Scale (L). Lie scale assesses the validity of an examinee's responses.The statements on EPQ can be answered as 'yes' or 'no'. It is designed for persons aged 16 and older. EPQ with 81 questions is also available which can be used for children aged 7 to 15. EPQ can be used both as an individual test and as a group test. Some

statements from EPQ are:

Do you often break rules? Would you worry if you were in debt? Do you like to meet new people? Are your feelings easily hurt?

The EPQ is a highly reliable (test-retest correlations .78 (P), .89 (E), .86 (N), and .84 (L)) and valid questionnaire (internal consistency were in the .70(S) for P and .80(S) for the other three scales) for personality assessment. A major focus of research with the EPQ has been extraversion and introversion.

After the participant completes the test, the scores on each scale are tabulated and interpretation for each scale is described with reference to the explanation provided by Eysenck and as discussed in the manual.

2) **16 Personality Factor**

We are aware about the number of approaches and theories that been developed to understand and explain the concept of personality. These theories are based on different models of human behavior. Each throws light on a significant aspect of personality but not all aspect of personality. Psychologists distinguish between type and trait approach to personality. Type approach attempts to comprehend human personality by examining certain broad patterns in the observed behavioral characteristics of the individual. Each behavioral pattern refers to one type in which individuals are placed in terms of the similarity of their behavioral characteristics with that pattern. Whereas, the trait approach focuses on the specific psychological attributes along which individuals tend to differ in consistent and stable ways.

Efforts to categories people into personality types have been made since ancient times. The Greek physician Hippocrates proposed a typology of personality based on fluid or humor. He classified people into four types (sanguine, phlegmatic, melancholic and choleric); each characterised by specific behavioral features. Ayurveda classifies people into the categories, Vat, Pitt, and Kapha, on the basis of three humoral elements called tridosh. There is another typology of personality based on the Trigunas, i.e. Sattva, Rajas and Tamas. All the three gunas are present in each and every person in different degrees.The dominance of one or the other guna may lead to a particular type of behaviour.

Sheldon using body build and temperament as the main basis, proposed Endomorphic (fat, round, soft, relaxed, and sociable), Mesomorphic (strong body build), Ectomorphic (thin, long, fragile body build) classification. Jung proposed another important typology by grouping people into introverts and extroverts. Recently, Friedman and Rosenman have classified individual into Type A and Type B personality. Type A personality seems to possess high motivation, lack patience, feels short of time, and be in a great hurry. Such people are prone to developing coronary heart disease and hypertension. Absence of such traits is Type B personality. Morris suggested a Type C personality, one that is prone to cancer. Type D personality is characterised by proneness to depression. Trait theorists are mainly concerned with the description of characterisation of basic components of personality. They are mainly interested in the 'building blocks' of personality. Human beings display a wide range of variations in psychological attributes, yet it is possible to club them into smaller number of personality traits. A trait is considered as a relatively enduring attribute or quality on which one individual differs from one another. They include a range of possible behaviour that is activated according to the demands of the situation. A number of psychologists have used traits to formulate their theories of personality, for example, Allport, Eysenck, Cattell.

About the Test: 16 Personality Factor Test is constructed by British psychologist,

Raymond B.Cattell. According to Cattell, there is a common structure on which people differ from each other. This structure could be determined empirically. With the help of statistical technique called factor analysis, he discovered the common structures. He found 16 primary or source traits. The source traits are stable, and are considered as the building blocks of personality. Besides these, there are also a number of surface traits that result out of the interaction of source traits. Cattell described the source traits in terms of opposing tendencies. Cattell developed Sixteen Personality Factor Questionnaire (16 PF), for the assessment of personality. This test is widely used by psychologists today.

The test was first published in 1949, thereafter revised in 1956 and 1962.Five alternative forms of the 4th edition were released between 1967 and 1969.Fifth edition of 16 PF was released in 1993. PF stands for 'Personality Factors' and there are sixteen personality factors, hence, it is known as 16 PF. These 16 factors are the major source traits .Cattell's theory asserts that every person possesses a degree of each of the following sixteen traits (Cattell also uses the term factors).

For each trait, factor label or code letters are used. The major source traits as represented on 16 Personality Factor Inventory is as follows:

Factors	Description
A	Outgoing- Reserved Outgoing-Reserved
B	Intelligence
C	Stable-Emotional
E	Dominant-Submissive
F	Sober-Happy-go-lucky
G	Conscientious-Expedient
H	Venturesome-Shy
I	Tough-minded-Tender-minded
L	Trusting-Suspicious
M	Imaginative-Practical
N	Shrewd-Forthright
O	Apprehensive-Placid
Q1	Radical-Conservative
Q2	Self-sufficient-Group-dependent
Q3	Undisciplined-Controlled
Q4	Relaxed-Tense

The 16 PF Inventory is a paper pencil test that consists of 185 multiple-choice items. The participant has to select one option. There is no right or wrong answer to the statements. On an average, it takes 35-50 minutes to complete the test. After completion, the scores are tabulated and interpreted with the help of manual.

Experimental Psychology-Background

The first psychology laboratory was established in 1879 by Wilhelm Wundt at Leipzig. In a way, experimental psychology as a formal discipline may be said to be more than hundred and thirty years old. Over the years, experimental psychology has expanded to a large extent. Psychologists have been able to develop precise methods, techniques and procedures of observation and analysis. With the help of experiments, psychologists have also successfully investigated complex behaviour of both human and animals, predict behaviour with a good deal of accuracy, and have been able to improve behaviour in real life situations.

Experimental psychology had its roots in philosophy and subsequently emerged as an independent discipline. Growth of Experimental Psychology has been possible not because psychologists themselves made all the contributions but also because of their ability to assimilate and adapt the findings of other sciences like physiology, chemistry, astronomy, sociology, etc. Among the philosophical writings which gave a prominent place for matters of psychological interest were those of **Descartes, Leibnitz, and the British Associationists**. These writers gave importance to issues like acquisition and growth of knowledge, memory, etc. which were directly related to an understanding of human behaviour. **Locke, Berkeley, Hume, Brown**, gave the earliest scientific principles of psychology, known as the Laws of Association, which were derived through intellectual analysis and not experimentation.

The mid 19th century witnessed significant developments in the field of biology and physics. The most important was the theory of organic evolution, propounded by **Charles Darwin**. Since, early psychologists had a close association with religion, theology, and philosophy, Darwin's theory gave a new outlook of establishing psychology as an independent experimental science. This paved the way to take help from developments in other areas like physiology, neurology, medicine, etc. in explaining behaviour. Attempts were made to design and carry out experiments on human behaviour.

In the meantime, the physicist-physiologist **Helmholtz** made an attempt to study the speed of reaction in frogs. Helmholtz demonstrated that the speed of nerve conduction in a frog could be measured. This gave way to study the speed of reactions in human beings. Significant contributions was made by **Donders**, a Dutch physiologist. This was the starting point of now famous 'reaction-time' experiments.

The next important development came from the work of **E.H.Weber**, a German physiologist, who experimented on sensation. Weber attempted to study the quantitative relationship between changes in physical conditions and accompanying psychological changes. Weber, called this area of experimentation as **psychophysics**. Weber's work was further developed by **G.T. Fechner**, a German physicist. The work of Weber and Fechner resulted in the formulation of Weber-Fechner law, the first quantitative law in psychology.

The problem of individual differences was addressed by **Galton**, who was mainly interested in studying and analyzing differences in human behaviour. The most important aspect studied was imagery. Galton devised a test to study the differences among people in imagery.

All these developments were taking place in Europe and this further helped in the establishment of the first psychology laboratory in Leipzig (by **Wilhelm Wundt** in 1879). After this, various other laboratories were established in places like Vienna, Berlin,Wurzberg, etc. These laboratories carried out experiments on laws of association, reaction-time, imagery, and sensation.

Another important development in experimentation was by **Herman Ebbinghaus**, regarding the processes of memory (retention of knowledge) and forgetting (loss in knowledge). This brought 'higher mental processes' into the domain of experimental psychology.

In the United States, attempt to develop experimental psychology was made by **E.L. Thorndike**. Thorndike had come out with his experiments on learning process and the unique feature in his experiments was the use of animal subjects. He was of the view that animal behaviour would provide very useful clues to study human behaviour. Thorndike's experiments on trial and error learning with cats as subjects and the 'puzzle box' as the apparatus were significant and provided the foundation for modern experimental psychology. Thorndike's work resulted in the first set of empirically derived quantitative laws in the area of learning. The introduction of animals in the laboratory helped in the development of experimental psychology, since, animal experiments provided more accurate observation, as well as, greater manipulation of experimental conditions to ensure better control.

Yet another major development was by Russian physiologists, **Bechterev** and **Pavlov**. Bechterev's 'objective reflex' and Pavlov's 'conditioned reflex' threw significant light on the origin of behaviour.

Experimental psychologists soon realised the significance of social factors, and the result was the development of experimental social psychology. Early contributions were made by **Allport**, **Newcomb, Lippitt, Asch, Sherrif, Murphy, Lewin**, and others. Today, experimental social psychology has become an independent branch of study all together. Social psychologists have planned and carried out experiments that have helped us to understand the behaviour of human beings in different kinds of social situations. Such understanding has found application in industry, hospitals, schools and other situations where people are found to interact.

Thus, it may be concluded that experimental psychology gradually expanded to areas of learning and social behaviour. Over the years, experimental psychology also included the study of abnormal behaviour, and this resulted in the emergence of experimental clinical psychology to be an important field of application and inquiry. Experimental psychology has developed techniques of behaviour therapy and behaviour modification which may be applied in hospitals, clinics, correctional homes, prisons, etc. The findings of experimental psychologists are applied in factories, offices, hospitals, schools, etc. There is probably no area where experimental psychology cannot make its contributions. Its area of scope and application is much wider than those of most other sciences.

Now, we will discuss two experiments. You will select only one from the experiments described below.

1) Experiment on Muller-Lyer Illusion

In the Muller-Lyer illusion there are two horizontal lines, one is SS (Standard Stimulus), with 'arrow heads' and the other is SV (Variable Stimulus) with 'feather heads'. Both lines are equal in length. But the line with feather heads will be perceived by the participant to be longer than the arrow heads line. The participant adjusts SV till she/he perceives the two lines to be equal. The experimenter may find out how close the participant comes to match the two lines from the scale fixed behind the illusion board. The direction to the participant for adjustment should be varied. In half of the trials the SV should be set with a value considerably longer than the standard and in half of the trials it should be set considerably shorter than the SS. There are two conditions followed in all trials. They are: (1) space condition (right and left; R and L) and (2) movement condition

(outward and inward; O and I). Consequently, there are four combinations as RO, RI, LO, and LI. When these four conditions are counterbalanced, we have the sequences as RO, LI, LO, RI, LI, RO, RI and LO. For each sequence there are 10 trials and a total of 80 trials. There are four ascending and four descending series.

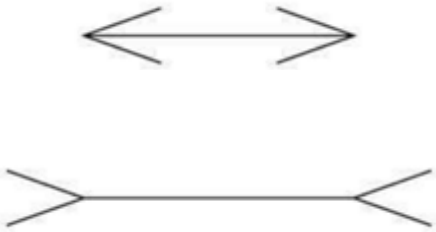

Figure 9.1: Arrow head and Feather head line

Experiment: Determination of equal stimuli by the Method of Average Error

Problem: The purpose of this experiment is to determine the extent of visual illusion in the Muller-Lyer illusion apparatus by using the method of average error.

Material Required: Muller-Lyer illusion apparatus, paper and pencil.

Procedure: The experimenter in advance should prepare observation table in record book for noting down the judgements.The table should have two space and two movement conditions with the sequence of RO, LI, LO, RI, LI, RO, RI, and LO. The experimenter should give the following instructions: "Look at this board, there are two lines. These two lines as you see are unequal in size. I will keep the length of this line as constant and go on varying the length of variable line in small units, either increasing or decreasing. At every step you should tell me whether SV is equal to SS or not. When you feel they are equal, I will stop".

Result: In all, there are 4 ascending series (RO, LO, RO, LO) and 4 descending series (RI, LI, RI, LI). Thus, we have eight conditions. The means for R and L spaces and means for O and I movements have to be worked out. The main aim of this experiment is to determine the discrepancy between the SS (arrow heads) line and the average of the subject's judgements (Mj). This is the extent of illusion. This is the main constant error (Ec) of the experiment.

The formula to find out space error is : MR-ML/2;

MR = Mean of the right space

ML = Mean of the left space

The formula to find out the movement error: MO-MI/2;

MO = Mean of outward movement

MI = Mean of inward movement

The formula to find out constant error is : Mj-SS= Ec

Mj = Mean of all judgements

SS = Standard stimulus

Ec = Constant error

Discussion: Discuss the results obtained in Muller-Lyer illusion experiment. State the extent of illusion whether it is due to overestimation or underestimation. State whether the result is in accordance to the assumption of the experiment. The SS line should be underestimated in comparison with the SV. Compare the space and movement error and state which is greater and why. Is the constant greater than the space and movement error, if so, why? Any variation in the subject's judgement in the ascending series from the descending series has also to be explained.

2) **Experiment on Transfer of learning**

Bilateral transfer of learning occurs when there is transfer of performance to one side of the body following training of the opposite side, eg. improved left-handed performance following right-handed training. You will verify the phenomenon by conducting a simple experiment as explained below.

Problem: To demonstrate the phenomenon of bilateral transfer of learning.

Material Required: Mirror-drawing apparatus, stylus, stop watch, paper and pencil.

Procedure: The following instructions are to be given to the participant, "Look at this mirror, you will see a star image. The star image is a reflection of a pattern grooved on the wooden board and hidden by the screen. Take the stylus in your left hand (the experimenter will give the stylus to the participant and helps him/her to position it at the end of the nearest projection). Now you will have to look into the mirror image and trace the star pattern with the stylus. Be careful about the stylus not touching the edges of the groove. If you touch, it will be counted as an error. Try to do as speedily as possible." After the participant traces the path once with the left hand, she/he is asked to trace the path again. Time taken and the number of errors committed are noted down.

In the same way, now the participant is asked to trace the star pattern with the right hand for 10 trials. In each of these trials, the number of errors committed and the amount of time taken in seconds to complete the pattern are noted down. Again the participant is asked to perform the same task in the same manner with the left hand, and the errors committed and time taken in seconds are noted down.

Result:

- Tabulation of data: performance index (time taken and number of errors) for first trial with left hand, followed by trials with right hand (10 trials), and lastly, the second trial with left hand.
- Calculate the percentage gain in time (if any), for second trial with left hand.
- Calculate the percentage reduction in the number of errors (if any), for second trial with left hand.

Discussion: Compare the time taken in seconds and errors committed in the first trial with left hand with that of the second trial with left hand (after training with right hand for ten trials). Find out whether there is any transfer of training in the second trial with left hand and also if it is positive, negative or zero transfer.

APPENDIX – I

TITLE PAGE FOR PRACTICAL NOTEBOOK IGNOU
BA PSYCHOLOGY

Programme Code: BAG

Course Code: BPCC 131

Title of the Course: Foundations of Psychology

Name & Enrolment of the Learner:

Address:

Phone No.:

Email:

Study Centre Name/Code/Address:

Regional Centre:

Date:

Signature of the Learner

CERTIFICATE

This is to certify that Ms/ Mr. _____ of BAG Psychology Ist Semester has conducted and successfully completed the practical work in BPCC 131 Practical: Foundations of Psychology.

Signature of the Learner

Name:

Enrolment No.:

Name of the Study Centre:

Regional Centre:

Place:

Date:

Signature of Academic Counsellor

Name:

Designation:

Place:

Date:

ACKNOWLEDGEMENT

This is to acknowledge that Ms./Mr. _____

Enrollment No. _____ of BAG (1st Semester) has submitted the Practical Notebook at the study centre _____,

Regional Centre _____

Date:

Signature (with stamp)
(Coordinator, Study Centre)