Unit -1

THINKING, LANGUAGE AND INTELLIGENCE - I

Unit Structure :

1.0 OBJECTIVES

After studying this unit you should be able to:

➢ Understand how people think.
➢ Understand the meaning of thinking, mental imageryand concepts.
➢ Understand problem solving and decision making and the methods people use to solve problems and make decisions.
➢ Comprehend the various barriers to problem solving.
➢ Understand the Decision Making.

1.1. INTRODUCTION: THINKING

Most of our waking hours, and even when we are asleep and dreaming, we are thinking. It is hard not to think. As you read these words you are thinking, and even if you stop thinking about what

you are reading, your thoughts wander off to something else-perhaps to what you are going to do tomorrow- you will still be thinking. What do we do when we think? Loosely speaking, we might say that we mentally, or cognitively, process information. There are different definitions of thinking. We would discuss in briefly.

Thinking consists of the cognitive rearrangement and manipulation of both information from the environment and the symbols stored in long-term memory. From another viewpoint, thinking is the form of information processing that goes on during the period between a stimulus event and the response to it.

In other words, thinking is the set of cognitive processes that mediate, or go between, stimuli and responses. To illustrate, suppose you are trying to make a decision about buying a new mobile. The seller presents several mobiles in your price range (the stimuli), and you eventually purchase one of them (the response). Before making the response, however, you consider the advantages and the disadvantages of the several mobiles; you process the information you have about them. Your thinking about the mobiles - thus mediates between the mobiles as stimuli and your eventual response of buying one of them.

The general definition of thinking given above encompasses many different varieties of thought. For instance, some thinking is highly private and may use symbols with very personal meanings. This kind of thinking is called as autistic thinking; dreams are an example of autistic thinking. Other thinking is aimed at solving problems or creating something new; this is called directed thinking. Directed thinking is the kind you were engaged in when you solved (or tried to solve) the problem.

1.1.1. How people think?
One of the most complex and highest forms of human behaviour is thinking. The topic of thinking came within the purview of psychology only in the 1960s with the growth of cognitive psychology. Behaviorists were not in favour of the study of thinking as according to them thinking was covert in nature and not empirically observable. Thinking is closely related to learning, memory, intelligence, decision making and language development. We would discuss these topics in this as well as the next unit.

1.1.2. Thinking or Cognition:
The terms thinking and cognition are often used synonymously. There is considerable difference between them. The term cognition is much broader in scope as compared to thinking. According to one definition, thinking is a symbolic mediation or a symbolic bridge that fills the gaps between a situation and the

response we make to it. According to Watson, 'thinking' is 'sub-vocal speech'. Thinking is also defined as "mental activity that goes on in the brain when a person is processing information such as organizing it, understanding it, and communicating it to others." Thinking is not only verbal in nature but also involves the use of mental images or mental representation. The three most important elements involved in thinking are mental images (also called as mental imagery), concepts and prototypes.

1.2 CONCEPTS

Concepts are an important class of language symbols used in thinking. A concept is a symbolic construction representing some common and general features of object or events. Some natural, or basic, concepts are easily acquired and appear in thinking early in life. Other concepts are acquired by discriminative learning by seeing examples of the concept in different context, and by definition. There are different types of concepts. We would discuss these in detail.

1) Superordinate Concept:

It is the most general type of a concept, such as "bird" or "vegetable" or "fruit".

2) Basic level Type:

A basic level type of concept is one around which other similar concepts are organised, such as Mango or apple or watermelon, as there can be many different types of mangos such as alphonso, dusseri, badami, payri, langda, etc.

3) Subordinate Concept:

It is the most specific type of a concept. Such as "Crackle Cadbury chocolate" or the name of your dog or a "Kashmiri apple", etc.

4) Formal Concept:

Formal concepts refer to those concepts which have a strict definition. These concepts are defined by specific rules or features and are very rigid. Formal concepts are generally taught in schools and colleges as a part of academic activity.

5) Natural Concept:

Natural concepts are those concepts which people form as a result of their experiences in the real world. Unlike formal concepts, natural concepts are not well defined. Is tomato a vegetable of fruit? Is duck a mammal or a bird? What about whale, is it a fish or a mammal? We form concepts about these as a result of our

experiences in the outside world. Natural concepts help us to understand our surrounding in a less structured and rigid manner.

Becoming a human being involves the attainment of concepts: much human thinking uses them. It is therefore of some practical value to discovery what helps or hinders concept attainment. One factor in concept attainment is transfer. A second factor is the degree to which the common elements are isolated, grouped, or otherwise made conspicuous. This may be called as distinctiveness. A third factor is ability to manipulate the materials involved in the concept. Rearranged, rewarding, or reorganized materials containing the common properties helps people to discover the concept. Another factor is the instructional set people have. Finally, people usually learn concept faster if they have all the relevant information available at the same time, instead of being given only a piece of information at a time.

1.2.1. Mental Imagery:

Mental imagery is also called as visual imagery or imagery and is an important component of human thought or cognition. Mental imagery refers to the representations that stand for objects or events and have a picture-like quality. Mental imagery is used by most people in their everyday life. Considerable degree of research on mental imagery has been done by Allan Paivio, Kosslyn and others.

Research studies by Kosslyn and his colleagues (1990)have shown that most of our imagery is visual. They did some pioneering studies on mental rotation of visual images. Kosslyn also found that when we form a mental image our experience seems much like seeing something in our mind. It seems a lot like vision. When we form a mental image we seem to be able to manipulate them and we seem to be solving problems some times by means of manipulating them. Mental images can be quite detailed but they tend to be less detailed than actual perception. Kosslyn's research has demonstrated the following with respect to imagery and size.

➢ People take longer to make judgements about the characteristics of small mental images than of the large mental images.
➢ It takes longer time to travel a large mental distance than when images are different.

Research shows that visual imagery is a powerful strategyfor enhancing memory. Research has also shown that memory is most effective when the items must be recalled are shown interacting with each other (Begg 1982).

1.2.2. Prototypes:

Prototype is another important element of thinking. It can be defined as an example of a concept that closely matches the defining characteristics of a concept. Prototypes can be defined as mental models of the typical qualities of members of some group or category. Concepts simplify our thinking. We can't think of life without concepts. Without concepts, we would need a different name for every person, vents, objects and ideas. For example, suppose we ask a child to "throw a ball", a child will not understand if he has no concept of ball or throw. So we can say that concepts such as ball gives us much information with little cognitive efforts.

Prototypes can be defined as mental frame- work for e.g., we have prototypes for Indian political leaders, certain film stars, criminals, etc. Prototypes describe the truly typical member of such categories. The prototypical model helps us to compare new persons we meet in order to determine if they do or do not fit into the category. When they fit quite well, we can readily place them in various categories. When they do not, the situation is more puzzling. For example, suppose you meet a young woman who told you that she reads books as a hobby, likes to do social work and who was dressed in simple clothes. When you discovered that she was a film actress you would probably be surprised. The reason is simple: she does not seem to fit well with the prototype of film actress that you have built up through past experience. Prototypes also exert important effects on social thought and social behaviour. The prototype for objects and events varies from culture to culture and from region to region. For e.g., In an Indian family it is customary to touch the feet of elders. However, such a custom does not exist in many other cultures. Similarly, prototype of fruits or drink varies from region to region depending upon what fruit or drink is commonly available in a given region or culture. For e.g., someone who lives in a tropical area will have a different prototype for fruit as compared to one who stays in Northern Hemisphere. For e.g., someone who grew up in an area where there are many coconut trees, for e.g., Kerala might think of coconut as the most typical fruit as compared to a person who comes from Kashmir where apples are found in plenty. It has also been noted that people who are familiar or have knowledge about given objects and events will have a different prototype about these objects and events as compared to persons who are not knowledgeable or lack information about such objects and events. Thus, many factors influence the development and formation of prototypes. Some common factors are as follows:

- ➢ Geographical Region
- ➢ Culture
- ➢ Information and Knowledge
- ➢ Experience

One's thinking is considerably influenced by the prototype that one develops or holds. They also aid in the process of problem solving and decision making. Eleanor Rosch (1973) has done considerable research work with respect to prototypes. The prototype approach has had an important impact on cognitive psychology and other related disciplines.

1.3 PROBLEM SOLVING STRATEGIES AND OBSTACLES

In general, a problem can be any conflict or difference between one situation and another situation we wish to produce our goal. In trying to reach the goal of problem solution, we use information available to us from long term memory and from our here-and-now perception of the problem situation before we process this information according to rules that tells us what we can and cannot do. In other words, many instances of problem solving can be considered a form of rule-guided, motivated information processing (Newell & Simon, 1972).

1.3.1. Problem Solving Strategies:

Many of the rules used in solving problems concern the changes that are permissible in going from one situation to another. Four major types of such rules are algorithm, heuristics, trial and error and insight.

1) Algorithm:

An algorithm is a set of rules which, if followed correctly, will guarantee a solution to a problem. For instance, if you are given two numbers to multiply, you immediately start thinking of all the rules for multiplication you have learned and you apply these algorithm to the problem. If you follow the rules correctly, you will solve the problem. Algorithm is a step-by-step procedure that guarantees a solution. But it can be laborious and frustrating experience.

2) Heuristics:

Heuristic are simpler thinking strategies, usually based on our past experience with problems, that are likely to lead to a solution but do not guarantee success. One common strategy, or heuristic, is to break the problem down into smaller sub problems, each a little closer to the end goal.

3) Trial and Error:

This is the most commonly used method in problem solving. It is used when a person does not have any well thought out strategy for solving a problem or when he is incapable of thinking about his problem systematically. In other words, he does not know about the rules to help him solve the problem. He goes on trying

one thing after another till somehow the problem gets solved by chance – an abrupt, true seeming and often satisfying solution. Insight strikes suddenly with no prior sense of 'getting warmer' or feeling close to a solution.

Mechanical solutions also involve solving by rote or a learned set of rules. Many problems in life can be solved by merely applying certain rules mechanically. If the rules are applied correctly the solution is sure to be found. Many problems in everyday life and in school and college situations involve mechanical application of the facts or knowledge that we have acquired. The strategy involving use of algorithms and heuristics is representatives of this method.

4) Insight:

This is another important method of solving a problem. For some problems, solutions occur suddenly. Insight occurs when the problem solver suddenly 'sees' the relations involved in a task and is immediately able to solve the problem. It was Kohler who first suggested that learning takes place by insight. An instance of insight is found in the example of Archimedes who ran naked out of his bathtub, shouting 'Eureka', when he found an answer to a problem that had troubled him for a long time. Most creative problems are solved through insight. When human beings solve the problem through insight they experience a good feeling called as 'aha' experience. Thus, insight occurs when the learner 'suddenly sees' the solution involved in a task and is immediately able to solve the problem. When he suddenly gets the solution, he is said to have got insight.

1.3.2. Obstacles in Problem Solving:

Problem solving is not an easy task, it is filled with considerable difficulties or obstacles that are involved in the process of problem solving. Some problems are difficult to solve as compared to others. Human beings commit errors or have limitations that come in the way of solving problems. The three most common barriers to solving a problem are as follows:

1. Functional Fixedness
2. Mental Set
3. Confirmation bias.
4. Using incomplete or incorrect representations
5. Lack of Problem specific knowledge or expertise

We will discuss each of these briefly.

1. Functional Fixedness:

Functional Fixedness means that the functions or uses we assign to objects tend to remain fixed or stable. Functional fixedness is a cognitive bias that that limits a person to using an

object only in the way it is traditionally used. Karl Duncker defined functional fixedness as being a "mental block against using an object in a new way that is required to solve a problem." This "block" then limits that ability of an individual to use the components given to them to make a specific item, as they cannot move past the original intention of the object. When people develop functional fixedness, they recognize tools only for their obvious function. For example, an object is regarded as having only one fixed function. The problem-solver cannot alter his or her mental set to see that the tool may have multiple uses. To overcome functional fixedness, we need to think flexibly about other ways that objects can be used. To overcome functional fixedness, we have to realize that an object designed for one particular function can also serve another function. The history of technology offers numerous examples of overcoming functional fixedness. For instance, the steam engine was used for a century to pump water out of mines before an inventor realized that it could be used as a source of locomotive power (Gellatly, 1986).

2. Mental Set:

Mental set is a tendency to adopt a certain framework, strategy or procedure or more generally, to see things in certain ways instead of others. Mental set is analogous to perceptual set, the tendency to perceive an object or pattern in a certain way on the basis of your immediate perceptual experience. Mental set is one type of functional fixedness. Mental set directs the thinking process to solving problems in the same way. When problem solvers have mental set, they keep trying the same solution they have used in previous problems, even though the problem could be approached via other, easier ways. Mental sets involve a kind of mindless rigidity that blocks effective problem solving (Langer, 1989).A mental set often works against us in our everyday experiences too. A number of research studies have been carried out to study how mental set effects problem-solving behavior. The three major studies using different problems are as follows: i)Luchin's study using water Jar problem. ii) Nine-dot problem iii) Six match stick problem. Luchin (1942) in one of the earliest studies on mental set demonstrated that 75 percent of the students were blind to easy solution and continued to solve the problem in the same fashion as they did in the practice problem.

3. Confirmation bias:

Confirmation bias is one of the barriers to logical thinking. Confirmation bias refers to a type of selective thinking whereby one tends to notice and to look for what confirms one's beliefs, and to ignore, not look for, or undervalue the relevance of what contradicts one's beliefs. Confirmation bias is a phenomenon wherein decision makers have been shown to actively seek out and assign more weight to evidence that confirms their hypothesis, and ignore or

under weigh evidence that could disconfirm their hypothesis. Confirmation bias is one of the hurdles in objective evaluation of a theory. In this a researcher overemphasizes data supporting the theories they favour and tend to ignore or downplay data which are inconsistent with their views.

4. Using incomplete or incorrect representations:

Irrelevant information hinders problem solving as it slows the process down, can cause confusion or misunderstandings.

5. Lack of Problem Specific Knowledge or Expertise:

If we don't have problem specific knowledge or expertise, we can't solve problem. Even if we are going to solve problem it can create difficulties in solving problem.

1.4 FORMING GOOD AND BAD DECISIONS AND JUDGMENTS

Decision-making is a kind of problem solving in which a person must choose among several alternatives. In choosing among alternatives that involve certain amounts of risk, we are often guided by heuristic rules. There are two types of heuristics.
1) Availability Heuristics
2) Representative Heuristics

We would discuss each of these heuristics briefly.
1) Availability Heuristics:

Availability heuristics is a mental shortcut that helps us make a decision based on how easy it is to bring something to mind. In other words, we often rely on how easy it is to think of examples when making a decision or judgment. For instance, in 2011, what percentage of crimes do you suppose involved violence? Most people are likely to guess a high percentage because of all the violent crimes - murder, rape, robbery, and assault - that are highlighted on the news. Yet the FBI reported that violent crimes made up less than 12% of all crimes in the United States in 2011. So, anything that makes information 'pop up' into mind- its vividness, recency or distinctiveness can make it seem common place. We often fear the wrong things. For example, we fear flying because we play in our head some air disaster.

2) Representative Heuristics:

A mental shortcut that helps us make a decision by comparing information to our mental prototypes. For example, if someone was to describe an older woman as warm and caring with a great love of children, most of us would assume that the older woman is a grandmother. She fits our mental representation of a grandmother, so we automatically classify her into that category.

These rules include judging on the basis of representativeness, using the available information to decide which outcome is more likely, and using adjustment to arrive at an estimate of the probability of a certain outcome. Each of these heuristics introduces bias into the decision-making process.

Heuristics are simple decision-making rules we often use to make inferences or draw conclusions quickly and easily. Heuristics are strategies, usually based on our past experiences with problems, that are likely to lead to a solution but do not guarantee success. We make use of many mental heuristics in our effort to think about and use social information. Two most important heuristics approaches in solving a problem are as follows:

1) The Means-Ends Analysis
2) The Analogy Approach.

1) **The Means-Ends Analysis:**

It is a problem solving strategy in which the solver compares the goal to the current state, and then chooses a step to reduce maximally the difference between them. In other words this strategy involves figuring out the "ends" you want and then figuring out the "means" you will use to reach those ends. The means-ends analysis concentrates the problem solver's attention on the difference between the current problem state and the goal state. Very often, it so happens that in order to reach a goal state certain preconditions have to be fulfilled. These preconditions constitute sub goals. Through the creation of sub goals, the task is broken down into manageable steps, which help us to reach a final goal state. Newell and Simon developed a computer program called General Problem Solver or GPS, which is a program whose basic strategy is means-ends analysis.

2) **The Analogy Approach:**

In an analogy, we use a solution to an earlier problem to help with a new one. Analogies pervade human thinking. Whenever we try to solve a new problem by referring to a known, familiar problem, we are using an analogy (Halpern et al.,1990).

Bad Decisions:
a.) **Overconfidence:** Sometimes our judgments and decisions go wrong simply because we are more confident than correct. In many tasks, people tend to overestimate their performance. For example, many overconfident students expect to finish preparing for exam ahead of schedule. In fact, the preparation takes more time than what they predict. Similarly, many people do not realize that there can be a potential for error in their thinking and believe that they will have more money next year and merrily take loans and later on find

it difficult to pay back as they may not get as much pay raise as they expected.

However, overconfidence has an adaptive value. Research studies have shown that people who make mistakes in judgment due to overconfidence live more happily. They make tough decisions more easily, and they seem to be more credible than others. The wisdom to know when we know a thing and when we don't know is born from experience.

b.) Belief Perseverance: Just like we have problem of overconfidence, we also have problem of belief perseverance - our tendency to cling to our beliefs in the face of contrary evidence. Belief perseverance often leads to social conflicts. The more we come to appreciate why our beliefs might be true, the more tightly we cling to them. For example, once we have explained to ourselves why we believe a child is 'gifted' or has a 'learning disability', we tend to ignore evidence undermining our beliefs. Once beliefs form and get justified, it takes more compelling evidence to change them than it did to create them.

To control this tendency, a simple trick is to consider the opposite. When people are asked to imagine and ponder over opposite findings, they become much less biased in their evaluation of the evidence.

c.) The Effects of Framing: Framing refers to the way we present an issue, sways our decisions and judgments. For example, imagine that two different surgeons are explaining a surgery risk to a patient. One surgeon says that 10% people die during this surgery, while the other surgeon says that 90% people survive this surgery. The information is same but the effect will be different. Patients report that risk seems greater when they are told that 10% people die during this surgery.

Framing can be a powerful persuasion tool. If rightly framed arguments are presented, it can persuade people to make decisions that could benefit them or society as a whole.

1.5. THINKING CRITICALLY ABOUT THE FEAR FACTOR

"Most people reason dramatically, not quantitatively," said Oliver Wendell Holmes. After 9/11, many people feared flying more than driving. (In a 2006 Gallup survey, only 40 percent reported being "not afraid at all" to fly.) Yet Americans were mile for mile— 230 times more likely to die in an automobile crash than on a commercial flight in the months between 2003and 2005 (National

Safety Council, 2008). In a late-2001 essay, we calculated that if because of 9/11—we flew 20 percent less and instead drove half those unflown miles, about 800 more people would die in traffic accidents in the year after 9/11(Myers, 2001). In checking this estimate against actual accident data (why didn't I think of that?), German psychologist Gerd Gigerenzer (2004) found that the last three months of 2001 did indeed produce significantly more U.S. traffic fatalities than the three-month average in the previous five years. Long after 9/11, the dead terrorists were still killing Americans. As air travel gradually recovered during 2002 through 2005, U.S. commercial flights carried nearly 2.5 billion passengers, with no deaths on a major airline big jet (McMurray, 2006; Miller, 2005). Meanwhile, 172,000 Americans died in traffic accidents. For most people, the most dangerous aspect of airline flying is the drive to the airport.

1.5.1 Why we fear the wrong things:

Figure: 1.1 Dramatic deaths in bunches breed concern and fear: The memorable South Asian tsunami that killed some 300,000-peoplestirred an outpouring of concern and new tsunami-warning technology. Meanwhile, a "silent tsunami" of poverty-related malaria was killing about that many of the world's children every couple months, noted Jeffrey Sachs, the head of a United Nations project aiming to cut extreme poverty in half by 2015(Dugger, 2005).

Why do we judge terrorism to be a greater risk than accidents—which kill nearly as many per week in just the United States as did terrorism (2527deaths worldwide) in all of the 1990s (Johnson, 2001)? Even with the horror of 9/11, more Americans in 2001 died of food poisoning (which scares few) than of terrorism (which scares many). Psychological science has identified four influences on our intuitions about risk. Together they explain why we sometimes fret over remote possibilities while ignoring much higher probabilities.

First, we fear what our ancestral history has prepared us to fear. Human emotions were road tested in the Stone Age. Our old brain prepares us to fear yesterday's risks: snakes, lizards, and spiders (which combined now kill just about no one in developed countries). And it prepares us to fear confinement and heights, and therefore flying.

Second, we fear what we cannot control. Driving we control, flying we do not.

Third, we fear what is immediate. Threats related to flying are mostly telescoped into the moments of takeoff and landing, while the dangers of driving are diffused across many moments to come, each trivially dangerous. Similarly, many smokers(whose habit shortens their lives, on average, by about five years) fret openly before flying (which, averaged across people, shortens life by one day). Smoking's toxicity kills in the distant future.

Fourth, we fear what is most readily available in memory. Powerful, available memories—like the image of United Flight 175 slicing into the World Trade Center—serve as our measuring rods as we intuitively judge risks. Thousands of safe car trips have extinguished our anxieties about driving.

Dramatic Death in Bunches:
Vivid events also distort our comprehension of risks and probable outcomes. We comprehend disasters that have killed people dramatically, in bunches. But we fear too little those threats that will claim lives un-dramatically, one by one, and in the distant future. As Bill Gates has noted, each year half million children worldwide—the equivalent of four 747s full of children every day—die quietly, one by one, from rotavirus, and we hear nothing of it (Glass, 2004). Dramatic outcomes makeup gasp; probabilities we hardly grasp. The point to remember: It is perfectly normal to fear purposeful violence but smart thinkers will remember this: Check your fears against the facts and resist those who serve their own purposes by cultivating a culture of fear. By so doing, we can take away exaggerated fear.

1.6 DO OTHER SPECIES SHARE OUR COGNITIVE SKILLS?

Other species cognition research examines the processes used to generate adaptive or flexible behavior in species. In the context of animal cognition research, cognition research usually focuses on questions about the mechanisms involved in specific capacities, such as learning, memory, perception, or decision-making. Researchers also investigate animal concepts, beliefs, and

thoughts. While the representational theory of mind is a common assumption among animal cognition researchers, there is also the investigation into the role perception plays in animal learning, and interest in how much explanatory work can be done by non-conceptual content, sometimes inspired by work in embodied cognition (e.g. Barrett 2011). Yes, other species share our cognitive skills to some extent. They don't share our all cognitive skills as it is. For example, dogs that understand commands or birds that can "talk"? Dogs can be trained to follow certain commands such as 'sit', 'come' and 'roll over', but does this mean they understand language and therefore can use it as well? Dogs are known to be experts at reading their owners intentions and that they do not respond to actual words but the tone in which it is said. So, if you say "bad dog" in a cheerful tone, the dog will wag its tail. If you say "good dog" in a harsh tone, the dog will put his tail in between his legs. Birds that are in captivity are known to be able to "talk"- it is believed that it does not mean anything to them and they are merely copying sounds they hear. There is no doubt that animals communicate with each other to one degree or another in response to different stimuli such as hunger or fear. Human language is creative and consists of unique characteristics that give us the ability to engage in abstract and analytical ways.

1.7 SUMMARY

In this unit we began by explaining the concept of thinking. We then explained the concept, mental imagery and prototypes, which are the three elements of thinking. Following this, the concept of problem solving was discussed. In Problem solving concept we have studied briefly problem solving strategies and problem solving obstacles. We explained the four methods of problem solving which included: Algorithms, Heuristics, Trial & Error and Insight. We also discussed the five most common problems in the process of solving a problem i.e. Functional Fixedness, Mental Set and Confirmation bias, Using incomplete or incorrect representations, Lack of Problem specific knowledge or expertise. We have also studied decision making in briefly. We have also studied thinking critically about: the fear factor and why we fear the wrong things. Towards the end of the unit we have discussed about other species and cognitive skills.

1.8 QUESTIONS

a) What is thinking?
b) What is Mental Imagery?
c) What is Concepts?
d) What is Prototypes?

e) Discuss in detail about Problem Solving.

f) Discuss in detail about Decision Making.

g) Explain the different Methods people use to solve problems and make decision?

h) What are the different barriers in Problem Solving?

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Unit -2
THINKING, LANGUAGE AND INTELLIGENCE - II

Unit Structure :

2.0 OBJECTIVES

After studying this unit you should be able to:
➢ Understand the Language structure
➢ Know the nature of Language development
➢ Study the relationship between thinking and language.
➢ Study language and related topics
➢ To know how Language influences thinking
➢ Understand the concepts of emotional intelligence

2.1 INTRODUCTION: LANGUAGE

Language is a system of communication that is governed by a system of rules (a grammar) and can express an infinite number of propositions. Language gives us the ability to communicate our intelligence to others by talking, reading, and writing. As the psychologist Steven Pinker puts it, language is the jewel in the crown of cognition (Pinker, 1994).

It is important to define language precisely and particularly to distinguish between language and communication. Although

language is often used as a communication system, there are other communication systems that do not form true languages. For example, many bees use elaborate dances to tell other bees about a new found source of food. Although this dance communicates where the food is, it can only communicate that kind of message- the dance can't inform the bees about an interesting sight to see along the way to the food source. A natural language has two essential characteristics.

1) Regular and Productive:

It is regular (governed by a system of rules, called grammar), and it is productive, meaning that infinite combinations of things can be expressed in it.

2) Arbitrariness and Discreteness:

Other characteristics of human languages include arbitrariness (the lack of necessary resemblance between a word or sentence and what it refers to) and discreteness (the system can be subdivided into recognizable parts, for example- sentences into words (Hocket, 1960).

2.1.1The Structure of Language

When you have conversation, you first have to listen to the previous sounds the speaker directs at you. Different languages have different sounds (called phonemes).**Phoneme** is the smallest distinctive sound unit of a language. The study of the ways in which phonemes can be combined in any given language constitutes the study of phonology. Next you put the sounds together in some coherent way, identify the meaningful unit of the language, an aspect known as morphology. Word ending prefix, tense markers and the like are critical part of each sentence. Some of the **morphemes** (smallest unit that carry meaning in a given language) are words, and you also need to identify this and determine the role each word plays in sentence. To do so, you need to determine the syntax, or structure, of the sentence. A syntactically correct sentence does not by itself make for a good conversation.

The sentence must also mean something to the listener. Semantics is the branch of linguistics and psycholinguistics devotes to the study of meaning. Finally, for the conversation to work there must be some flow of given- and-take. Listeners must pay attention and make certain assumptions, and speakers must craft their contributions in ways that will make the listener's job feasible. This aspect of language, pragmatics, will conclude our discussion on the Structure of language. Keep in mind throughout that although the various aspects of language will be discussed separately, in actual conversation they must work together.

We will repeatedly bring forth the ideas of the different linguistic rules (such as phonological rules, syntactic rules) in this section. These rules make up the grammar of the language and, taken together, define the ways language works. It is important that linguists and psychologist used the term grammar in the very restricted sense, here, meaning "the set of rules for language". In particular, grammatical in this context has nothing to do with the "rules" of "good English" such as "Don't use ain't" or "Use punctuation at the end of the statement." To a linguist or a psycholinguist, the sentence "I ain't going happily to it" is perfectly meaningful and "legal"-that is, it follows the "rules" of English that native speakers observe - and is therefore grammatical. (You understand it perfectly well, right?). Here grammar refers not to polite ways of speaking but to ways of speaking that form intelligible phrases or utterances recognizable as examples of language that a native speaker of the language might produce. Starting with the basic sound of speech, spoken language can be broken down into these elements: phonemes, syllables, morphemes, word, Phrase, and sentence. Apart from this there are many concepts in this topic. We would discuss all this concepts in details.

➢ **Phoneme:**

Speech sounds, or phonemes, are made by adjusting the vocal cords and moving the tongue, lips, and mouth in wonderfully precise ways to produce vibrations in the airflow from the lungs. While hundreds of speech sound can be distinguished on the basis of their frequency(the number of vibrations per second), their intensity (the energy in the vibrations) and their pattern of vibrations over time.

To illustrate phonemes, consider the k phoneme in the word key and cool. Say these words to yourself, and you will realize that the k sound is different in two words: simply notice the position of your lips when you are saying them and the "sharper" sound of the K phones in the word key here, they are two different phonemes, but either K sounds can be used in the word key without changing the meaning of the word; the same can be said for cool. English speakers do not notice the difference in these k sounds and, therefore, since they make up no difference in the meaning of the words and can be substituted for the one another, they can be grouped together as a single phoneme.

➢ **Morpheme:**

In a language, the smallest unit that carries meaning; may be a word or a part of a word (such as a prefix).Although syllables are the unit of speech perception, and some syllables have meanings, other language elements are the perceptual units carrying the meaning of speech. These elements, morphemes, are the smallest units of meaning in the speech perception. Consider

the word distasteful. It is composed of three morphemes, each of which has meaning. The morphemes in this example are dis, taste, and ful. Dis means "negation" taste is a meaningful word, ful and means "quality". Thus, morphemes can be prefixes, words, or suffixes. Each is composed of syllables, of course, but what makes them morphemes is that they convey meaning. Morphemes are discovered by asking people to break words up into the smallest unit that have meaning for them.

➢ **Semantics:**

The set of rules by which we derive meaning from morphemes, words, and sentences in a given language; also, the study of meaning.

➢ **Syntax:**

The rules for combining words into grammatically sensible sentences in a given language.

➢ **Grammar:**

In language, a system of rules that enables us to communicate with and understand others. Words are combined by the rules of grammar into clauses, and clauses are formed into sentences. A clause consists of a verb and its associated nouns, adjectives, and so on. Evidence indicates that clauses, and not individual words or whole sentences, are the major units of perceived meaning in speech. When we hear a sentence with more than one clause, we tend to isolate the clauses, analysing the meaning of each (Bever, 1973).

2.1.2 Language Development

Childhood is the best time for language, no doubt about it. Young children, the younger the better, are good at it; it is child's play. It is a onetime gift to the species. (Lewis Thomas, The Fragile Species, 1992). Language development is a process starting early in human life. Anyone who has tried to master a second language as an adult knows the difficulty of language learning. And yet children learn languages easily and naturally. Children who are not exposed to language early in their lives will likely never learn one. Case studies, including Victor the "Wild Child, who was abandoned as a baby in France and not discovered until he was 12, and Genie, a child whose parents kept her locked in a closet from 18 months until 13 years of age, are (fortunately) two of the only known examples of these deprived children. Both of these children made some progress in socialization after they were rescued, but neither of them ever developed language (Rymer, 1993). This is also why it is important to determine quickly if a child is deaf and to begin immediately to communicate in sign language. Deaf children who are not exposed to sign language during their early years will likely never learn it (Mayberry, Lock, & Kazmi, 2002).

Milestones in Language development?
Receptive Language:

Children's language development moves from simplicity to complexity. Infants start without language (infantis means "not speaking"). Yet by 4 months of age, babies can discriminate speech sounds (Stager & Werker, 1997). They can also read lips: They prefer to look at a face that matches a sound, so we know they can recognize that ah comes from wide open lips and from mouth with corners pulled back (Kuhl & Meltzoff, 1982). This period marks the beginning of the development of babies' receptive language, their ability to comprehend speech – what is said to them or about them. At seven months and beyond, babies grow in their power to do what you and I find difficult when listening to an unfamiliar language: segmenting spoken sounds into individual words. Moreover, their adeptness at this task, as judged by their listening patterns, predicts their language abilities at ages 2 and 5 (Newman et al., 2006).

Productive Language:

Babies' productive language is their ability to produce words, matures after their receptive language.

Stages of Language Development:

There are mainly five stages of language development. We would discuss in details all the stages-

1) **Babbles Stage:**

Beginning at about 04 months. It consists of babbles, many speech sounds. Yet by 4 months of age, babies can discriminate speech sounds (Stager & Werker, 1997). Many of these spontaneously uttered sounds are consonant -vowel pairs formed by simply bunching the tongue in the front of the mouth or by opening or closing the lips.

Beginning at about 10 months, babbling changes and a trained ear can identify various sounds related to the household language. Without exposure to other languages, babies lose their ability to hear and produce sounds and tones found outside their native language. Babbling is not an imitation of adult speech - it includes sounds from various languages, including the one not spoken at home. Deaf infants who observe their deaf parents signing begin to babble more with their hands.

2) One-word stage:

Beginning at about 12 months. The stage in speech development, during which a child speaks mostly in single words. They have already learnt that sounds carry meanings. They now begin to use sounds - usually only one recognizable syllable such as ma or da. But family members quickly learn to understand.

Across the world, baby's first words are often nouns that label objects or people. This one-word stage may equal a sentence.

3) Two-word, telegraphic speech:

At about 18 months, children's words learning explodes from about a word per week to a word per day. By their second birthday, most have entered the two-word stage. They start uttering two-word sentences in telegraphic speech: Like the old-fashioned telegrams (TERMS ACCEPTED. SEND MONEY), this early form of speech contains mostly nouns and verbs (Want juice). Alsolike telegrams, it follows rules of syntax; the words are in a sensible order. English-speaking children typically place adjectives before nouns—big doggy rather than doggy big.

4) Language develops rapidly into complete sentences:

Once children move out of the two-word stage, they quickly begin uttering longer phrases (Fromkin & Rodman, 1983). If they get a late start on learning a particular language, for example after receiving a cochlear implant or being an international adoptee, their language development still proceeds through the same sequence, although usually at a faster pace (Ertmer et al., 2007; Snedeker et al., 2007). By early elementary school, children understand complex sentences and begin to enjoy the humour conveyed by double meanings: "You never starve in the desert because of all the sand-which-is there."

Table 10.1.: Summary of Language development

Sr. No.	Month (Approximate)	Stage
1	4	Babbles many speech sounds
2	10	Babbling resembles household language.
3	12	One-word stage.
4	24	Two-word, telegraphic speech.
5	24+	Language develops rapidly into complete sentences.

Explaining Language Development:

Noam Chomsky argued that all languages do share some basic elements which he called universal grammar. For example, all human languages have nouns, verbs and adjectives as grammatical building blocks. Chomsky believed that we human beings are born with a built-in predisposition to learn grammar rules, that is why preschoolers pick up language so readily and use grammar so well. It happens naturally. But no matter what language

we learn, we start speaking it mostly in nouns rather than in verbs and adjectives.

Further, research shows that 7 month olds can learn simple sentence structures. In an experiment, after repeatedly hearing syllable sequences that follow one rule, infants listened to syllables in a different sequence. They could detect the difference between two patterns later on. This suggested that babies come with a built in readiness to learn grammatical rules.

Childhood seems to represent critical(sensitive) period for mastering certain aspects of language before the language learning window closes. People who learn a second language as adults usually speak it with the accent of their native language and have difficulty in mastering the second language. The window on language learning closes gradually in early childhood. By about age 7, those who have not been exposed to either a spoken or a signed language gradually lose their ability to master any language.

Language communication:

A language is said to communicate when others understand the meaning of our sentences, and we, in turn, understand their communications, of course, this is not limited to language. We convey much information to others nonverbally by gesture. When we speak one of the thousands of languages of the world, we draw on our underlining knowledge of the rules governing the use of language. This knowledge about language, or linguistic competence, as it is called, is used automatically and almost effortlessly to generate and comprehend meaningful speech. Linguistic competence seems to be universal human species-typical ability.

2.1.3 Close Up: Living in a silent world:

The discussion so far has been about the use of vocal speech symbols, or verbal language, in thinking. Can other language system be used as tools of thought? Studies of the deaf provide an approach to this question. Deaf children with little verbal language ability score in the normal range on standardized tests of cognitive performance (Vernon, 1967), and their cognitive and thinking abilities develop relatively normally (Furth, 1971). Such findings have been interpreted as indicating that language plays little or no role in the thinking or cognitive development of the deaf. But many of the deaf are taught sign language, and, even if they are not explicitly taught such language, it has been found that deaf children will develop their own (Goldin& Feldman, 1977). This may indicate that there is an innate human program for language be it verbal or gestural.

The standard visual-gestural sign languages learned by the deaf have many features in common with auditory languages. For example, just as the auditory-vocal languages use combinations of small number of basic sounds, or phonemes, as they are called to generate meaningful language, so, too, do the visual-gestural languages of the deaf make use of a relatively small number of basic movement combinations for communication. Thus, from combinations of the basic gestures, an infinity of ideas can be expressed in the visual-gestural languages. Some studies suggest that deaf children who know sign language are better at a variety of cognitive and thinking tasks than are those without this language (Vornon & Koh, 1971; Stuckless & Birch, 1966).Thus, those deaf people whose verbal languages skills are minimal seem to have a nonverbal language tool of thought.

The challenge of life without hearing may be greatest for children. Unable to communicate in customary ways, signing playmates find it difficult to coordinate their play with speaking playmates. Their school achievement may suffer because academic subjects are rooted in spoken languages. Adolescents may feel socially excluded with a resulting low self-confidence.

2.1.4 The brain and language:

We process complex language information with amazing speed is an understatement. Caplan (1994), reported, for example, that people typically recognize spoken words after about 125 milliseconds (about one eight of a second) that is, while the word is still being spoken. Normal word production, estimated over a number of studies, requires us to search through a mental "dictionary" of about 20,000 items, and we do so at the rate of three words per second.

Obviously, the brain architecture to support this rapid and complex cognitive processing must be sophisticated indeed. Neuropsychologists have been trying to understand what the underlying brain structures involved with language are, where they are located, and how they operate. In this topic, we will see two important language disorders which are related to brain and language.

Adults whose hearing becomes impaired later in life also face challenges. When older people with hearing loss must expend efforts to hear words, they have less remaining cognitive capacity available to remember and comprehend them. It has been found that people with hearing loss, especially those not wearing hearing aid, have reported feeling sadder, being less socially engaged and more often experiencing others' irritation. They may also experience a sort of shyness. Henry Kisor (1990) very aptly said, "we can be self-effacing and diffident to the point of invisibility.

Sometimes this tendency can be crippling. I must fight it all the time". Helen Keller, both deaf and blind, also noted that "Blindness cuts people off from things. Deafness cuts people off from people".

Broca's Aphasia:

Interest in localizing language function in the brain dates back at least to the 1800s, when a French physician with interests in anthropology and ethnography, Pierre Paul Broca, read a paper in 1861 at the meeting of the society Anthropologist in Paris. The paper reported on a patient, nicknamed "Tan" because he had lost the ability to speak any word save for tan. Shortly after the patient died, his brain was examined and found to have a lesion in the left frontal lobe. The very next day, Broca reported this exciting (for science, not for the patient or his family, probably) finding (Posner &Raichle, 1994). The area of the brain, henceforth known as Broca's area, is shown in the figure 2.7.A. It is also called expressive aphasia. A Broca's aphasia appeared to leave language reception and processing undisturbed. In 1865, Broca reported that after damage to an area of the left frontal lobe a person would struggle to speak words while still being able to sing familiar songs and comprehend speech.

Fig.2.1: Brain structure involved with languages.
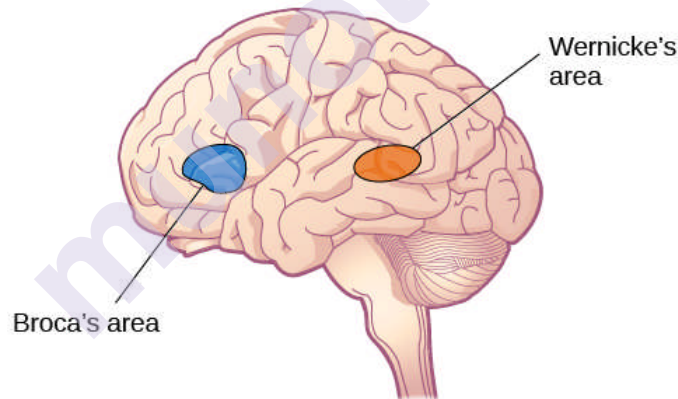
Wernicke's Aphasia:

About 13 years later, in 1874, a German neurologist Carl Wernicke identified another brain area that, if damaged by a small lesion (often result of a stroke), left patients with extreme difficulty in comprehending (but not producing) spoken language (Posner & Raichle, 1994). (Not surprisingly, this area has come to be called Wernicke's area, and it is also shown in figure 2.7.A. It is also called receptive aphasia. People could speak words and sentences (although the language was often gibberish). Damage to Wernicke's area also disrupts understanding.

But today, Functional MRI scan shows that different neural networks are activated by nouns and verbs, or objects and actions,

by different vowels and by reading stories of visual vs. motor experiences. It was also found that jokes that play on meaning are processed in a different area of the brain than jokes that play on the words. The main point is that in processing language, the brain operates by dividing its mental functions – speaking, perceiving, thinking, remembering into sub functions. Localized trauma that destroys one of these neural work teams may cause people to lose just one aspect of processing.

2.1.5 Do other species have language?

Language is considered to be a very complex form of communication that occurs among the human race. It is a set of verbal and non-verbal conventions that humans use to express their ideas and wants. Humans use words while talking to express their needs and wants and they cry, slouch and make faces when they want to express feelings. Animals, or in other words non-humans also show signs of communication such as a dog wagging its tail when excited or a bird singing a song to attract the opposite sex. However, do animals have their language? Researchers say that animals or non-humans, do not have a true language like humans. However, they do communicate with each other through sounds and gestures. Animals have a number of in-born qualities they use to signal their feelings, but these are not like the formed words we see in the human language. Human children show these same forms of communication as babies when crying and gesturing. But they slowly learn the words of the language and use this as form of communication.

If human children were separated at birth away from humans they would not learn the words of the language and would not be able to communicate with other humans. They would resort to sounds and gestures as their primary form of communication. However, in the animal kingdom if they are reared alone from birth they are still able to behave and communicate in the same way as other species of their kind.

So what about animals such as dogs that understand commands or birds that can "talk"? Dogs can be trained to follow certain commands such as 'sit', 'come' and 'roll over', but does this mean they understand language and therefore can use it as well? Dogs are known to be experts at reading their owners intentions and that they do not respond to actual words but the tone in which it is said. So if you say "bad dog" in a cheerful tone, the dog will wag its tail. If you say "good dog" in a harsh tone, the dog will put his tail in between his legs. Birds that are in captivity are known to be able to "talk"- it is believed that it does not mean anything to them and they are merely copying sounds they hear. There is no doubt that animals communicate with each other to one degree or another in response to different stimuli such as hunger or fear. Human

language is creative and consists of unique characteristics that give us the ability to engage in abstract and analytical ways.

2.2 THINKING AND LANGUAGE

Philip Dale very correctly said that thinking is more than language and language is more than thinking, but thinking and language are related and in this topic we will describe some of the ways in which they are related.

Every day we use language in our thinking. For many people, much of the time, a good deal of thinking involves the use of word symbols and the rules of grammar to join the words into phrases and sentences. The words, their meanings and rules for joining them together are stored in our semantic long term memories. When we think with language, we draw on this store of information to use language as tool of thought.

Some theories take a more extreme view of the role language in thinking; they claim that language can actually determine the thoughts we are capable of having. But this linguistic relativity hypothesis, as it is called, has been under increasing attack in recent years.

Because so much thinking involves language, the idea arose in psychology that thinking was actually a kind of inner speech, a kind of "talking to yourself under your breath." According to this idea, people make small movement of the vocal apparatus when they think and carry on their thinking by talking to themselves. A number of experiments have indicated that movements of the vocal apparatus may indeed accompany thought, but other experiments have made it clear that such movements are not necessary for thinking (Smith et al., 1947). In one heroic experiment, the subject, a physician, was completely paralyzed by means of a drug. He literally could not move a muscle, and his breathing was done for him by an iron lung. The paralyzing drug, however, did not affect the way his brain worked; it merely acted on the drug, the subject was given certain verbal problems to solve; he could not answer, of course, because the muscles necessary for speaking were paralyzed. There is no way to be certain that, thinking while under the influence of the drug, but all indications are that he was unable to do so because after the paralysis was removed by a counteracting drug, he clearly remembered what had taken place while he was drugged and promptly gave the answer to problems.

2.2.1 Language influences thinking:

There are at least 5,000 living languages in the world about 140 of them are spoken by a million or more people. Is a particular

language merely a convenient set of symbols for the communication of our thoughts? According to the linguist Benjamin L. Whorf, the answer is no. Whorf argued that the higher levels of thinking require language and that the characteristics of particular language actually shape the way that users of the language think about things. There are two ideas here. One is that thinking requires language, the other has come to be called the **linguistic relativity hypothesis**. Most of the interest has focused on this hypothesis. In its strongest form, it says that the particular language people used determines how they see the world.

Whorf based his hypothesis on studies of North American Indian languages, but his hypothesis is said to hold for all languages. He found many differences between these languages and European ones and argued that such differences predispose their users to think in different ways. For example, the grammar of a language dictates how people describe changes in the environment. Since the basic unit of English grammar are nouns and verbs, English-speaking people commonly think in terms of "things" and "actions" Whorf found that people using other languages do not necessarily divide situation up this way. Furthermore, all languages have some words for which no equivalents can be found in any other language. The German word weltanschauungsfor instance, means something like "a general world view, or a general philosophy of the world". There is no word with this precise meaning in English. In addition, languages categorize events in various ways. Eskimos are said to use some four different words for snow, while English has only one. According to the linguistic relatively hypothesis. Eskimos can think about snow with greater precision than English speaking can people and have different conception of what snow is, the Hopi language has single word for all flying objects their than birds. The hypothesis states that Hopi speakers thinks differently about flying objects than do speakers of languages that do not categorize the world in this way. The Hanno people of the Philippine, islands are said to have names for 92 varieties of rice, but all 92 varieties are, for the English speaker, simply rice(Con, 1954 cited in brown, 1965).

The linguistic relativity hypothesis is controversial. Many linguistic have argued that the hypothesis is circular Whorf found that languages differ in their grammar and in the concepts they can express from the hypothesized that thinking must also differ among the users of this different languages. However, the differences in the thinking are themselves assessed by the way of the language is used. What is hidden are ways of assessing conceptions of the word independently of language. The few experiments that have attempted this have had inconclusive results. Perhaps it is not so much a matter of what can be thought about by users of a language as it is of how easy it is to think about certain things. English-

speaking thinkers can think about the concept of the "world view" even if they do not have a convenient word for it. English speakers can think about different kinds of snow, even have to use more words to describe it.

More recently, interest has shifted away from relativity to universals in thinking perhaps the basic thought processes in thinking are similar, even though languages differ widely. Colour perception provides an example of the possible universality of thinking despite the different ways in which different languages designate colours. It has been found that certain "focal" colours-a maximum of 11-are chosen from a colour chart by speakers of widely differing languages. Furthermore, it has been shown that thinking can be influenced by these focal colours even when the language does not have names for them. This is contrary to what might be expected from the linguistic relativity hypothesis. For example, Eleanor Rrosch has done experiments with the Dani people of the New Guinea. The Dani have only "black" and mola for "white". The Dani subjects in these experiments studies a colour chart arbitrary names were assigned to eight of the focal colours and eight of the non-focal colours on the chart. The Dani learn the names assigned to the focal colours more rapidly and remembered them better than they did those given to the other colors. Thus even though the Dani do not have names for the focal colors in their language, their thinking is influenced by them.

2.2.2 Thinking in images

To a large degree, the availability of the symbols that we use in thinking are often words and language, and therefore thinking and language are closely related. A language makes available hundreds of thousands of potential language symbols is what makes human thinking so much more sophisticated than the thinking of other animals. Although language is a powerful tool in human thought, as when we "talk to ourselves" internally, images are another important type of symbol used in thinking.

People vary remarkable in how much they use images in their thinking. A few report that they almost never use mental pictures, so they must be doing their thinking with words, or verbally; others that most of their thinking is done in image form. When we use images to think, they are not usually complete "pictures in the head". They are usually incomplete. Consider the imagery you use, if you use it at all, in solving the following problems (Huttenlocher, 1973). Imagine that you are standing on a certain street corner in a section of a city you know well. How would you walk or drive from this point to some other part of the city?

Here is another problem in which you might use imagery: from where on earth could you walk first 1 mile south, then 1 mile

east, then 1 mile north, and end up exactly where you began? Did you use imagery in trying to solve this problem? If so, what was your imagery like?

When solving problems like these, most people report that their images are incomplete. To solve the first problem, people usually make a visual map, but it is a strange one. Although it shows turns, the lines connecting the turns are of no particular length. In solving the second problem (the answer is the north pole), people imagine a globe- but not the whole globe, only the polar region. Such problem-solving images contain only a few details- say, of sidewalks, roads, buildings, or color-although some people may imagine snow when they think of the north pole. In general, the images are abstractions of certain features from previous experience.

The incomplete, abstract images most of us use in thinking seem to be constructed from elements stored in long term memory. The constructive process involved in imagery has been studied by means of experiment in which people were asked to form images of various sizes. For example, an elephant might be imaged as the size of a mouse, or mouse imaged as the size of an elephant. Variations of this sort in the sizes of images indicate that images are constructions. Even more interesting, however, are studies indicating that the ease with which information is found in an image depends on the size (and other aspects) of the image constructed (Kosslyn, 1983).

2.3 SUMMARY

In this unit we began by explaining the concept of language and its structure. We then explained how language developed in human beings. We have also studied the stages of language development. We explained the relationship between thinking and language and how language influences thinking. The concept of thinking in images and association between brain and language was also explained. In "brain and language" topic we studied two important language disorders (Broca's aphasia and Wernicke's aphasia). Following this we discussed about living in a silent world and do other species have language.

2.4 QUESTIONS

A) Write long answers:
   a) Discuss in detail about language structure.
   b) Discuss about Language development.
   c) Explain how language influences thinking?

B) Write short notes:
- a) The brain and language.
- b) Do other species have language?
- c) Thinking and Language.
- d) Thinking in images.

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Unit -3

THINKING, LANGUAGE AND INTELLIGENCE – III

Unit Structure :

3.0 OBJECTIVES

After studying this unit you should be able to:

➤ Know the nature of intelligence and some important concepts of intelligence.

➤ Understand the origins of intelligence testing and Assessment of Intelligence.

➤ Understand the various tests that are used to measure intelligence.

➤ Understand the relationship between Intelligence and creativity

➤ Understand the concepts of emotional intelligence.

➤ Understand the Principles of test construction.

3.1 INTRODUCTION: WHAT IS INTELLIGENCE?

In this unit, we will discuss numerous topics related to intelligence such as determinants of intelligence and is intelligence one general ability or several specific abilities. We will also be discussing neurological measurement of intelligence, mental

retardation and giftedness. We would discuss in detail about the origins of intelligence testing and different ways to assess intelligence. After this, we would briefly discuss modern tests of mental abilities such as Binet Mental Ability Test, Stanford Binet and The Wechsler Tests. It should be remembered that Intelligence is one of the most important and unique ability that human beings possess. The term intelligence was popularized by Sir Francis Galton, Alfred Binet and others. Intelligence refers to the cognitive ability of an individual to learn from experience, to reason well, and to cope with the demands of daily living. Some important concepts and topics related to intelligence such as emotional intelligence, Intelligence and creativity, the nature v/s nurture controversy and the bell curve would also be discussed in brief. Towards the end of the unit we would study principles of test construction.

Intelligence is a key construct employed to know how individuals differ from one another. It also provides an understanding of how people adapt their behaviour according to the environment they live in. In this chapter, we would learn about intelligence in its various forms.

Definition:

Psychological notion of intelligence is quite different from the common notion of intelligence. If you watch an intelligent person, you are likely to see in her/him with attributes like mental alertness, ready wit, quickness in learning and ability to understand relationships. Intelligence is not a quality like height or weight, which has the same meaning for everyone around the globe. People assign the term intelligence to the qualities that enable success in their own time and in their own culture. There are different definitions of intelligence given by different psychologist, some of which are given below.

➢ Alfred Binet was one of the first psychologist who worked on intelligence. According to him, Intelligence is the ability to judge well, understand well and reason well (Alfred Binet, 1973).
➢ According to Wechsler, Intelligence is the global and aggregate capacity of an individual to act purposefully, to think rationally and to deal effectively with his/her environment. (Wechsler, 1950).
➢ Other psychologists such as Gardner and Sternberg have defined intelligence as well. Intelligent individual not only adapt to their environment but also actively modifies or shapes it (Gardner & Sternberg).

In simple words, intelligence is synthesis of one's abilities. Binet assumes intelligence as a general capacity for comprehension and reasoning that manifests itself in various ways, another psychologist, Charles Spearman, proposed that all

individuals possess a general intelligence factor in varying amounts. In contrast to Spearman. Louis Thurstone felt that intelligence could be broken down into a number of primary abilities. Rejecting all these theories, Guilford states that many aspects of intelligence tends to be ignored when items are lumped together to form tests.

Important Concepts in Intelligence:
Individual Differences in Intelligence:

It is often said that no two individuals are exact duplicates; they differ from each other in some way or the other. Hence the job of the psychologist is to identify and understand this uniqueness in individuals. Such a similarity or difference between persons reveals individual differences. It happens in our day-to-day life when we see people around us. A question comes to mind; how and why people appear similar or different to each other? For example, when we think about their physical appearance, we often ask ourselves why some people have dark or fair complexion, why some people are tall and some are short, why some are thin and why some are very fat. When we think about their psychological characteristics we often come across people who are very talkative or less talkative, some laugh too much whereas others take much time even to smile and some are very friendly whereas some prefer to be alone. In psychology, these are called individual differences referring to the extent and kind of variations or similarities among people on some of the important psychological aspects such as intelligence.

When we speak Individual differences in terms of intelligence, individual difference occur due to interaction of genetic and environmental factors. We inherit certain characteristics from our parents through genetic codes. The phenotype or the expressed forms of our characteristics depend on contributions of the socio-cultural environment. This is the reason why we are not exactly like our parents and our parents not exactly like our grandparents. We do share similarities with our parents in respect of many physical attributes like height, colour of eyes, shape of nose etc. We also inherit certain cognitive, emotional and other characteristics from our parents like intellectual competence, love for sport, creativity etc. However, our own characteristics develop largely by the support from the environment in which we live.

Extremes of Intelligence: Retardation and Giftedness:

The results of studies assessing the measurement of intelligence show that IQ is distributed in the population in the form of a normal distribution curve, which the pattern of scores is usually observed in a variable that clusters around its average. In a normal distribution, the bulk of the scores fall toward the middle, with many fewer scores falling at the extremes. The normal distribution of

intelligence (Figure11.2. Distribution of IQ Scores in the General Population") shows that on IQ tests, as well as on most other measures, the majority of people cluster around the average (in this case, where IQ = 100), and fewer are either very smart or very dull. Because the standard deviation of an IQ test is about 15, this means that about 2% of people score above an IQ of 130 (often considered the threshold for giftedness), and about the same percentage score below an IQ of 70 (often being considered the threshold for mental retardation).

The normal distribution of IQ scores in the general population shows that most people have about average intelligence, while very few have extremely high or extremely low intelligence.

Figure3.1: Normal Distribution Curve of Intelligence: Bell Curve
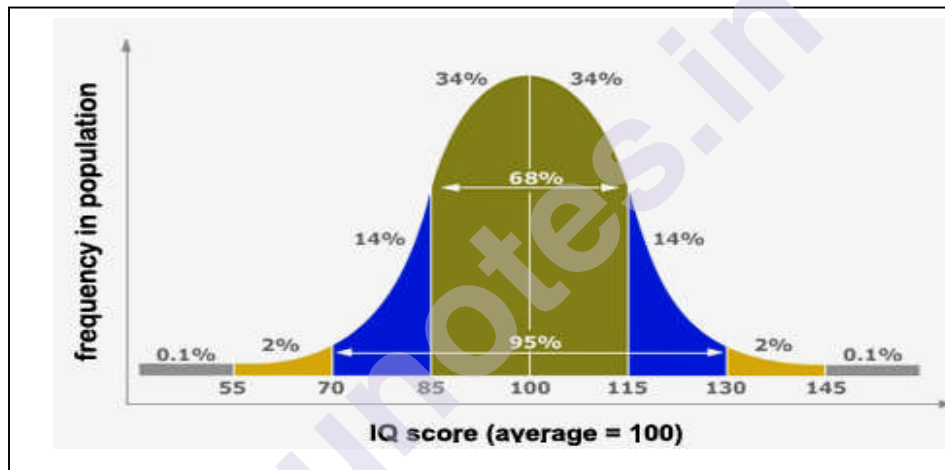
> ➤ **Retardation:**

One cause of mental retardation is Down syndrome, a chromosomal disorder leading to mental retardation caused by the presence of all or part of an extra 21st chromosome. The incidence of Down syndrome is estimated at 1 per 800 to 1,000 births, although its prevalence rises sharply in those born to older mothers. People with Down syndrome typically exhibit a distinctive pattern of physical features, including a flat nose, upwardly slanted eyes, a protruding tongue, and a short neck.

Societal attitudes toward individuals with mental retardation have changed over the past decades. We no longer use terms such as mad, idiot to describe these people, although these were the official psychological terms used to describe degrees of retardation in the past. Laws such as the Person with Disabilities Act (PWD) have made it illegal to discriminate on the basis of mental and physical disability, and there has been a trend to bring the mentally retarded out of institutions and into our workplaces and schools.

➢ **Giftedness:**

Having extremely high IQ is clearly less of a problem than having extremely low IQ, but there may also be challenges to being particularly smart. It is often assumed that schoolchildren who are labeled as gifted may have adjustment problems that make it more difficult for them to create social relationships. To study gifted children, Lewis Terman and his colleagues (Terman & Oden, 1959) selected about 1,500 high school students who scored in the top 1% on the Stanford-Binet and similar IQ tests (i.e., who had IQs of about 135 or higher), and tracked them for more than seven decades (the children became known as the termites and are still being studied today). This study found, first, that these students were not unhealthy or poorly adjusted but rather were above average in physical health and were taller and heavier than individuals in the general population. The students also had above average social relationships for instance, being less likely to divorce than the average person (Seagoe, 1975).

As you might expect based on our discussion of intelligence, kids who are gifted have higher scores on general intelligence (g). But there are also different types of giftedness. Some children are particularly good at math or science, some at automobile repair or carpentry, some at music or art, some at sports or leadership, and so on. There is a lively debate among scholars about whether it is appropriate or beneficial to label some children as gifted and talented in school and to provide them with accelerated special classes and other programs that are not available to everyone. Although doing so may help the gifted kids (Colangelo & Assouline, 2009), it also may isolate them from their peers and make such provisions unavailable to those who are not classified as gifted. There is IQ classification given by Wechsler for understanding of IQ range. Classification of IQ range is given below.

No.	IQ Range	IQ Classification
1.	130 and Above	Very Superior
2.	120-129	Superior
3.	110-119	Above Average Intelligence
4.	90-109	Average Intelligence
5.	80-89	Below Average Intelligence
6.	70-79	Borderline Intelligence
7.	55-69	Mild Mental Retardation
8.	40-54	Moderate Mental Retardation
9.	25-39	Severe Mental Retardation
10.	24 and Below	Profound Mental Retardation

Figure 3.1.A: Classification of Intelligent Quotient by Wechsler

Nature v/s Nurture Controversy:

Intelligence has both genetic and environmental causes, and these have been systematically studied through a large number of twin and adoption studies (Neisser et al., 1996; Plomin, DeFries, Craig, & McGuffin, 2003). These studies have found that between 40% and 80% of the variability in IQ is due to genetics, meaning that overall genetics plays a bigger role than does environment in creating IQ differences among individuals (Plomin & Spinath, 2004). The IQs of identical twins correlate very highly (r = .86), much higher than do the scores of fraternal twins who are less genetically similar (r = .60). And the correlations between the IQs of parents and their biological children (r = .42) is significantly greater than the correlation between parents and adopted children (r = .19). The role of genetics gets stronger as children get older. The intelligence of very young children (less than 3 years old) does not predict adult intelligence, but by age 7 it does, and IQ scores remain very stable in adulthood (Deary, Whiteman, Starr, Whalley, & Fox, 2004).

But there is also evidence for the role of nurture, indicating that individuals are not born with fixed, unchangeable levels of intelligence. Twins raised together in the same home have more similar IQs than do twins who are raised in different homes, and fraternal twins have more similar IQs than do non-twin siblings, which is likely due to the fact that they are treated more similarly than are siblings. The fact that intelligence becomes more stable as we get older provides evidence that early environmental experiences matter more than later ones. Environmental factors also explain a greater proportion of the variance in intelligence for children from lower-class households than they do for children from upper-class households (Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003). This is because most upper-class households tend to provide a safe, nutritious, and supporting environment for children, whereas these factors are more variable in lower-class households.

Social and economic deprivation can adversely affect IQ. Children from households in poverty have lower IQs than do children from households with more resources even when other factors such as education, race, and parenting are controlled (Brooks-Gunn & Duncan, 1997). Poverty may lead to diets that are under-nourishing or lacking in appropriate vitamins, and poor children may also be more likely to be exposed to toxins such as lead in drinking water, dust, or paint chips (Bellinger & Needleman, 2003). Both of these factors can slow brain development and reduce intelligence. If impoverished environments can harm intelligence, we might wonder whether enriched environments can improve it. Government-funded after-school programs such as Head Start are designed to help children learn. Research has found

that attending such programs may increase intelligence for a short time, but these increases rarely last after the programs end (McLoyd, 1998; Perkins & Grotzer, 1997). Intelligence is improved by education; the number of years a person has spent in school correlates at about r = .6 with IQ (Ceci, 1991).

It is important to remember that the relative roles of nature and nurture can never be completely separated. A child who has higher than average intelligence will be treated differently than a child who has lower than average intelligence, and these differences in behaviors will likely amplify initial differences. This means that modest genetic differences can be multiplied into big differences over time.

The Bell Curve:

Richard Herrinstein and Charles Murray in 1994 published an important book called as "The Bell Curve" which has become highly controversial and had made certain conclusion concerning intelligence, race and genetics. According to Herrenstein and Wilson (1994) intelligence is an important asset in a modern society. The demand for intelligence in modern society has created two groups in society. One group consists of highly intelligent individuals who hold good jobs and earn more. Due to their high intelligence, they are paid more and they progress economically as well as socially. On the other hand, are individuals, who, because of their low intelligence, hold low status jobs and are paid less. Consequently, their economic and social status is also low. Thus, according to Herrenstein and Murray (1994) one's intelligence determines one's occupational success and one's social status. Its central point is that intelligence is a better predictor of many factors including financial income, job performance, unwed pregnancy, and crime than parents' Socioeconomic or education level. Also, the book argued that those with high intelligence, which it called the "cognitive elite", are becoming separated from the general population of those with average and below-average intelligence and that this was a dangerous social trend.

Thus, in The Bell Curve, Herrnstein and Murray set out to prove that American society was becoming increasingly meritocratic, in the sense that wealth and other positive social outcomes were being distributed more and more according to people's intelligence and less and less according to their social backgrounds.

The Bell Curve has become highly controversial. The Bell Curve is not a scientific work. It was not written by experts, and it has a specific political agenda. According to experts the book has many statistical errors and ignored the effects of environment and culture in determining his/her success in life.

Social Determinants &Biological Determinants of Intelligence:

There are two basic factors which influence the human intelligence. These two factors are biological and social. The heredity-environment issue, debated in regard to many aspects of human behaviour, has focused most intensely on the area of intelligence. Few experts doubt that there is some genetic basis for intelligence, but opinion differ as to the relative contribution of heredity and environment.

Most of the evidence bearing on the inheritance of the intelligence comes from studies correlating IQs between person of various degree of genetic relationship. The average correlation between the IQs of parents and their natural children is 50; between parents and their adopted children the correlation is about 25. Identical twins, because they develop from a single egg. Share precisely the same heredity; the correlation between their IQs very high –about 90. The IQs of fraternal twins (who are genetically no more alike than ordinary siblings, since they develop from separate eggs) correlated higher, .75, than those of fraternal twins reared together.

Note that being reared in the same home situation tends to increase IQ similarity, even for individual who are unrelated. Although adopted children resemble their natural parents on the basis of their natural parent's ability (Skodak and Skeels, 1949).

Racial Differences:

After discussing generic contribution to intelligence, it is obvious that there are racial differences in intelligence. Because of the recent issue on the question of whether blacks are innately less intelligent than whites. In view of the heated controversy centered on this issue and its significance for social policy, it is important that we examine the available evidence. On standard intelligence tests black Americans, as a group, score 10 to 15 IQ points lower than while Americans, as a group. This fact is not a debate but revolves around how to interpret the difference. Some possible explanations should be apparent from what we have already said about the nature of IQ tests and the influence of environmental factor on tested intelligence. For example, most intelligence have been standardized on white populations. Since black and whites generally grow up in quite different environments and have different experiences, the contents of such tests may not be appropriate for blacks. And a black child may react differently to being tested (particularly if he or she is being tested by a white examiner) than a white child. Thus, the whole issue of estimating black intelligence is complicated by the questions of whether the tests are appropriate and whether the data obtained by white testers represent an unbiased measure of IQ.

3.1.1 Is intelligence one general ability or several specific abilities?

In the early 1900s, the French psychologist Alfred Binet (1857–1914) and his colleague Henri Simon (1872–1961) began working in Paris to develop a measure that would differentiate students who were expected to be better learners from students who were expected to be slower learners. The goal was to help teachers better educate these two groups of students. Binet and Simon developed what most psychologists today regard as the first intelligence test, which consisted of a wide variety of questions that included the ability to name objects, define words, draw pictures, complete sentences, compare items, and construct sentences.

Binet and Simon (Binet, Simon, & Town, 1915; Siegler, 1992) believed that the questions they asked their students, even though they were on the surface dissimilar, all assessed the basic abilities to understand, reason, and make judgments. And it turned out that the correlations among these different types of measures were in fact all positive; students who got one item correct were more likely to also get other items correct, even though the questions themselves were very different.

On the basis of these results, the psychologist Charles Spearman (1863–1945) hypothesized that there must be a single underlying construct that all of these items measure. He called the construct that the different abilities and skills measured on intelligence tests have in common the general intelligence factor (g). Virtually all psychologists now believe that there is a generalized intelligence factor, g, that relates to abstract thinking and that includes the abilities to acquire knowledge, to reason abstractly, to adapt to novel situations, and to benefit from instruction and experience (Gottfredson, 1997; Sternberg, 2003).

Although there is general agreement among psychologists that g exists, there is also evidence for specific intelligence (s), a measure of specific skills in narrow domains. One empirical result in support of the idea of "s" comes from intelligence tests themselves. Although the different types of questions do correlate with each other, some items correlate more highly with each other than doother items; they form clusters or clumps of intelligences.

Theory of Multiple Intelligence:

According to American psychologist Howard Gardner (1983) we do not have one underlying general intelligence, but instead have multiple intelligences. The nine types of intelligence identified by Howard Gardner are as follows:

- **Linguistic Intelligence:** Children with this kind of intelligence enjoy writing, reading, telling stories or doing crossword puzzles. Linguistic intelligence involves aptitude with speech and language and is exemplified by poet T. S. Eliot.

- **Logical-Mathematical Intelligence:** Children with lots of logical intelligence are interested in patterns, categories and relationships. They are drawn to arithmetic problems, strategy games and experiments. Physicist Albert Einstein is a good example of this intelligence.

- **Spatial Intelligence:** It is used to perceive visual and spatial information and to conceptualize the world in tasks like navigation and in art. Painter Pablo Picasso represents a person of high spatial intelligence.

- **Musical intelligence:** It is the ability to perform and appreciate music, is represented by composer A. R. Rahman and Rahul Dev Burman (R.D. Burman).

- **Bodily-kinaesthetic intelligence:** It is the ability to use one's body or portions of it in various activities, such as dancing, athletics, acting, surgery, and magic. Martha Graham, the famous dancer and choreographer, is a good example of bodily-kinaesthetic intelligence. It is the type of ability shown by the gifted athletes, dancers or super surgeons who have great control over their body, hand and finger movements.

- **Interpersonal intelligence:** It involves understanding others and acting on that understanding. It is the type of ability shown by those who can easily infer other people's mood, temperaments, or intentions and motivations.

- **Intrapersonal intelligence:** It is the ability to understand one's self and is typified by the leader Mohandas Gandhi. It is the ability shown by someone who has great insight into his/her own feelings and emotions.

- **Naturalist Intelligence**: the ability to recognize and classify plants, animals, and minerals. Naturalist Charles Darwin is an example of this intelligence. Naturalistic Intelligence is defined as the ability to observe and/or interact with diverse species in nature. The type of ability shown by biologists or environmentalist

- **Existentialist:** It is the ability to see the "big picture of the human world by asking questions about life, death and the ultimate reality of human existence.

3.1.2 Intelligence and creativity:

One important debate in understanding the variations in creativity has been the relationship of creativity with intelligence. Let us take an example of two students in a class. Savita is regarded by her teacher as an excellent student. She does her work on time, scores the highest grades in her class, listens to instructions with care, grasps quickly, reproduces accurately but she rarely comes out with ideas which are her own. Rima is another student who is just average in her studies and has not achieved high grades consistently. She prefers to learn on her own. She improvises new ways of helping her mother at home and comes up with new ways of doing her work and assignment. The former is considered to be more intelligent and the latter as more creative. Thus, a person who has the ability to learn faster and reproduced accurately may be considered intelligent more than creative unless she/he devises new ways of learning and doing.

Terman, in the 1920s, found that persons with IQ were not necessarily creative. At the same time, creative ideas could come from persons who did not have a very high IQ. Other researchers have shown that not even one of those identified as gifted, followed up throughout their adult life, had become well-known for creativity in some field. Researchers have also found that both high and low level of creativity can be found in highly intelligent children and also children of average intelligence. The same person, thus, can be creative as well as intelligent but it is not necessary that intelligent ones, in the conventional sense, must be creative. Intelligence, therefore, by itself does not ensure creativity.

Researchers have found that the relationship between creativity and intelligence is positive. All creative acts require some minimum ability to acquire knowledge and capacity to comprehend, retain and retrieve. Creative writers, for example, need facility in dealing with language. The artist must understand the effect that will be produced by a particular technique of painting, a scientist must be able to reason and so on. Hence, a certain level of intelligence is required for creativity but beyond that intelligence dose not correlate well with creativity. It can be concluded that creativity can take many forms and blends. Some may have more of intellectual attributes, others may have more of attributes associated with creativity. Yet there is more to creativity than what intelligence tests reveal. Intelligence tests require convergent thinking while creativity tests require divergent thinking. Injury to certain areas of the frontal lobes can leave reading, writing and arithmetic skills intact but destroy imagination. Sternberg et.al. have identified 5 components of creativity-

1. **Expertise** – a well-developed base of knowledge- furnishes the ideas, images and phrases we use as mental building blocks. The more blocks we have, the more chances we have to combine them in novel way.

2. **Imaginative Thinking Skill**– It provides the ability to see things in a novel way, to recognize patterns, and to make connections. Having mastered a problem's basic elements, we redefine or explore it in a new way.

3. **A Venturesome Personality** – A venturesome personality seeks new experiences, tolerates ambiguity and risk, and perseveres in overcoming obstacles. For example, Wiles said he labored in near-isolation from the mathematics community partly to stay focused and avoid distractions.

4**. Intrinsic Motivation** – Intrinsic motivation is being driven more by interest, satisfaction and challenge than by external pressures. Creative people focus less on extrinsic motivators such as meeting deadlines, impressing people, or making money – than on the pleasure and stimulation of the work itself. When Newton was asked how he solved such difficult problems, he said by thinking about them all the time.

5**. A Creative Environment** sparks, supports, and refines creative ideas. After studying the careers of 2026 famous scientists and inventors, Dean keith Simonton (1992) concluded that most of these men were mentored, challenged and supported by their colleagues. Many had the emotional intelligence needed to network effectively with peers. Creativity -fostering environments support innovation, team building and communication. They also support contemplation.

3.1.3 Emotional intelligence:

Most psychologists have considered intelligence a cognitive ability, people also use their emotions to help them solve problems and relate effectively to others. Emotional intelligence refers to the ability to accurately identify, assess, and understand emotions, as well as to effectively control one's own emotions (Feldman-Barrett & Salovey, 2002; Mayer, Salovey, & Caruso, 2000).

This concept was first introduced by Salovey and Mayer. According to them, Intelligence is the ability to monitor one's own and others emotions, to discriminate among emotions and to use the information to guide one's thinking and actions. The idea of emotional intelligence is seen in Howard Gardner's interpersonal intelligence (the capacity to understand the emotions, intentions, motivations, and desires of other people) and intrapersonal intelligence (the capacity to understand oneself, including one's emotions).

Emotional Quotient (EQ):

Emotional Quotient (EQ) is used to express emotional intelligence in the same way as Intelligent Quotient (IQ) is used to express intelligence. Emotional Quotient (EQ) is a ratio concept and is a score of emotional intelligence obtained by dividing chronological age by emotional age and multiplying by 100. The formula of Emotional Quotient (IQ) is given below.

Emotional Quotient (EQ) = Emotional Age/ Chronological Age* 100

Emotional intelligence is a set of skills that underlie accurate appraisal, expression and regulation of emotions. It is the feeling side of intelligence. A good IQ and scholastic record is not enough to be successful in life. You may find many people who are academically talented but are unsuccessful in their own life. They experience problems in their life, workplace and interpersonal relationships. What do they lack? Some psychologists believe that the source of their difficulty may be lack of emotional intelligence. In simple words, emotional intelligence refers to the ability to process emotional information accurately and efficiently. There are some characteristics of emotional intelligent person. Person who are high on emotional intelligence who possess following characteristics.

Characteristics of Emotional Intelligent Person:
➢ Perceive and be sensitive to your feelings and emotions.
➢ Perceive and be sensitive to various types of emotions in others by noting their body language, voice, tone and facial expressions.
➢ Relate your emotions to your thoughts so that you take them into account while solving problems and taking decisions.
➢ Understand the powerful influence of the nature and intensity of your emotions.
➢ Control and regulate your emotions and their expressions while dealing with self and others.

Daniel Goleman, an American author and journalist, popularized the concept in his book Emotional Intelligence (1995). He expanded the concept to include general social competence. The importance of emotional intelligence has been very well brought out in the following words by Daniel Goleman "Emotional Intelligence is a master aptitude, a capacity that profoundly affects all other abilities, either facilitating or interfering with them. According to Daniel Goleman the term encompasses has following five characteristics and abilities:

1) **Self-Awareness**: Knowing your emotions, recognizing feelings as they occur, and discriminating between them.

2) **Mood Management**: Handling feelings so they're relevant to the current situation and you react appropriately.

3) **Self-Motivation**: Gathering up your feelings and directing yourself towards a goal, despite self-doubt, inertia, and impulsiveness.

4) **Empathy**: Recognizing feelings in others and tuning into their verbal and nonverbal cues.

5) **Managing relationships**: Handling interpersonal interaction, conflict resolution, and negotiations.

Thus, emotional intelligence is not same as self-esteem and optimism. Rather emotionally intelligent people are both social and self-aware. Those scoring high on managing emotions enjoy higher-quality interactions with friends (Lopes et.al.2004). They avoid being hijacked by overwhelming depression, anxiety or anger. Being sensitive to emotional cues, they know what to say to soothe a grieving friend, encourage a colleague and manage conflict.

Emotional intelligence is less a matter of conscious efforts and more of one's unconscious processing of emotional information. (Fiori,2009). Across many studies in many countries, those scoring high on emotional intelligence showed somewhat better job performance. They could also delay gratification in pursuit of long-term rewards, rather than being overtaken by immediate impulses. They were emotionally in tune with others and therefore often succeeded in career, marriage and parenting.

3.1.4 Is intelligence neurologically Measurable?

Using today's neuroscience tools, we might link differences in people's intelligence test performance to dissimilarities in the heart of smarts—the brain? Might we anticipate a future brain test of intelligence?

More recent studies that directly measure brain volume using MRI scans do reveal correlations of about +.33 between brain size (adjusted for body size) and intelligence score (Carey, 2007; McDaniel, 2005). Moreover, as adult's age, brain size and nonverbal intelligence test scores fall in concert (Bigler et al., 1995). One review of 37 brain-imaging studies revealed associations between intelligence and brain size and activity in specific areas, especially within the frontal and parietal lobes (Jung & Haier, 2007). Sandra Witelson would not have been surprised. With the brains of

91 Canadians as a comparison base, Witelson and her colleagues (1999) seized an opportunity to study Einstein's brain. Although not notably heavier or larger in total size than the typical Canadian's brain, Einstein's brain was 15 percent larger in the parietal lobe's lower region—which just happens to be a center for processing mathematical and spatial information. Certain other areas were a tad smaller than average. With different mental functions competing for the brain's real estate, these observations may offer a clue to why Einstein, like some other great physicists such as Richard Feynman and Edward Teller, was slow in learning to talk (Pinker, 1999).

If intelligence does modestly correlate with brain size, the cause could be differing genes, nutrition, environmental stimulation, some combination of these, or perhaps something else. Recall from earlier chapters that experience alters the brain. Rats raised in a stimulating rather than deprived environment develop thicker, heavier cortexes. And learning leaves detectable traces in the brain's neural connections. "Intelligence is due to the development of neural connections in response to the environment," notes University of Sydney psychologist Dennis Garlick (2003). Postmortem brain analyses reveal that highly educated people die with more synapses—17 percent more in one study—than their less-educated counterparts (Orlovskaya et al., 1999). This does not tell us whether people grow synapses with education, or people with more synapses seek more education, or both. But other evidence suggests that highly intelligent people differ in their neural plasticity—their ability during childhood and adolescence to adapt and grow neural connections in responseto their environment (Garlick, 2002, 2003).

The neurological approach to understanding is currently in its heyday. Will this new research reduce what we now call the g factor to simple measures of underlying brain activity? Or are these efforts totally wrongheaded because what we call intelligence is not a single general trait but several culturally adaptive skills? The controversies surrounding the nature of intelligence are a long way from resolution.

3.2 ASSESSING INTELLIGENCE

3.2.1 The origins of intelligence testing:

In 1904, French government officials asked psychologist Alfred Binet to help them decide which students were most likely to experience difficulty in school, since they needed a way to identify and help these youngsters. (Primary school education was mandatory in France). Binet asked a colleague, Theodore Simon, to help him create a test with questions focusing on practical

matters such as attention, memory and problem solving, things the children were not taught in school. Some children were able to answer more advanced questions than their age group, and so, based on these observations, the now classical concept of mental age came into being. Their test, the Binet - Simon scale, was the first standardized IQ test.

By 1916, Stanford University psychologist Lewis Terman had taken the Binet-Simon scale and adapted it to the American public. The Binet–Simon Scale (adapted) was named the Stanford-Binet Intelligence Scale and soon became the standard intelligence test for several decades in the United States. The Stanford-Binet, as it is called, used a single number known as IQ (Intelligence Quotient) to represent an individual's score on the test.

During World War I, several tests were developed by the United States Army with an eye to screening recruits and determining eligibility for certain military jobs. The Army Alpha was a written test and the Army Beta was administered only in cases where the recruits were illiterate.

These and other IQ tests were eventually used for a less than admirable purpose, screening new immigrants as they entered the United States from Ellis Island. IQ test results were inappropriately used to make sweeping generalizations and to verify the claim of "surprisingly low intelligence" of Jewish and Southern European immigrants. These test results and outlandish claims led to a then popular proposal by the "racially motivated" psychologist H.H. Goddard and others (1920)—to enable Congress to enact restrictions in immigration. Despite the fact that the tests administered were in English only and the vast majority of the immigrants could not understand that language, the United States government deported many thousands of worthy individuals whom they unfortunately labeled as "unfit" or "undesirable." And this took place a full decade or so before the news began to trickle in from Nazi Germany about Adolph Hitler's new eugenics. This is, indeed, a sad chapter in the history of the United States of America.

In 1955, the Wechsler Adult Intelligence Scale made its debut. The WAIS, as it is called, was psychologist Robert Wechsler's first test, and the WISC (Wechsler Intelligence Scale for Children) and the Wechsler Preschool Primary Intelligence Scale of Intelligence (WPPSI) were developed later. The adult version has since gone through three revisions: WAIS-R (Revised, 1981), the WAIS-III (1997), and, in 2008, the WAIS – IV made its first appearance in the United States. Thus, psychologist started to develop psychological tests scientifically.

Measurement of intelligence is a topic that has interested psychologists since last more than 100 years. It was Alfred Binet and his team in France who developed some of the earliest tools for measuring Intelligence. Let us understand the concept of Intelligent Quotient (IQ).

Intelligent Quotient (IQ):

The concept of IQ was for the first time introduced by William Stern in 1912 and employed in 1916 Stanford Binet Scale. IQ is a ratio concept and is a classic score of intelligence obtained by dividing chronological age by mental age and multiplying by 100.

Intelligent Quotient (IQ)= Mental Age / Chronological Age* 100

Originally, IQ was calculated with the formula A 10-year-old who scored as high as the average 13-year-old, for example, would have an IQ of 130 (13/10 X 100). With the help of IQ, children of different chronological ages can be directly compared. IQs that are over 100 indicate that the person is more intelligent than the average.

3.2.2 Modern Tests of Mental Abilities:

There are many different ability tests developed in the world of psychology. We would discuss only some of these test such as Binet's mental ability test, Stanford - Binet test and The Wechsler test.

1. Binet's Mental Ability Test:

Alfred Binet along with his colleague Theodore Simon developed one of the first known Intelligence test, which came to be called as Binet - Simon scale. This test was revised in 1908 and 191. Binet believed that intelligence should be measured by tasks that required reasoning and problem solving. According to Binet the slow learner child was similar to a normal child except for the fact that the mental growth of the slow child was retarded. On the test of intelligence, a slow learner would perform just like a normal child but his/her performance will be equivalent to that of a young child. He developed the concept of mental age. Alfred Binet assumed that intellectual abilities improved with age during childhood. Alfred Binet arranged the test items of his intelligence tests in order of increasing difficulty. The score obtained on Binet's Intelligence Test is equal to the number of questions answered correctly, but it is expressed in terms of the age of the child for which that score is the average. For e.g. if the child correctly answered 9 items and the average number of items answered by the children 4 years and 3 months in age was 9 then the score would be expressed as "4 years and 3 months." Binet called this score as the mental age.

2. Stanford - Binet Test:

The Stanford–Binet Intelligence Scales is an individually administered intelligence test that was revised from the original Binet-Simon Scale by Lewis M. Terman, a psychologist at Stanford University. After Binet's death in 1911 his tests were revised and used extensively in America. The most widely used revision was called as Stanford-Binet tests. One of the first Stanford Binet Scale was developed in 1916. This test was revised in 1937 1960, 1972 and 1986 and 2003. The Fifth edition of Stanford-Binet, revised in 2003, (SB5) is the most updated and revised version of the Stanford-Binet tests. The Stanford Binet Scale is one of the most widely used and scientifically well developed tests of Intelligence to measure the intelligence of school children.

3. The Wechsler Tests:

The Wechsler intelligence scales were developed by Dr. David Wechsler, a clinical psychologist with Bellevue Hospital. David Wechsler developed a series of test initially to measure adult intelligence and later on he developed tests of intelligence to measure intelligence of children and preprimary school children. His tests have been periodically revised and updated. David Wechsler felt that the Binet scales were too verbally loaded for use with adults, so he designed an instrument with sub-tests to measure both verbal and nonverbal abilities, largely borrowing from many other tests, such as the US Army Alpha test.

The first Wechsler scale, called as the Wechsler Bellevue scale was constructed in the year 1939 to measure adult intelligence. However, this scale had a number of technical difficulties, which were corrected in the 1955 scale, which has become famous as WAIS. The 1955 WAIS was revised in 1981 and is called as WAIS-R. He further revised this test which is today called as WAIS – IV. He has also developed Wechsler Intelligence Scale for Children (WISC – IV) and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI – III).

These tests differ from that of Stanford-Binet in the sense that they give three different types of IQ: Verbal Scale IQ, Performance Scale IQ and Full Scale IQ. All of the Wechslerscales are divided into six verbal and five performance subtests. The following table gives a brief overview of the different types of sub-tests in the WAIS test.

Sr. No.	Verbal Subtests	Performance Subtests
1	Information.	Picture Completion
2	Digit Symbol	Picture Arrangement
3	Comprehension	Block Design
4	Arithmetic	Digit Span
5	Similarities	Object Assembly
6	Vocabulary	

3.2.3 Principles of Test Construction:

Test construction is a scientific process and is concerned with development of new tests, revising existing tests and issues relating to test administration and interpretation. Development of intelligence test is a difficult process. Some important characteristics of good test construction include: Reliability, Validity, Standardization of Tests and Norms.

Reliability:

Reliability is one of the most important characteristics of a given scientific test. Reliability can be defined as the extent to which a test yields consistent results. Reliability refers to consistency of scores obtained by the same individual on the same test or equivalent forms of the test, which is administered after some period of time. It refers to the scores obtained by the same person when re-examined with the same test on different occasions or with different sets of equivalent form. In order to determine reliability we actually measure correlations between two sets of scores on the same test (also called as test retest reliability) obtained by the same individual after some period of time. If instead of the same test an equivalent form is used then the reliability is termed as equivalent or alternate form of reliability. When two examiners obtain score by administering the same test to an individual then the correlation between the scores obtained by the two examiners is called as scorer reliability or inter-rater agreement or inter-judge reliability.

Validity:

Validity is an important characteristic of intelligence test. It means the extent to which a test measures what it is supposed to measure. Validity is concerned with the following question: Does a test measure what it wants to measure and how well it measures what it wants to measure. Validity of a test is generally assessed by correlating it with some external criteria. This criterion can be obtained either along with the test score or just prior or immediately after the test score was obtained. Thus, validity of a given test is determined by correlating the scores obtained by the individual on a test as well as scores obtained on some external criteria.

Standardization of Tests:

The number of questions you answer correctly on an intelligence test would tell us almost nothing. To evaluate your performance, we need a basis for comparing it with others' performance. To enable meaningful comparisons, test-makers first give the test to a representative sample of people. When you later take the test following the same procedures, your scores can be compared with the sample's scores to determine your position relative to others. This process of defining meaningful scores relative to a pretested group is called standardization. Standardization is basically concerned with uniformity. By a standardized test we mean a test which is uniform and will remain uniform for all the conditions and subjects. Uniformity should be in the areas of administering, scoring and interpretation of a test.

Norms:

Norms are the scores from the standardization group. Norms are standards (created by the scores of a large group of individuals) used as the basis of comparison for scores on a test. Norms are developed on the basis of empirical data by using a sample (called as normative sample). Norms tell us what is a good or of poor performance. Norms help us to set standards against which we judge an individual's performance on a given test.

3.3 SUMMARY

In this unit we had defined intelligence and discussed the different concepts of intelligence. We have also studied different types of Intelligence Tests. There are three types of tests that we briefly discussed, Binet Mental Ability Test, Stanford Binet and IQ, The Wechsler Tests. Research studies have revealed that there is Individual Differences in Intelligence. Two important components of intelligence were discussed i.e. Mental Retardation and Giftedness. Some important concepts and issues related to intelligence were also discussed such as Emotional Intelligence, Nature v/s Nurture Controversy and The Bell Curve, Is intelligence one general ability or several specific abilities, origins of intelligence testing. Neurologically Measurement of Intelligence were also discussed in brief. Towards the end of this unit we have discussed some Principles of Test construction. Principles of Test construction is a scientific process. Some important topics related to Principles of test construction such as validity; reliability, standardization and norms were discussed in brief.

3.4 QUESTIONS

a) Explain Intelligence in details.
b) Is intelligence one general ability or several specific abilities?
c) Discuss in detail about Intelligence and creativity.
d) Explain emotional intelligence in detail.
e) Discuss in detail about the origins of intelligence testing.
f) Discuss in detail about Modern Tests of Mental Abilities.
g) Explain different Principles of test construction.

Short Notes:
a) Measuring Intelligence.
b) Neurologically Measurement of Intelligence.
c) Binet Mental Ability Test
d) Stanford Binet Test
e) The Wechsler Tests.

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Unit -4

MOTIVATION AND EMOTION – I

Unit Structure :

4.0 OBJECTIVES

After reading this unit you will be able to understand:
➢ The concept of motivation.
➢ Various approaches/theories related to the concept of motivation.
➢ How hunger motivates human beings
➢ Why people become obese (fat) and how to control weight

4.1 INTRODUCTION

In this unit, we will discuss about motivation. Before explaining the concept of motivation, let's ask you some questions that will help you to understand the concept of motivation.

Have you ever wondered why some people regularly go to gym or take part in Marathon even if they are senior citizens or have physical disability? In fact, such people might have been discouraged by their family members. They do not expect to receive any reward or recognition and yet take part with great

enthusiasm. Similarly, the question arises why do people observe fast or go on pilgrimage even though it causes lot of physical discomfort? Why do some people enjoy activities like hiking, playing football while others like to sit down in a corner, with a novel or watch a movie on television?

We can continue raising question "Why" for almost each and every situation in everyday life. By raising the question "why" we are trying to understand the reason or motivation behind the behavior that we observe.

Different people may have different motives for same behavior. For example, a student may take up a course in Psychology because he likes the subject and wants to enhance his knowledge, while another may take up a course in Psychology because this may brighten his career prospects, a third student may take up a course in Psychology because his parents has insisted on it or because of peer pressure.

Different people with same motive may behave in different manner. For example, a person who is hungry may decide to have his lunch to satisfy his hunger while another person may satisfy his hunger by eating a burger or any other junk food.

The motivation issue becomes more complex with the fact that the **same person showing same behavior may have different motives at different stages of life.** For example, a lady who dislikes mathematics, may study mathematics to pass her school exam, but later on, she may study mathematics again with lot of zeal to help her child to cope up with this subject.

These examples highlight the fact that all human behavior takes place in response to some form of internal or external motives /needs or desires. It also shows that motivation is a complex issue and yet necessary to understand so that we can deal with them in much more meaningful and effective way. Now let us try to understand what is motivation.

Definition of Motivation:

The word motivation comes from a Latin word 'movere' which means to move or to energize. **Steers and Porter (1987)** believe that "When we discuss motivation, we are primarily concerned with (1) what energizes human behavior; (2) what directs or channels such behavior and (3) how this behavior is maintained or sustained."

Thus, in another way motivation can be defined as an internal state or condition that activates and gives direction to our thoughts, feelings and actions, and maintains our activity till our goal is achieved.

Characteristics of Motivation:

On the basis of above mentioned definitions and explanation we can deduce following characteristics of motivation.

1. **Motivation is Inferential:** An important characteristic of motivation is that we cannot see it directly. We can only infer it to explain others' behavior. For example, we cannot see hunger, but if we see a person eating food hungrily, we can infer that his behavior is guided by hunger motivation.

2. **Motivation Predicts Behaviour:** Motivation helps us to make predictions about our own or others' behavior. If we understand the motive behind a person's present behavior, we might be in a better position to predict how that person will behave in future.

3. **Motivation is goal directed behavior:** Motivated individuals keep working until they reach their goal.

4. **Multiple motives** - People can have multiple causes for same behavior. For example, a person may take part in adventure sport due to need to risk taking motive, social motivation, escape from boredom, need to overcome fears, need for achievement, etc.

5. **Motivation varies in the type and strength** – People differ in the type and strength of their motives from time to time. Studies have shown that there are two types of motivation that can influence a person. Primary motives and Secondary Motives. Primary motives cater to our need for self-preservation. For example, need for hunger, thirst, warmth, avoidance of pain, etc. Secondary motives are mainly learned motives, and they differ from one person to another. In many ways, they involve a person's own sense of values and priorities in life. Secondary motivation is influenced by socio-cultural factors.

6. **A person may be aware of his motives or may not be aware of his motives** that guide his behavior. Usually a person may automatically respond to primary motives without being conscious of them and may be fully aware of his secondary motives and meticulously plan to achieve them.

4.2 MOTIVATIONAL CONCEPTS

The question, why people behave as they do, has intrigued psychologists for more than a century and has generated lot of research. There is no single answer. Motivation can be triggered by biological, cognitive and social factors. Mayer (2013) aptly suggested that motivation arises from the interplay between nature (the bodily "push") and nurture (the "pull" from our thought processes and culture). However, the complexity of motivation has led different psychologists to develop various conceptual approaches or theories of motivation over the years. Many of these theories of motivation differ in the amount of emphasis they place on either biological, cognitive or social factors but most of them include some level of both (some nature, some nurture).

We will elaborate here on four most prominent theories that have received lot of attention over the years.

Theories of Motivation

4.2.1 Instincts and Evolutionary Theories:

Instincts refer to inborn patterns of behavior that are biologically determined, have a fixed pattern throughout a species, and are not learned behaviors. Early in the 20th century, psychologists were highly influenced by Charles Darwin's evolutionary theory and sought to explain the motivation behind all kinds of behavior in terms of instincts. For example, if people criticized themselves, they explained it in terms of "self-abasement instinct".

Instinct theory argued that people try to survive, and that any quality that increases survival will eventually become genetically based. Psychologists believed that people and animals are born with preprogrammed set of behaviors that are necessary for their survival. These instincts give them the energy that channels their behavior in appropriate direction. For example, sex can be explained as a response to an instinct for reproduction.

William McDougal (1908) viewed instincts as behavior patterns that are unlearned, uniform in expression and universal in a species. For example, within a species of bird, all the members may build identical nests and work in the same ways. This is true even for those birds of that species born and raised in captivity and isolation, and thus could not have learned the appropriate nest building behavior from other, experienced role model birds. McDougal carried it a step further by stating that humans are the same and have instincts for behaviors such as: parenting, submission, jealousy, mating, and more.

Criticism of this perspective:

1. Instead of explaining human behavior, this theory was simply naming them or labeling them in terms of instincts. For example, submissive people possess the instinct of submission. To name a behavior is not same as explaining it.

2. According to it all instincts occur impulsively and therefore people have no control over their behavior. It does not recognize the role of free will.

3. There is a circular argument. The cause (instinct) explains the behavior, but the behavior is proof for its cause.

4. There is no agreement on what, or even how many primary instincts are there. William McDougall (1908) suggested that there are 18 instincts. Other theorists came up with even more. One sociologist scanned 500 books and compiled a list of 5759 supposed to be human instincts.

4.2.2 Drives and Incentives:

After rejecting instinct theory, psychologists proposed **drive - reduction theory**. Let us first understand what is the meaning of drive.

Drive:

A Drive is an internal state of tension/ an unpleasant state that causes us /energizes behavior to do something to reduce or remove that tension. A drive is an arousal that in order to fulfill some need. For example, biological needs arising within our bodies create unpleasant states of arousal – the feelings of hunger, thirst, fatigue, etc. The moment this drive/ arousal or tension takes place, we become active to reduce it or eliminate it.

So, the physiological aim of drive reduction is homeostasis. **Homeostasis** is the body's natural tendency to maintain a steady internal state - a state of physiological equilibrium. For example, our body's temperature regulation works like a room thermostat. If our body's temperature cools, blood vessels constrict to conserve warmth, and we feel driven to put on more clothes or seek a warmer environment. On the other hand, if the body temperature increases, we start perspiring to cool the body and seek to remove extra clothing and seek cooler environment, which finally leads to the restoration of equilibrium.

Basic kinds of drives, such as hunger, thirst, sleepiness, stable body temperature, etc. are called **Primary drives**. According to drive theory, motivation is basically a process in which these primary drives **push (drive)** us to action designed to satisfy these needs. Behaviors that helps us to reduce the appropriate drive are

strengthened and tend to be repeated and those behavior that fail to bring the equilibrium /homeostasis will not be repeated when that drive occurs once again.

Criticism:
1. Drive reduction theory works well to explain the actions people take to reduce tension created by needs, but it does not explain all human motivation. For example, it does not explain why we eat even when they are not hungry?

2. It could not explain behavior in which the goal is not to reduce a drive, but rather to maintain or even to increase a particular level of arousal. For example, some people seek thrills through activities such as racing cars, etc. The question arises why would people do things like these if it does not reduce some need or restore homeostasis? In such cases the concept of homeostasis seems irrelevant.

3. Though, in its original form, drive theory focused primarily on biological needs and the drives they produce. But later on, psychologists realized that motivation may exist without a drive /arousal and therefore extended this model to cover other forms of behavior that was not clearly linked to basic needs, such as drive for stimulation, status, achievement, power, and forming stable social relationships. These are called **secondary drives**. The needs involved in secondary drives are created by prior experience and learning.

Psychologists recognized the fact that we are not only pushed by our need to reduce drive, but we are also **pulled by incentives.**

Incentives:
Incentives are positive or negative stimuli that attract or repel us. Incentives are influenced by an individual's personal experiences or learning in the past. Here we can see a move away from biological influence toward the environment and its influence on behavior. In incentive approach, behavior is explained in terms of external stimulus and its rewarding or repelling properties. The rewarding or repelling properties exist independently of any need or level of arousal and can cause people to act only upon the incentive. Thus incentive theory is actually based on the principle of learning.

For example, if in the past, a person has enjoyed the taste and aroma of freshly made coffee, then while passing outside a coffee shop, the aroma of freshly made coffee can motivate his behavior and he may get pulled (attracted/tempted) towards the coffee shop. When there is both a need and an incentive, we feel

strongly driven. For instance, if you are hungry and you get the aroma of freshly baked bread, you will feel strong hunger drive. The aroma of baking bread becomes a compelling incentive. So, for each motive, we can ask, "How is it pushed by our inborn physiological needs and pulled by incentives in the environment?" In other words, drive reduction theory accepted that our past learning and environment also plays a major role along with physical internal drives in motivating our behavior.

4.2.3 Optimum Arousal:

With more research in the area of motivation, when it became clear to psychologists that we are much more than homeostasis system and people sometimes seek to increase rather than reduce existing drives, another theory of motivation known as "arousal theory" was proposed. This theory focuses on arousal, our general level of activation. After all our biological needs are satisfied, we feel driven to experience stimulation and we hunger for information. Neuroscientists, Irving Biederman and Edward Vessel (2006) said we are **"infovores",** after they identified brain mechanism that rewards us for gaining information. For example, toddlers explore every nook and corner of the house, children love to break their toys to investigate the mechanism inside the toys, people love to travel to new places just to explore what those places look like, etc.

Arousal levels vary throughout the day, from low levels during sleep to much higher levels when we are performing strenuous tasks or activities that we find exciting. The theory suggests that what we seek is not less or more arousal but **optimal level of arousal – the level that is best suited to our personal characteristics and to whatever activity we are currently performing.** If our stimulation and activity levels become too high, it creates stress for us and we try to reduce them. On the other hand, if the levels of stimulation and activity are too low, we feel bored and try to reduce boredom by seeking stimulation and activity. Even though the average person might require an average level of arousal to feel content, there are some people who need less arousal and some who need more. The person who needs more arousal is called a sensation seeks. Sensation seekers seem to need more complex and varied sensory experiences than do other people.

4.2.4 Maslow's Need Hierarchy:

Abraham Maslow proposed that human beings are driven by different factors/needs at different times. When a single need is fulfilled humans seek to satisfy the next need, and so forth. Maslow introduced his theory based on personal judgment and his theory is generally known as the need hierarchy theory. He believed that if people grow up in an environment in which their needs are not met,

they will be unlikely to function as healthy individuals or well-adjusted individuals.

Maslow believed that all needs vary in priority. Some needs have to be satisfied first while the satisfaction of other needs can be delayed. He described these priorities as a hierarchy of needs and arranged them in a pyramidal form to indicate which needs have more priority. The journey of satisfying these needs before graduating to other needs starts from the bottom of the pyramid.

Originally Maslow's (1943,1954) hierarchy of needs pyramid had only five needs – up to self-actualization, but later on it was expanded to include cognitive and aesthetic needs (Maslow, 1970a) and later transcendence needs (Maslow, 1970b). Maslow explained that throughout our life we are dominated by some need or the other. There is not a single moment in our daily life when we are not dominated by some need or the other. Now let us see what these needs are.

1. **Physiological Needs -** These needs include the need for food, water, rest, air, temperature regulation, etc. If these needs are not met, the organism can't survive. Thus, these are the most basic and most important needs. Maslow classified these needs as part of deficiency needs. If these needs are not satisfied, the human body cannot function properly and will ultimately fail. Therefore, once any of these needs is aroused it demands immediate gratification without any delay and a person cannot think of anything else unless and until that particular need is satisfied.

2. **Safety Need–**Once the physiological needs are satisfied, then we get concerned about our safety. **T**hese needs refer more to the long-term survival than day to day needs. In other words, we are faced with the question that just as today we have been able to satisfy our physiological needs and survived peacefully, can we survive in future also.

a. People want physical safety – freedom from threat of war, natural disaster, family violence, childhood abuse. They want order and do not want to live in a world that is not filled with chaos and danger.

b. People want economic safety - For example, all saving schemes, insurance schemes work on the basis of this need only. We choose jobs where we can have job security; we try to improve our qualifications today to ensure that our future is not endangered. We fix safety doors, grills, and cc cameras in our homes, offices to satisfy this need only. People seek out grievance procedures for protecting themselves from unilateral authority and arbitrary decisions.

3. **Belongingness and love –**Once our safety need is satisfied,then we pay attention to other people in our surroundings. People seek out love and affection from family members, friends, and lovers. People long to get into steady long term relationships. It is the need to be loved and to love, to belong and be accepted; need to avoid loneliness and separation.

4. **Esteem -** Once individuals' physical, safety and belongingness needs are satisfied, they look at ways to satisfy their need for developing positive feelings of self-worth and self-esteem, and act to foster pride in their work and in themselves as people. At this level, people are concerned with achievements, mastery, independence, status, dominance, prestige, responsibilities, etc. both at work place as well as in their social circle.

5. **Cognitive** - Needs at this level are based on acquiring knowledge and understanding of the world, people, behavior, etc. If you are in college to learn (not simply to get a degree) then you are attempting to fulfill your cognitive needs. This need also includes curiosity, exploration, need for meaning and predictability. This need is typical of an academician who learns for the sake of gathering knowledge.

6. **Aesthetic -** Aesthetic need includes appreciation and search for beauty, balance and order in life. Humans need beautiful imagery or something new and aesthetically pleasing to continue up towards Self-Actualization. Aesthetics refers to the quality of being creatively, beautifully, or artistically pleasing; aesthetic needs are the needs to express oneself in pleasing ways. Decorating your living room, wrapping birthday presents attractively, washing and waxing your car, and keeping up with the latest styles in clothing are all ways of expressing your aesthetic sense. This need is typical of artistic people.

7. **Self-actualization -** The growth of self-actualization refers to the need for personal growth and discovery that is present throughout a person's life. In self-actualization, a person comes to find a meaning to life that is important to them. As each individual is unique the motivation for self-actualization is satisfied in different ways by different people. For example, people can achieve self-actualization through creating works of art or literature, through sport, in the classroom, or within a corporate setting. This is the highest and most difficult level to reach. In fact, according to Maslow, very few people actually reach this level. Self-actualization is the need to fulfill one's own potential, capacities and talents. As Maslow stated, "What a man can be, he must be."

According to Maslow self-actualizing persons have some common characteristics such as they are - able to look at life

objectively, problem-centered (not self-centered). They are independent and nonconformist. They are democratic, fair and non-discriminating, concerned for the welfare of humanity, accept themselves and others as they are and do not trying to change people. They have deep appreciation of basic life-experiences, establish deep satisfying interpersonal relationships with a few close intimate friends rather than many surface relationships. They have unusual sense of humour directed at oneself or the human conditions in general. They are spontaneous, creative, inventive and original, excited and interested in everything, and have strong moral values.

8. **Transcendence Needs:** Maslow later divided the top of the triangle to add self-transcendence which is also sometimes referred to as spiritual needs. Spiritual Needs are a little different from other needs, accessible from many levels. This need when fulfilled, leads to **feelings of integrity** and take things to another level of being. Transcendence involves helping others to achieve their full potential.

Criticism of the theory:

1. There is little scientific support for this theory. Maslow developed this theory based on his personal observations rather than on any empirical research.

2. There have been many anecdotal evidences indicating that lower needs need not be satisfied before moving over to higher needs. For example, while preparing for an upcoming exam, a student may not eat / sleep a day before exam.

3. Maslow's theory is based on his study of Americans. Cross-cultural research shows that the order of needs in the hierarchy does not always hold true in other cultures.

Check your Progress:

1. Define motivation. What are the characteristics of motivation.
2. Elaborate on any two motivational concepts
3. Write short notes on Instinct theory and Optimal arousal theory of motivation.
4. Write a detailed note on Drives and incentives.
5. Explain the theory of Motivation which is purely based on biological approach.
6. Discuss in detail Maslow's hierarchy of needs.

4.3 HUNGER

Introduction: Hunger as a Motive

Hunger motivation – an urge to eat food is one of the most powerful biological motivation. The power of hunger motivation was very aptly demonstrated by Aneel Keys et.al. (1950) in their experiment. In their experiment, 36 male volunteers went through semi starvation and researchers studied their behavior. Semi-starvation had physical and psychological impact on these men. Without thinking about it, they began conserving their energy; appeared listless and apathetic. They became food obsessed. They talked, day dreamed about food, collected recipes, read cookbooks, and stared at forbidden food. In other words, unsatisfied hunger motivation hijacked their consciousness.

Hunger motivation and eating habits of people today have become a major concern and has been extensively studied. The question arises why do we feel hungry? Research has shown that hunger is a much more complex phenomenon and there are various aspects to it.

4.3.1 Physiological Components of Hunger:

Generally, we know that hunger takes place due to empty stomach. But this is not the only cause. There are other causes also that activate hunger.

a) **Hunger Pangs/ Stomach Contraction:** In an earlier experiment, Canon(1912) believed that the source of the hunger motivation was hunger pangs or stomach contractions. When the stomach is empty, contractions occur and are sensed and they are the signals for feelings of hunger. Canon believed that the presence of food in the stomach would stop the contractions and appease the hunger drive. But it was found that in many cases, empty stomach is not the only deciding factor. Recent research studied showed that people reported feeling hungry and ate food even after their stomach was removed.

b) **Body Chemistry and the Brain:** Human beings and other animals automatically regulate their caloric intake to prevent energy deficits and to maintain a stable body weight. Body does this automatic regulation of calories intake through **'Glucose' or 'Blood sugar'**. Pancreas in our body produce hormones called **insulin and glucagon** that control the levels of fats, proteins and carbohydrates in the whole body, including blood sugar. Insulin reduces the level of glucose in the blood stream while glucagons increase the level blood glucose levels. When glucose drops below a certain level, our brain triggers the feeling of hunger and people eat. When the glucose level in the blood exceeds a certain point,

they feel satiated and stop eating. If your blood glucose level drops, you may not consciously feel this change. But your brain, which is automatically monitoring your body's internal state, will trigger hunger. This is the reason why dieticians ask a person to take low-carbohydrate diet. Low carbohydrate will control the insulin reaction and prevent hunger cravings.

c) **Hypothalamus:** Brain receives the messages from stomach, intestine and liver about glucose level in body and accordingly triggers hunger. However, stomach and pancreas are not the only factors influencing our hunger. The hypothalamus in our brain also plays a significant role in controlling the hunger. The hypothalamus has two parts that control our eating behavior. These two parts are–
1. **The Ventromedial Hypothalamus (VMH)**
2. **The Lateral Hypothalamus (LH).**

1. The ventromedial hypothalamus (VMH) is involved in stopping the eating response **when glucose levels in the blood go up**. For example, in one experiment, rats whose VMH areas were damaged could not stop eating. The kept eating until they were quite overweight (looked almost like a football).

2. The Lateral Hypothalamus (LH) influences the onset of eating behavior when **insulin levels go up in the blood**. If this area of hypothalamus is damaged, rats stop eating to the point of starvation. They would eat only when they are force fed. Blood vessels connect the hypothalamus to the rest of the body, so it can respond to our current blood chemistry and other incoming information. One of its task is to monitor the levels of appetite hormone such as ghrelin, a hunger arousing hormone secreted by an empty stomach. During bypass surgery for severe obesity, doctors seal off part of the stomach. The remaining stomach then produces less ghrelin, and the person's appetite lessens. Other appetite hormones are leptin, PYY and orexin. Orexin triggers hunger while the other two reduce hunger.

Weight Set Point and Basal Metabolic Rate:
Hypothalamus affects the particular level of weight that the body tries to maintain. This is called weight set point. When semi starved rats fall below their normal weight, the weight thermostat (that is complex interaction between appetite hormones and brain activity) signals the body to restore the lost weight. Hunger increases and energy expenditure decreases. If body weight rises, as it happened when rats were force fed, hunger decreases and energy expenditure increases. This stable weight toward which semi starved and overstuffed rats return is their weight set point.

Metabolism – the rate at which the body burns available energy for maintaining basic body functions when the body is at rest. When

people don't get enough food for a long time, to maintain their set point, they reduce their energy expenditure, partly through inactivity and partly by dropping basal metabolic rate. Metabolism and exercise also play a part in the weight set point.

Some researchers, however, doubt that our bodies have a preset tendency to maintain optimum weight. They point out that slow, sustained changes in body weight can change one's set point and that psychological factors also influence our feeling of hunger. With unlimited access to a wide variety of food, people as well as animals, tend to overeat and gain weight. Therefore, researchers have given up on the idea of biologically fixed set point and now they prefer the term settling point. Settling point indicates the level at which a person's weight settles down in response to caloric intake and expenditure, which is influenced by biology and environment both.

The rate at which the body burns energy when a person is resting is called the basal metabolic rate (BMR) and is directly tied to the set point. If a person's BMR decreases, that person's weight set point increases. The BMR decreases more dramatically as the age of the person increases. Adolescents can eat far more than an adult of the same size and not gain weight. In adulthood, the BMR begins to decline. If the eating habits of the teenage years are maintained, adult will gain excessive weight in no time.

4.3.2. The Psychology of Hunger:

The question arises is hunger controlled and regulated by biological factors only or whether psychological, cultural and situational factors can also influence the feeling of hunger and eating behavior? The answer is, along with biological factors, all these factors mentioned above also play a very significant role in driving and regulating the feeling of hunger.

A) Eating is a learned Behavior:

People often eat even when they are not hungry. Many of them eat breakfast, lunch and dinner at certain times just because it is the convention, that is, it is lunch/dinner time. A large part of this convention is result of our classical conditioning. The body becomes conditioned to respond with the hunger reflex at certain times of the day, through association with the act of eating at those times of the day. For example, a person who has just had late breakfast will still feel hungry at noon, simply because the clock says it's time to eat.

B) Memory:

Cognitive factors too play a part in eating behavior. For example, Rozin et.al.(1998) conducted an experiment to show that apart from internal cues from 9our bodies, memories about when

we last ate can influence whether we decide to eat and how much we eat at a given time. For their experiment, they tested two patients with amnesia, who could not remember recent events - events occurring more than a minute ago. Both patients were offered lunch at lunch time and after 20 minutes they were again offered lunch, which they readily consumed. 20 minutes after their second lunch they were again offered lunch, a third time. One of them ate part of the third meal also. They were asked to rate their hunger before and after the meal. Both of them had rated their hunger less after having first meal than before it. Yet, in spite of not being hungry, they went ahead and had second meal and partly the third meal also because they could not remember that they had just eaten.

C) Taste Preference:

Very often, you must have noticed that a person enjoying dinner at a wedding party comments that he has over eaten and now he cannot consume another morsel, but while passing in front of dessert counter he gets tempted by the sight of his favorite ice-cream and gulps down a large helping of that ice-cream. The reason is that biological and cultural factors play a significant role in our taste preference.

Biological Factors: It has been observed that people crave to have starchy, high in carbohydrate food especially when they are tense or depressed. Carbohydrates help boost levels of the neurotransmitter serotonin, which has calming effects on our nerves. Though preferences for sweet and salty taste are genetic and universal but other taste preferences are conditioned. If people are given highly salted food from childhood, they develop a liking for excess salt. Same is true for spicy food. People who become sick due to food (food poisoning) develop an aversion to it and avoid to eat that food in the future that caused them food poisoning.

Culture also affects the taste preference: Indian children are used to eating spicy food and like it that way while European kids are used to bland non-spicy food and can't tolerate even the smell of spicy curries from the neighborhood.

Taste preferences are adaptive. For example, the spices are used in hot climate countries, especially in non-vegetarian dishes because meat spoils quickly in hot climate and spices inhibit the growth of bacteria. Pregnancy related nausea and food aversions peak during the 10th week of pregnancy because the developing embryo is most vulnerable to toxins at that time.

Both human beings and animals avoid unfamiliar food, especially animal based foods. Sociobiology explains that this dislike of things unfamiliar was adoptive for our ancestors. It

protected them from potentially harmful/toxic substances. So, there is biological wisdom to our taste preference. Cultural trends can also influence the human genetics that affect their diet and taste. For example, where milk is available in abundance, survival patterns have favored people with lactose tolerance.

D) Situational and Cultural Factors Influence Eating Behavior:

People eat more when they eat with others. This is the reason why after participating in celebrations, we realize that we have over eaten.

Cultural factors also play a major role in determining what, when, and how much we eat. Andrew Geier et.al. (2006) conducted a research to show cultural influence on eating habits. They observed that French people offer foods in smaller portion sizes. That is why they are much slimmer than Americans. Their research found that when people are offered large size portions, they consume that entire large size portion and gain more calories. They called this **unit bias.**

Food Variety: We tend to eat more when there is more variety of food to choose from. From biological point of view, this tendency makes sense. When food is available in plenty and in variety, eating all types of food provides vitamins and minerals and produce fat that used to protect our ancestors in winter or famine when food was not available. But, now when food is available in abundance, if a person wants to control his waistline, he needs to follow certain rules as follows –

➢ Before eating with others, they should decide how much they wish to eat
➢ Make sure to take small size portions of the food
➢ Not to go for second helpings.
➢ Food should be served with smaller bowls, plates and utensils.
➢ Variety should be limited and
➢ Appealing food should be kept out of sight.

Check your Progress

1. Define hunger. What are the physiological causes of hunger?
2. Define hunger. What are the psychological causes of hunger?
3. Write short notes on the following:
a) Role of Hunger Pangs and Blood Glucose in regulating hunger
b) Role of Hypothalamus in regulating hunger
c) Weight Set Points
d) Hunger influenced by classical conditioning and memory
e) Taste Preference and Eating Behavior
f) Food Variety and situational factors influencing eating behavior
g) Cultural influence and gender differences in eating behavior

4.3.3 Obesity and Weight Control:

Being overweight and obesity is a growing problem all over the world and it has taken the shape of an epidemic. In a survey conducted in 2007 by World Health Organization, it was estimated that worldwide more than one billion people are overweight and out of that three million are obese - that is they had body mass index of 30 or more.

The question arises why being overweight is alarming for us? If we look back at folk wisdom, in earlier centuries, being thin was considered bad and unattractive while people used to find heavier bodies attractive. Obesity was a symbol of affluence and social status. It was believed that our bodies store fat for good reasons. Fat is an ideal form of stored energy – a high calorie fuel reserved to carry the body through periods when food is scarce. Scarcity of food was a common occurrence in our prehistoric ancestor's time. So the convention was to consume when they found energy rich fat or sugar. However, in present times, in most parts of the world food is available in abundance and this convention has now become dysfunctional.

A) Impact of being overweight or obese:

a) Biological: Being overweight has become a health hazard. Studies have shown that obesity increases the risk of diabetes, high blood pressure, heart disease, gallstones, arthritis and certain types of cancer and shortens life expectancy.

b) **Cognitive:** Recent research has linked women's obesity to their risk of deteriorating cognitive abilities, including Alzheimer's disease and loss of brain tissues, in late life. Gunstad et.al. (2011) found in their experiment that memory performance improved for severely obese people, 12 weeks after they went through weight loss surgery and lost significant weight.

c) Social: Obesity can be socially toxic. It affects the way you are treated by others and how you feel about yourself. The stereotype of obese people is that they are lazy, slow, undisciplined, less sincere, less friendly, meaner and extremely unpleasant.

Gortmakeret.al. (1993) conducted a longitudinal study on 370 obese women and found that even after 7 years two third of them were still obese and were earning less money than an equally intelligent group of non-obese women and they were less likely to get married. Similarly, Regina Pingitore et.al. (1994) studied the impact of discrimination based on weight. They found that when the same person appeared as overweight applicant he/she was considered as less worthy of hiring than when he/she appeared as normal weight person. Weight bias was especially strong against women.

Weight discrimination is worse than race and gender discrimination. It occurs at every stage of employment. Overweight people (especially women) have less chance of getting hired and promoted, they are paid less and chances of their getting punished for indiscipline and getting sacked from the job are much higher. The prejudice against weight appears early in life. Children show contempt and disdain towards fat children and even towards normal weight friends of fat children. Obese children are bullied more.

d) Psychological Well-Being: Obesity is linked to lower psychological well-being, especially among women. Obese women are more likely to suffer depression, body dissatisfaction and low self-esteem.

B) The Causes of Obesity:

1) Biological Factors:

I. **Set Point and Metabolism:** People become fat because they consume more calories than they expend and to reduce weight they go on diet. That means they reduce their food/ calorie intake. In most of the cases dieting does not help. Why? This is because once we become fat, we require less food to maintain our weight than we did to attain it. Fat has a lower metabolic rate than does muscles. That means fat takes less food energy to maintain itself. So when an overweight person's body drops below its previous set point/settling point, the person's hunger increases and metabolism slows down. The body adapts to starvation by burning off fewer calories. Bray (1969) reported that in amonth-long experiment, obese patients' daily food intake was reduced from 3500 calories to 450 calories but they lost only 6% of their weight. The reason was that their metabolic rate dropped by 15% only as a result of starvation.

II. **Physical Activity:** In another experiment, Levine et.al. (1999) overfed volunteers an extra 1000 calories a day for 8 weeks. They found that those who tended to spend their extra calorie energy by fidgeting more, gained least weight. Lean/slim people have a natural tendency to move around much more rather than sitting at one place for long time.

III. **The Genetic Factors:** Studies have shown than genes influence body weight. For example, it was found that –
   i. In a family, if two children are adopted , then in spite of sharing same family meals, their body weights are not similar to each other and are not similar to their adoptive parents also. Their body weightsare similar to their biological parents' body weight.

ii. Another study reported that identical twins have closely similar weights even when they are reared apart.

iii. It was also found that if parents are obese then the chances of a boy being obese are 3 times more and the chances of girl being obese are 6 times more, compare to children of normal weight parents.

iv. Scientists have identified many different genes that influence body weight. For instance, a variant of a gene called FTO nearly doubles the risk of becoming obese.

IV. **Hormonal Factors:** Scientists now believe that a hormone called leptin plays a key role in appetite control. Leptin is a protein that is secreted as a hormone by the fatty tissues of the body. Leptin enters the bloodstream from the fat cells, traveling to the hypothalamus in the brain and causes the hypothalamus to signal the body to either stop eating or to eat more. When enough food is consumed, high levels of leptin are produced that cause the appetite to decrease. A low level of leptin signals a condition of starvation and increases the urge to eat. Scientists conducted experiments on obese rats by giving them a high dosage of leptin and expected it to decrease the appetite and result in weight loss for the mice. However, it was found that certain obese mice initially responded to leptin as it was expected but later on did not lose weight when leptin levels were increased. They developed a resistance to leptin, suggesting that their bodies can respond only to certain levels of leptin, and when the level goes too high, the body stops responding, allowing appetite to remain out of control. The studies are suggesting that once we have gained a significant amount of weight, our sensitivity to leptin actually decreases.

2) Environmental Factors:

I. Sleep Loss: Studies in Europe, Japan and the United States indicate that those who suffer from sleep loss tend to be obese because with sleep deprivation, the levels of leptin (which reports body fat to the brain) fall, and ghrelin (the appetite-stimulating stomach hormone) rises.

II. Social Influence: Social influence is another important factor in gaining weight. A longitudinal study conducted over 32 years found that people are most likely to be obese when a friend becomes obese. If the obese friend happens to be a close one, the chances of your also becoming obese increase by three times.

III. The Food and Activity Factor: People from developed as well as developing countries are getting heavier and obesity has reached an alarming proportion. One of the most important reason

for this phenomenon is our changing food consumption habits and activity levels. We are eating more and moving less. Increasingly, jobs requiring physical activity are declining and technology is enabling us to do everything at the click of the button (remote control). We have put fast food on every corner, junk food in our schools, we have got rid of physical education classes, we put chocolates and soft drinks at the payment counters in malls and every other shop. Junk food is available on every road and street, in every nook and corner.

C) Weight Control:

With set point, metabolism and genetic and environmental factors always working in favor of obesity, it is not easy to lose weight permanently. Many people lose weight successfully but it all comes back with vengeance the moment they are not vigilant.

Psychologists believe that obesity is neither the result of any personality maladjustment, nor it is due to lack of will power. In fact, continuously trying to be thin puts people at the risk of binge eating, food obsession, weight fluctuations, malnutrition, smoking, depression, and harmful side effects of weight loss drugs. It is better to accept oneself as a bit heavy than to diet and binge and feel continually out of control and guilty.

4.3.4 Close Up: Waist Management:

Researchers have offered some tips for managing your waist line.

1. Managing waist line requires being self- motivated and self-disciplined. Permanent weight loss requires a lifelong change in eating habits and increased exercise.
2. Minimize exposure to tempting food cues - keep tempting food out of the house. Go for buying food items only when you have eaten and your stomach is full. Avoid the counters where sweets and chips or other fried items are kept.
3. Eat simple meals. If there is more variety, people consume more.
4. Exercise empties fat cells, builds muscles, speeds up metabolism and helps lower your settling point, especially when supported by 7 to 8 hours of sleep a night.
5. Eat healthy food – Whole grain, fruits, vegetables and healthy fats such as those found in olive oil and fish help regulate appetite and artery clogging cholesterol.
6. Don't starve all day and eat one big meal at night - It slows down metabolism. Those who eat a balanced breakfast are by late morning more alert and less fatigued.
7. Eat slowly that will lead to eating less. Don't consciously restrain your eating, drinking alcohol, and don't feel anxious or depressed about being overweight. This can trigger the urge to eat.

8. Keep monitoring your eating, especially when you are eating with your friends. One tends to eat more with friends. Once a diet is broken, a person has a tendency to binge eat. So, make sure a lapse should not become full collapse.
9. Connect to a support group- Join with others, either face to face or online, with whom you can share your goals and progress.
10. Don't sit with any kind of food or drink while watching television or a movie. Consciously unlearn that behavior.

Check Your Progress:
1. Define Obesity. What is the impact of obesity and how waist management can be done?
2. What are the causes of obesity.
3. Write a short note on waist management.

4.4 SUMMARY

You would recall that we have touched upon the three learning items in this unit- Motivational, Hunger and Obesity.

In motivation, we have dwelled into definition and characteristics of motivation, four theories of motivation- instinct and evolutionary theory, drive-incentive theory, optimum arousal theory and Maslow's hierarchy of needs.

In hunger motivation, we have looked at physiological causes such as hunger pangs, body chemistry and role of hypothalamus, weight set point and metabolic rate. In psychology of hunger we have discussed that eating is a learned behavior. Apart from that memory, taste preference, situational and cultural factors also influence eating behavior. In obesity, we looked at what is obesity, why it is important to study obesity and what causes it and in waist management we pondered over how we can reduce and manage our weight. It is important to study obesity due to biological, cognitive, social, and psychological issues. It is caused due to biological and environmental reasons and tips to control it.

4.5 QUESTIONS

1. Write short notes on

   a.) Instinct theory of motivation
   b.) Drive and Incentive theory
   c.) Motivation and optimal arousal theory of motivation
   d.) Physiological causes of hunger
   e.) Psychological causes of hunger
   f.) Waist management

2. Discuss in detail Maslow's hierarchy of needs.

3. Discuss in detail physiological and psychological causes of hunger.

4. Elaborate on what are the causes of obesity and how can you manage weight?

4.6 REFERENCES

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Unit -5

MOTIVATION AND EMOTION-II

Unit Structure :

5.0 OBJECTIVES

After reading this unit, you will be able to understand –

➢ The concept of Need to Belong and its usefulness for human beings
➢ The concept of ostracism and why it is a painful experience
➢ The concept of social networking, its social effects and how to maintain balance between real world and virtual world.
➢ Historical theories of emotion and what is the connection between cognition and emotions
➢ The physiology of emotions
➢ How to detect emotions expressed by others
➢ The causes and consequences of anger
➢ The causes and consequences of happiness
➢ The techniques of being happier

5.1 THE NEED TO BELONG: INTRODUCTION

Aristotle wrote that all human beings are social animals. Even if people have all resources and amenities to live life comfortably, but no social contact with other human beings, they will choose not to live. They will prefer to live with others, even if it means to live with limited resources. We all have a need to affiliate with others, even to become strongly attached to certain others in long lasting close relationships. Alfred Adler called it an "urge to community". The question arises why do we have such strong desire to affiliate with others. Psychologists believe that need to belong is beneficial for human beings.

5.1.1 Aiding in Survival:

Evolutionary psychologists explained that social bonds increased the survival rate of our ancestors who were living in forests and caves. Survival was enhanced by cooperation. In solo combat, our ancestors could not fight back other animals who were much stronger than them. Similarly, to get food by hunting, fishing or by just collecting from plants, our ancestors realized that it is better to hunt in team and share the spoils rather than try to hunt individually. Travelling in group gave every one of them protection from predators and enemies.

Psychologists believe that all human beings have a strong instinct to propagate their genes in next generation. As adults, those who formed attachments were more likely to reproduce (have children) and to co-nurture their offspring to maturity. By keeping children close to their caregivers, attachments served as a powerful survival impulse. Those who felt a need to belong survived and reproduced more successfully. So being social is there in our genes.

Good Health: Studies have shown that people who feel supported by close relationships are the ones who live longer with better health and at a lower risk of psychological disorder than those who do not have social support, e.g. It was observed that married people are less at risk for depression, suicide and early death. Social isolation puts us at the risk of declining mental and physical health.

5.1.2 Wanting to Belong:

Most people report close, satisfying relationships with family, friends, or romantic partners is the first and foremost requirement for their happiness and meaning in life. (Berscheid, 1985) Studies show that money does not make a person happy, rich and satisfying close relationship do. A person may be very rich and yet unhappy and lonely. When our need to belong is satisfied in balance with psychological needs of autonomy (having a sense of personal control) and competence, we experience a deep sense of well-being. (Deci & Ryan (2002). When we feel included, accepted and loved by those who are important to us, our self-esteem goes up. Therefore, most of our actions are aimed at increasing our social acceptance. To avoid rejection, we generally **conform to** group norms and try to make favorable impressions.

The need to belong influences our need to define who we are. We express our identity in terms of faithful relationships and loving families. We proudly say that I belong to so and so family. However, our need to define who we are can be expressed in negative way also. For example, we may become part of teen gangs, we may become part of ethnic rivalries (our identity as Hindu, Muslim, or Sikh, etc.) and fanatic nationalism.

5.1.3 Sustaining Relationships:

It is well known that generally familiarity produces liking. Think of it. In a new class or conducted vacation trips, initially, we are indifferent to other students/participants, who are total strangers for us, but by the end of the course/ vacation trip, parting ways and breaking social bonds becomes a distressing experience and we promise to keep in touch with each other. These friendships with at least some of them becomes lifelong.

Our strong desire to maintain relationships with others, no matter how bad or abusive, are due to our fear of being alone. Studies on abusive relationships have shown that people prefer to stay in abusive relationships and suffer emotional and physical abuse rather than face the pain of being alone. People suffer emotional trauma even when bad relationship breaks down. After separations, people have feelings of loneliness and anger. Sometime they have strange desire to be near the former partner even if the relationship with former partner was not good.

Children who move through a series of foster homes or through repeated family relocations, with repeated disruptions of budding attachments, may have difficulty in forming deep attachments in later life. (Oishi & Shimmack, 2011). It has been observed that children reared in institutions have no sense of belonging to anyone, or children locked away at home under extreme neglect become pathetic beings – withdrawn, frightened and speechless.

Life's best moments occur when close relationships begin, e.g., when new friendship develops, we fall in love or when a new baby is born in the family. The worst moments of life take place when close relationship comes to an end. When some situation threatens, or dissolves our social ties, we experience extreme anxiety, loneliness, jealousy or guilt. When a person loses a life partner, he or she feels that life has become empty and meaningless. For immigrants and refugees moving alone to new places, the stress and loneliness can lead to depression for them. But if the feeling of acceptance and connection increases, then our self-esteem, positive feelings and desire to help others instead of hurting others also increases.

5.1.4 The Pain of Ostracism:

This social exclusion is called ostracism. For centuries together, humans have controlled social behavior by using the punishing effect of severe ostracism. In extreme form, it can be in the form of exile, imprisonment or solitary confinement. In milder form, it can be being excluded, ignored or shunned by your friends, being given a silent treatment by not talking to you, by avoiding you or averting his/her eyes in your presence or even making fun of you

behind your back. Williams & Zadro (2001) stated that being shunned – given the cold shoulder or the silent treatment, with others' eyes avoiding yours- threatens one's need to belong. This is the meanest thing you can do to someone, especially when you know that the other person can't fight back. Even just being linguistic outsider among people speaking a different language that you can't speak or understand must have made you feel excluded.

People often respond to social ostracism with depressed moods. In the beginning, they try to restore their acceptance and if they don't succeed, they go into withdrawal. People lose their self-esteem and their weight drops. Experiencing cyber-ostracism is equal to experiencing real pain. Ostracism (in the form of being ignored in a chat room or email going unanswered) even by strangers or by a despised out group takes its toll on the victim. It activates the same area of brain that is activated in response to physical pain. (Williams et.al.,2006).

When people experience rejection, and cannot rectify the situation they seek new friends or gain stress relief by strengthening their religious faith. They may turn nasty, may indulge in self- defeating behaviors, may underperform on given tasks, may not empathize with others and are more likely to behave aggressively, especially towards those who had excluded them.

5.1.5 Social networking:

Since social relationships are essential for leading a healthy life, it is but natural for us to see how the progress of communication technology has significantly impacted satisfaction of our need to have social contacts. Technology has changed the way we connect with others and communicate. Texting, e-chatting and e-mailing has replaced phone talking. With social networking being pervasive in all aspects of our life it is important for us to see how it impacts us.

The Social Effects of Social Networking:

As electronic communication becomes part of new normal, researchers are exploring how these changes affect our relationships. The question asked by psychologists is **"Are Social Networking Sites Making Us More Or Less Socially Isolated?"** Research has reported that when online communication in chat rooms and during social games was mostly between strangers in the internet's early years, adolescents and adults who spent more time online spent less time with friends, and their offline relationships in real world suffered.

Bonetti et.al. (2010) reported that lonely people tend to spend greater than average time online. Social networkers are less likely to know their real-world neighbors, and compared to non-

internet users, are 64% less likely to rely on neighbors for help either for themselves or for their family members.

However, social networking has its own **advantages** also. The internet is diversifying our social networks. It is possible to connect with likeminded people having similar interest from all over the world. Geographical boundaries are broken. To a large extent, social taboos are also broken. Despite the decrease in neighborliness, social networking is mostly strengthening our connections with people we already know. For example, we form groups on Facebook and WhatsApp. If Facebook page helps you to connect with friends, stay in touch with extended family, or find support in facing challenges, then you are not alone.

Another phenomenon noticed on social networking sites is that people disclose personal information to perfect strangers or for the whole world to see that in normal circumstances they will not like to disclose in real life. This observation brought another important question to psychologists – **Does Electronic Communication Stimulate Healthy Self-Disclosure?**

Mental health experts point out that confiding in others can be a healthy way of coping with day to day challenges. Very often we find that people pour out their woes on social networking site. For example, it was reported in TOI, dated 16th May 2017, that a film producer of Marathi films posted his suicide note on Facebook before committing suicide. This is not isolated news. Before that also, media has reported many such incidents. The question arises why people disclose their distress on social networking sites rather than talking to somebody in their vicinity. There can be many reasons for it such as:

1. People may not have any close friends to whom they can communicate face to face about their problems.

2. While disclosing our distress face to face, we are not sure how the other person is going to react. We are vulnerable and self-conscious. It makes us feel weak and hits our self-esteem. On the other hand, while communicating electronically rather than face-to-face, we often are less focused on others' reactions, feel less self-conscious and thus feel less inhibited. We become more willing to share our joys, worries and vulnerabilities. Sometimes, this disinhibition can take an extreme form. For example, people indulge in sexting, teens send nude photos of themselves to their internet friends, youth are "cyber-bullied" or trolling takes place, hate groups post messages promoting bigotry or crimes.

3. Self-disclosure can also help to deepen friendships. Even if our friendship with internet friends gets stronger, we crave to meet them face to face. This is because nature has designed us for face to face communication, which appears to be better predictor of life satisfaction. Texting and e-mailing are rewarding but having face to face conversation with friends and family is more enjoyable.

There are all sorts of people in virtual world just as they are in real world. Some people are honest, loving good human beings and some are cheats, criminals/ predators. Psychologists wondered whether people reveal their true selves on internet. So the next question is –**Do Social Networking Profiles and Posts Reflect People's Actual Personalities?**

Beck et.al. (2010) found that ratings based on Facebook profiles were much closer to the participants' actual personalities than to their ideal personalities. This indicated that generally social networks reveal people's real personalities. In another study, it was found that people who seemed most likable on their Facebook page also seemed most likable in face to face meetings also. This also indicates that Facebook profile reflects real personality of the person.

It has been observed that most of the people using social networking sites are mainly talking about themselves. It is always about me, my life, my family, my thoughts, my experiences etc. So, another question that intrigued psychologists was - **Does Social Networking Promote Narcissism?**

Narcissistic people are self – focused, self- promoting and have an unusual sense of self – importance. They like to be the center of attention. Such people on Facebook compare the number of friends they have, the number of likes they get from others, compared to their other friends. They are very active on social media. Just to feel the pleasure of having maximum number of friends, they collect more superficial friends. They post more staged, glamorous photos of themselves just to get more likes. Anyone who visits their Facebook page can judge that they are narcissists. So, social media is not just a platform for all narcissists to gather there, but it also satisfies their narcissistic tendencies

Maintaining Balance and Focus:
The question arises how to maintain balance between our real world and the virtual world. Some of the suggestions offered by experts are as follows:

1. **Monitor your time:** Keep a diary and see whether the way you use your time reflects your priorities. Check whether the time

spent on internet is interfering with your academic and work performance and whether it is eating your time with friends and family.

2. **Monitor your Feelings:** Check how you feel when you are not online. If you feel anxious and restless, if you keep thinking about social networking sites all the time even when you are in class or at work, then you are getting addicted to social networking sites and you need help.

3. **"Hide" your more distracting online friends:** Before posting anything on your social networking sites, ask yourself, is it something that I would like to read if somebody else had posted it?

4. **Try turning off your handheld devices(mobiles) or leaving them elsewhere:** Cognitive psychologists point out that we cannot pay full attention to two things at a time. When you do two things at once, you don't do either of them as well as when you do them one at a time. So while studying, resist the temptation to check your social networking sites like WhatsApp / Facebook. Disable sound alerts and pop-ups.

5. **Try going on Internet "Fast":** That means decide to go off internet for five hours/ten hours or one day.

6. **Recharge your focus with a natural walk:** Research has shown that walking in a quiet garden or in a forest recharges people's capacity for focused attention rather than walking in a busy street.

Check your Progress
1. Explain in detail the importance of need to belong in our lives.
2. Discuss in detail social networking.
3. Write a short note on methods to balance virtual world with real world.

5.2 COGNITION AND EMOTIONS

Emotions are responsible for the finest inhuman achievement and for the worst in history. They are the source of pleasure as well as sorrow in our life. Negative and long lasting emotions can make us sick. So, what are emotions? Emotions are our body's adaptive response. They exist to give us support for our survival. When we are faced with a challenge, emotions focus our attention and energize our actions. (Cyders & Smith, 2008). Emotions are a mix of bodily arousal (heart pounding), expressive behaviors (quickened pace) and conscious experience, including thoughts and feelings (panic, fear, joy). (Mayers D.G.,2013)

Historical as well as current research has been trying to find answer to two questions

1. Whether bodily arousal comes before or after we emotional feelings?
2. How do thinking (cognition) and feelings interact?

5.2.1 Historical Emotion Theories:

1) A. James Large Theory: Arousal Comes Before Emotion

Common sense suggests that first we experience a feeling and then consequently comes our action, e.g., we cry because we are sad, tremble because we are scared. But James-Lange theory proposes exactly opposite of that and states that feeling comes as a consequence of our action, e.g., we feel sorry because we cry.

In other words, James and Lange would say, "I feel sorry because I cry, I feel afraid because I tremble". If a person sees a bear while walking along in the woods, James and Lange would suggest that the person would tremble and then realize that, because they are trembling, they are afraid. He further stated that without the bodily states following on the perception, the latter would be purely cognitive in form, pale, colorless, destitute of emotional warmth. We might then see the bear, and judge it best to run, receive the insult and deem it right to strike, but we should not actually feel afraid or angry.

2) The Cannon-Bard Theory:

Cannon disagreed with James-Lange Theory and stated that people who show different emotions may have the same physiological state, e.g., cry when happy and sad. The body's responses such as heart rate, perspiration and body temperature are often too similar and too slow to cause different emotions, which erupt very quickly, e.g., does racing heart signal fear, anger or love? Physiological arousal may occur without the experience of an emotion, e.g., exercise increases heart rate no emotional significance. Cannon - Bard explained that our bodily responses and experienced emotions occur separately but simultaneously, e.g., The emotion triggering stimulus travels to sympathetic nervous system, causing body's arousal. *At the same time*, it travels to brain's cortex, causing awareness of emotion. So, my pounding heart did not cause my feeling of fear, nor did my feeling of fear cause my pounding of heart.

However, Cannon-Bard's theory has been criticized by those doing research on spinal cord injuries. It was reported by them that patients with high spinal cord injury (those who could feel nothing below neck) reported changes in their emotions' intensity. Patients reported that the intensity of experienced emotion such as anger

has come down drastically. One patient reported that "Anger just doesn't have the heat to it that it used to…" But other emotions that are expressed mostly in body above the neck were felt more intensely, e.g., these patients reported increase in weeping, lumps in the throat and getting choked up when saying good-bye, worshipping or watching an emotional movie. This indicates that our bodily responses feed our experienced emotions.

5.2.2 Cognition Can Define Emotion: Schachter and Singer's Two Factor Theory:

Schachter and Singer maintain that we don't automatically know when we are happy, angry, or jealous. Instead, we label our emotions by considering situational cues. Our physical reactions and thoughts together create emotions. So, there are two factors – physical arousal and cognitive appraisal. They also talked about **spillover effect**. some element in the situation (e.g., you have come home after a rigorous exercise) must trigger a general, nonspecific arousal marked by increased heart rate, tightening of the stomach, and rapid breathing. At that time, you get the good news that you have got the job that you wanted for a long time. You will feel more excited because of lingering arousal from the exercise. You would not have felt the same intensity of excitement if you had just woken up from sleep.

To show this spillover effect, they conducted an experiment in which volunteered were told that experiment was about the effects of a vitamin called Suproxin. After volunteers consented they were injected with epinephrine or a placebo. Epinephrine triggers a feeling of arousal and generally increases blood pressure, heart rate, and respiration. Thus, the men who received the epinephrine were more physiologically aroused than those who received the placebo. Schachter and Singer reasoned that once the epinephrine's effects take place, participants would begin to search for the cause of their arousal and their reaction would depend on the available situational cues. After administering injection, all participants were asked to wait in a waiting room, where another person (actually an accomplice of the experimenters) was already present. This accomplice acted either euphoric or irritated.

Before going into the waiting room some of the epinephrine injected participants were told that there are some common side effects of the drug - they might feel flushed, their hands might shake, and their hearts might pound. The other subjects, in contrast, were given no information at all about the effects of the drug. Once the effect of epinephrine kicked in, people who were told beforehand that the drug would arouse them felt no emotion and assumed that the drug was causing their hands to shake and their heart to pound and those who weren't told about the drug's effects, interpreted their arousal as an emotion. As Schachter and

Singer had predicted, the physiologically aroused subjects who hadn't been told about the drug's side-effects responded with motions that matched the confederate's actions. If they were aroused and hadn't been expecting the arousal, then they felt happy when the other person, i.e., confederate, was happy, but angry when the other person was angry. Forewarned subjects and unaroused subjects who received a placebo did not display any pronounced emotion. This finding that arousal state can be experienced as one emotion or the other depending on how we label it has been replicated in many other studies, indicating that arousal fuels emotions, cognition channels it.

5.2.3 Cognition May Not Precede Emotion: Zajonc, LeDoux and Lazarus' Theory:

Zajonc believed that some of our emotional reactions involve no deliberate thinking. He that our emotional responses follow two different brain pathways. Some emotions such as hatred and love travel a "high-road" while other emotions such as simple likes, dislikes and fears take "low road". This low road is like shortcut that enables our emotional response before our intellect interferes.

Lazarus said that our brains process vast amount of information without our conscious awareness and that some emotional responses do not require conscious thinking. Much of our emotional life operates via the automatic, speedy low road. However, we still need to appraise a situation to determine what we are reacting to. This appraisal may be effortless and we may not be conscious of it. In other words, he said that emotions arise when we appraise an event as harmless or dangerous, whether we truly know it is or not, e.g., we appraise the sound of the rustling bushes as the presence of danger. Later on we might realize that it was just the wind. So, some emotional responses-especially simple likes, dislikes and fears involve no conscious thinking, e.g., we may fear a snake and our emotion may not change in spite of knowing that snake is harmless. However, studies have shown that highly emotional people are intense partly because of their interpretations and although the emotional low road functions automatically, the thinking high road allows us to retake some control over our emotional life.

5.3 EMBODIED EMOTION: THE PHYSIOLOGY OF EMOTIONS

Different emotions do not have sharply distinct biological signatures and they do not engage very distinctly different brain regions. For example, insula, a neural center deep inside the brain gets activated when we experience different social emotions such as lust, pride and disgust. It gets activated with taste, smell or even

thought of some disgusting food or even if we feel moral disgust over a cheating case. However, researchers have identified some subtle physiological distinctions and brain patterns for different emotions, we can say that we cannot differentiate in emotions on the basis of heart rate, breathing and perspiration, but different emotions have different facial expressions and brain activity.

Emotions and the Autonomic Nervous System:

By now, we know that autonomic nervous system helps in moving our various bodily organs into action when the need arises and parasympathetic nervous system helps in calming down our bodily reactions. For example, when we are faced with a challenging or exhilarating situation, our adrenal glands secrete stress hormones, our liver releases more sugar in the blood stream to provide more energy and respiration rate goes up to provide more oxygen. The digestion slows down to divert more blood from internal organs to muscles and if you are wounded, the blood clots more quickly to stop the bleeding. The pupil in the eyes dilates so that more light comes in and you can see better. The perspiration increases to cool your stirred-up body, etc. This kind of bodily response is beneficial for better performance to meet the challenges. Moderate arousal is needed to give better performance. For example, can you imagine P.T. Usha winning a race if she was not moderately aroused/tense (or was sleeping) just before the race started. However, having too much arousal/ tension or having too little arousal/ tension before an important activity will not enhance the performance. One should not be too relaxed or too tense before the important activity.

On the other hand, when the situation comes back to normal and is no more challenging, the parasympathetic gradually calms down the body and stress hormones slowly dissipate from the blood stream.

The Physiology of Emotions:

Different emotions neither have very distinct biological reactions nor do they originate from specific distinct brain regions. For example, the insula in the brain is activated when we experience various social emotions such as lust, pride and disgust. It does not matter that these feelings may originate from different sources. For example, the feeling of disgust may originate from taste of disgusting food, smell of disgusting food or just a thought of some disgusting food or it may originate from watching a disgusting news of corruption practiced by politicians.

However, studies have shown that even though biological reactions and brain regions for different emotions appear to be similar, there are emotions such as sexual arousal, fear, anger, and disgust that are felt differently by the people and they appear to be

different to other people. Researchers have identified some subtle brain pattern differences and physiological differences for different emotions. For example, the finger temperature and hormone secretion related with fear and rage differ. Heart rate increases in fear and joy but both feelings stimulate different facial muscles. While experiencing fear, your eye brow muscles get tensed up and while experiencing joy, your cheeks and under your eyes pull into smile.

Some emotions also differ in their brain circuits. People show more activity in amygdala when they are watching fearful faces rather than angry faces. Experience of negative emotions such as disgust activates right side prefrontal cortex rather than left side one. People with depression and negative personality in general also show more right frontal activity. People with positive personalities, that is people who are alert, enthusiastic, energized and persistently goal oriented, show more activity in the left frontal lobe than in the right frontal lobe.

Thus, we can say that we can't easily differentiate emotions on the basis of bodily reactions such as heart rate, breathing and perspiration. But facial expressions and brain activity can differ with emotions.

5.3.1 Expressed Emotion:

A.) Detecting Emotions in Others:
To determine other people's emotions we read their bodies, listen to their voice tones and study their faces. Psychologists wondered whether non-verbal language differs according to our culture and can our expressions influence our experienced emotions. For example, in western culture, a firm handshake conveys an outgoing, expressive personality. A gaze, an averted glance or a stare indicates intimacy, submission or dominance. In a study, male-female pairs who were total strangers to each other, were asked to gaze intently at each other for two minutes. They reported feeling a tingle of attraction towards each other.

Most of us read nonverbal cues well. We are especially good at detecting nonverbal threats. In a crowd of faces, a single angry face is identified much faster than a single happy face. Experience can also sensitize us to particular emotions, e.g., viewing a series of faces depicting anger to fear, physically abused children were much quicker to spot the signals of anger than non-abused children. Hard to control facial muscles reveal signs of emotions that a person may be trying to hide, e.g., eyebrows raised and pulled together signal fear. Our brains are very good detectors of subtle expressions. Seeing a face for just 0.1 seconds also enabled people to judge attractiveness or trustworthiness of a person (Willis

& Todorov, 2006). It is rightly said that first impression occurs at lightning speed. Despite our brain's emotion detecting skills, it is difficult to detect deceiving expressions. The behavioral differences between liars and truth-tellers are too minute for most people to detect. However, some people are much better emotion detectors (especially introverts) than others. It is difficult to detect emotions from written communication because it does not have gestures, facial features and voice tones to help detection of emotions. Electronic communication also provides very poor quality nonverbal cues. That is why, people often use emoticons.

Lie Detection:

It is a common practice for researchers and crime detectors to use lie detector- polygraph to detect the lies. The question arises how effective and reliable is polygraph in detecting lies. The polygraph works on the principle that certain emotion-linked bodily changes, such as changes in breathing, cardiovascular activity and perspiration changes take place when a person tells a lie, even if that person can control his facial expressions. The tester/examiner asks questions to the testee and observes these bodily changes taking place in the testee while answering the questions. The tester starts questioning with certain question that may make any person nervous and polygraph will show signs of arousal. These are called control questions. For example, a tester may ask in last 10 years have you taken anything that does not belong to you? The arousal level shown on a polygraph, in response to these control questions serves as the base line. Then the tester will ask the critical questions, e.g., have you stolen anything from your previous employer? The arousal level shown on polygraph in response to this question will indicate whether the person is telling the truth or lying. For example, if the arousal level while answering the critical question is weaker than the base line arousal determined before, then we can say that person is telling the truth. On the other hand, if the arousal shown in response to critical question is more than base line arousal that means the person is telling the lie.

Criticism: It appears to be that simple, but it has certain criticism –
1. Our physiological arousal is almost same for various emotions such as anxiety, irritation and guilt. So how do we know which emotion a person was experiencing while answering that question?

2. Many innocent people get extremely tensed up while answering a critical question that implies accusation. Lykken (1991) found that many rape victims fail this test because they react emotionally even when they are telling the truth. On the other hand, Robert Park (1999) noted that a Russian spy within CIA went undetected, even though he took many polygraph tests and passed them all. Many hardened criminals also pass this test without getting detected.

Remedies: Psychologists are trying to find new ways to catch the liars. For example, it has been suggested that instead of polygraph, one should use **'guilty knowledge test'.** This test also assesses a suspect's physiological responses to crime-scene details that are known only to police and to the guilty person. For example, if a camera is stolen, then only a guilty person will react strongly to the brand name of the stolen item. Thus, an innocent person will rarely get wrongly accused.

Psychologists are also training police to detect **fleeting signals of deceit in facial expressions**. For example, when a person is lying, he has to use more of his cognitive abilities (that means, he has to think more), during such time his eye blinking will decrease and once he has finished telling a lie, his eye blinking will increase.

Some researchers are developing a **software to analyze the facial micro expressions** or to **compare the language of truth-tellers and liars**. It is believed that liars use less of first person pronouns and more of negative emotion words.

Forensic Neuroscience researchers are analyzing the **EEG recordings**. It has been observed that liars' brain activity can be seen in fMRI scans while honest people's brains do not show any such activity. A liar's left frontal lobe and anterior cingulate cortex becomes active when the brain inhibits truth telling.

B.) Gender, Emotion and Nonverbal Behavior:
Studies have proved that women are better at reading emotional cues than men, even if they are exposed to very little behavior of the other person, e.g., they can detect whether a male-female couple is a genuine romantic couple or just pretending one(Barnes & Sternberg, 1989).Women's nonverbal sensitivity is due to their greater emotional literacy and they more emotionally responsive. For example, in an experiment on emotional literacy, when men were asked how will they feel saying good bye to a friend, they simply said, "I will feel bad", while women said "It will be bittersweet; I'll feel both happy and sad".(Barrett et.al., 2000). A study of people from 26 cultures found that women reported themselves as more open to feelings than men. (Costa et.al. 2001). This clearly indicates that women are more emotional than men. However, generally, people tend to attribute women's reactions to their emotions while men's reactions to their circumstances, except for the feeling of anger. Anger is considered as more masculine emotion. Surveys showed that women are more likely to describe themselves as empathic. Their heart rate goes up and they are more likely to cry when they see someone in distress.

C.) Culture and Emotional Expression:

Studies have shown that there are universal facial expressions for basic emotions across different cultures. Facial muscles speak a universal language. In entire world, children cry when in distress and smile when they are happy. Even people blind from birth, naturally show the common facial expressions linked with emotions such as joy, sadness, fear and anger. Musical expressions also cut across cultures. In all cultures, fast paced music seems to be happy one and slow music is considered as sad one.

Charles Darwin said that in prehistoric times, before our ancestors communicated through words, they communicated threats, greetings and submission through facial expressions. Their shared expressions help in their survival. Emotional expressions help in our survival in other ways also, e.g., surprise raises the eyebrows and widens the eyes so that we can take in more information. However, it is observed that people are more accurate in judging emotions from their own culture, and there are cultural differences in how much emotion will be expressed. For example, in western culture, people openly show their emotions while in Asian cultures, people tend to have less visible display of their emotions.

D.) The Effects of facial Expression:

Studies indicate that expressions not only communicate emotions, they also amplify and regulate them. People report feeling more fear than any other emotion, when made to construct a fearful expression. It is said smile warmly on the outside and you will feel better on the inside. So, your face feeds your feelings. In an experiment, depressed patients felt better after getting Botox injections that paralyze the frowning muscles. Similarly, it is reported that people see ambiguous behaviors differently depending on which finger they move up and down while reading a story. If they read the story, while moving an extended middle finger, the story behaviors seemed more hostile. If read with a thumb up, they seemed more positive.

5.3.2 Experienced Emotions: Anger and Happiness

The experience of emotions in human beings can be placed on two dimensions – Positive vs. Negative and Low Arousal vs High Arousal. Any emotion is a combination of these two dimensions. For example, if we take emotion of anger, then enraged is angrier than angry (at arousal level) and it is a negative feeling. Let us discuss two of the most noticeable and pervasive emotions that impacts our lives. These are anger and happiness.

Anger:

Ancient wisdom describes anger as 'a short madness'. It says that anger 'carries the mind away' and can be 'many times more hurtful than the injury that caused it'. In other words, it is trying to say that when we are angry, we can't think rationally and may do or say things that ultimately causes more misery to us. However, Shakespeare held a different view and said that noble anger makes a coward person brave and energizes us. Who is correct? The answer is both are right. Anger can harm us. Studies have shown that chronic hostility can cause heart disease, blood pressure, lead to impaired social relationships and may even shorten our lives.

The question arises can we get rid of our anger? If yes, then how?

❖ **Gender Differences:** A Gallup teen survey showed that there are gender differences in dealing with anger. It reported that to get rid of their anger, boys usually move away from the situation that is causing them anger, they do lot of physical activities such as exercising to get over their anger. On the other hand, girls cope with their anger by talking to a friend, listening to music or writing down in diary or journal.

❖ **Cultural Differences:** Western culture, a predominantly an individualistic culture, believes that people should vent their anger, because internalizing the feeling of anger is more harmful. In fact, 'recovery' therapists encourage people to vent their rage against our dead parents, confront our childhood abuser and curse our boss in our imagination. Keeping anger within us is considered bad for our mental and physical health. Western culture believes that venting out of anger can be done through emotional release (either through aggressive act or through imaginary act) or **catharsis.** There is some empirical support for this line of thinking. Studies do show that sometimes, not always, the anger subsides when people retaliate against a provoker. But anger subsides only if a person counterattacks directly his provoker, retaliation is justifiable, their target is not intimidating (Geen et.al., 1977) and if they do not feel anxious or guilty later on. If anger led physical or verbal acts generate regret later on, it becomes maladaptive.

However, catharsis often fails to erase our feeling of rage. There can be some reasons for it

1. **Expressing anger may strengthen the anger instead of reducing it**: e.g., in case of road-rage. Ebbesen et. al. (1975) conducted an experiment on laid off employees. They were allowed to vent their hostility and later on given chance to express their attitude towards the company. Compared to those laid off employees who were not given a chance to vent their hostility in

initial questionnaire, it was found that employees who were given such a chance in first questionnaire, expressed more hostility. Their hostility increased instead of reducing. Similar results were reported by another study. Brad Bushman (2002) rightly said that venting to reduce anger is like using petrol to put out a fire.

2. **It may provoke retaliation and a minor conflict may turn into major confrontation**: In Asian culture, which is a community culture, giving vent to your aggression in this manner is considered bad. People don't give went to their rage because they derive their identity from the group and have a sense of interdependence. Such people consider venting their anger as a threat to group harmony.

3. **Angry outbursts are dangerous in another way**: They may temporarily calm us but this may act as reinforcement and so may be habit forming.

4. **Anger can lead to prejudice**: Americans developed prejudice against immigrants and Muslims after 9/11.

Techniques to Control Anger:

1. Wait before reacting. You can bring down the level of physiological arousal of anger by waiting.
2. Don't ruminate. Ruminating inwardly serves to increase it
3. Calm yourself by exercising, playing an instrument or talking it through with a friend.
4. Anger when used wisely can be a strength and can benefit the relationship. Express the grievances in ways that promotes reconciliation rather than retaliation.
5. Talk things over with the offender, thereby reducing the aggravation. Be civil but assertive.
6. If conflict can't be resolved, use forgiveness. Forgiveness releases anger and calms the body.

Happiness:

Happiness is a state of mind or a feeling of contentment, satisfaction, pleasure, or joy. 'Positive psychology, describes happiness as a high ratio of positive to negative feelings or sense of satisfaction with life.

A) Importance of Happiness in Our Lives:

Happiness/ unhappiness has tremendous impact on each and every aspect of our lives. This impact can be temporary or long lasting, mild or severe. Psychologists have been investigating the difference between happy and unhappy people and how it affects them. Some of the conclusions are that **happy people p**erceive the world as safer and they feel more confident, make decisions and cooperate more easily, are more tolerant, rate job applicants more

favorably, savor their positive past experiences without thinking too much on the negative aspects, are more socially connected, live healthier and more energized and satisfied lives (Mauss et.al., 2011), earn significantly more money (Diener et.al.,2002).

Baas et.al. (2008) stated that when your mood is gloomy, life as a whole seems depressing and meaningless, you are critical of your surroundings and thinking is skeptical, in such a situation, if you put in efforts to brighten your mood, your thinking will get broadened and you will become more playful and creative. In other words, you will get transferred from unhappy state to happy state. When we are happy, our relationships, self-image, and hopes for the future also seem more positive.

Feel - Good, Do- Good Phenomenon: Many research studies have reported that happiness doesn't just feel good, it does good, e.g., in many studies, mood boosting experiences (such as finding money, recalling a happy event, etc.) had made people more likely to give money, pick up someone's dropped papers, volunteer time and do other good deeds. Reverse of feel good and do good was also found to be true. When you do good for someone, you feel good.

B) The Short Life of Emotional Ups and Downs:
Studies have shown that over the long run, our emotional ups and downs tend to balance out, not only over the days but also during the day. Positive emotion rises over the early to middle part of most days and then drops off. A stressful event can trigger a bad mood, but by the next day, the gloom almost always lifts. Even when negative event persists for longer period, our bad mood usually ends. For example, romantic breakup feels devastating, but eventually the emotional wound heals and we move on in life.

Grief over the loss of a loved one or anxiety after a severe trauma such as child abuse, rape, or the terrors of war, may last for longer period, but eventually we get over it. No tragedy is permanently depressing. People who become blind or get paralyzed too recover near normal levels of day to day happiness.

People cope well with a permanent disability, though they do not rebound back to former emotions of happiness and well-being. A major disability leaves people less happy than average, yet much happier than able bodied people suffering from depression. Bruno et.al. (2008) commented that most patients "locked-in" motionless body(being in coma) do not say they want to die. The fact is that we overestimate the duration of our emotions and underestimate our resiliency and capacity to adapt.

C) Wealth and Well-Being:

To some extent, wealth does correlate with well-being, e.g., rich people are typically happier, healthier than poor people who lack control over their lives. Money can help to get out of hunger and hopelessness and also buy happiness. But once you have sufficient money for comfort and security, adding more money does not add to more happiness. This is because of diminishing returns of phenomenon. The power of more money to increase happiness is significant at low incomes and diminishes as income rises. In every culture, those who strive hardest for wealth tend to live with lower well-being, especially if they are seeking money to prove themselves, gain power or show -off rather than support their families.

D)Two Psychological Phenomena - Adaption and Comparison:

There are two psychological phenomena that explain why happiness is relative. These are Adaptation and Comparison. Let us understand these two principles –

1) The Adaptation-Level phenomenon: This principle suggests that we have a natural tendency to judge various stimuli in comparison to our past experiences. Harry Helson (1977) explain this phenomenon by explaining that on the basis of our past experience, we all reach certain neutral levels for everything, e.g., there are certain levels at which we will not find sounds either too loud or soft, temperatures as too high or low, events as pleasant or unpleasant. We will feel just neutral about them. Once these neutral points are developed, then we judge any new events or variations in existing events in comparison to these levels, e.g., if temperature goes higher than our neutral point temperature, then we find temperature too hot for our comfort.

Similarly, if compared to our present income we get higher income, we feel a temporary surge in our happiness, but later this new high becomes the new normal level and then to again feel happy we will require income more than this new normal level also. Same is true for other areas such as academic rewards, social prestige, etc. For example, do you remember, the thrill you had when cordless phones came in the market and you owned one (Those phones worked only within a limited range of landline phones, giving you very little flexibility). Later, mobile phones came into market and they gave you the freedom to talk to anyone even while traveling far away from your home. At that stage you were no more thrilled with cordless phones. Afterwards, mobiles got upgraded to smart phones and now you could not only talk with mobile phone but could also do lot more like using internet on phone. Now does ordinary mobile phone gives you any happiness or excitement? The answer will be no. This is exactly what the psychologists meant when they said happiness is relative to our own experiences.

There is no permanent happiness. Tomorrow, suppose you get a chance to live in an ideal world where you don't have any economic worries or health worries and your near dear ones give you unconditional love. You will be elated, but after some time you will adjust your adaptation level and this new world will become your new normal. Now you will feel satisfied if events exceed your expectations or you will feel dissatisfied if these events fall below your expectations. The point is that satisfaction or dissatisfaction are just our judgments based on our past experiences.

2) Comparison -Relative Deprivation: We always compare ourselves to others and our feeling of good or bad depends upon with whom we are comparing. Seeing many others getting rich may create a sense of relative deprivation. Such comparisons are the reason why rich people are more satisfied with life than the poor people. However, Russell (1930,p90) noted very aptly that "Beggars do not envy millionaires, though of course they will envy other beggars who are more successful". Comparing ourselves with those who are better off creates envy and comparing ourselves with those who are worse off creates contentment.

E) Predictors of Happiness:

Happy people share many characteristics such as they have high esteem, are optimistic, outgoing and agreeable, have close relationships or a satisfying marriage, have work and leisure that engages their skills, have an active religious faith, sleep well and exercise Research shows that age, gender, parenthood and physical attractiveness has no link with happiness, but **genes matter**.

Heritability: In one study of identical and fraternal twins, it was found that about 50% of the difference among people's happiness ratings was heritable. Other studies have also indicated that identical twins raised apart are often similarly happy.

Personal History and Culture: On the personal level, we already know that our emotions tend to balance around a level defined by our experiences. On the cultural level, groups differ in the traits that they value. For example, self-esteem and achievement are more important to Westerners due to emphasis on individualism. Social acceptance and harmony are more important for people living in communal cultures such as Japan, where family and community is more important than personal achievements. However, apart from our genes, studies indicate that relationship quality is also an important determinant of our happiness.

So, depending on our genes, our values, our recent experiences, our happiness seems to fluctuate around our "happiness set point". Due to this some people are always happy

while others are always negative. However, psychologists believe that our satisfaction with our lives is not fixed. Happiness can increase or decrease. It can be influenced by factors under our control.

5.3.3 Close up: Want to be Happier?

Our happiness, like our cholesterol levels, is genetically influenced. As cholesterol can be kept under check through diet and exercise, similarly, level of happiness can also be partly kept under our control. Researchers have given some research based suggestions to improve our mood and satisfaction of life. These suggestions are –

1. Realize that long lasting happiness may not come from financial success: We adapt to changes by adjusting our expectations. Neither wealth nor any other circumstances that we desire can guarantee happiness.

2. Take control of your time: Happy people feel in control of their lives. To manage time, set goals and break them into sub-goals for daily aims. It will be difficult and frustrating because you will find that first of all it is not possible to set goals, then break them into daily sub-goals. We need to have very clear and systematic thinking for that. Another problem is that human beings have a natural tendency to overestimate how much work they can accomplish in any given time, e.g., you may set a goal that you will finish studying the present chapter in a day. At the end of the day, you may realize that you have not been able to finish it for various reasons. So, to avoid disappointments and frustration, one needs to practice setting up realistic goals and organize the daily activities accordingly.

3. Act Happy: Empirical research showed that when people were manipulated to put on a smiling expression, they felt better. So, put on a happy face, laugh more, talk as if you feel positive self-esteem, being optimistic and outgoing. We can often act our way into a happier state of mind.

4. Seek Work and leisure that engages your skill: Happy people are often in a zone called "flow" – that is, they are absorbed in tasks that challenges but does not overwhelm them. The most expensive forms of leisure often provide less flow experience than simple activities such as gardening, socializing or creating something new. Money also buys more happiness when spent on experiences that enjoy, remember, and look forward to rather than when money is spent on buying some material stuff such as expensive mobile or clothes.

5. Joint the "Movement" movement: It has been found that aerobic exercise can relieve mild depression and anxiety as it promotes health and energy. Sound mind resides in sound body.

6. Sleep Sufficiently: Give your body the sleep it wants. Happy people live active lives, yet reserve time for renewing sleep and solitude. Now days, many people suffer sleep debt that results in fatigue, diminished alertness and gloomy mood. They remain irritable throughout the day that can have further negative experiences.

7. Give Priority to Close Relationships: Intimate friendships can help you to sail through difficult times. Confiding is good for soul as well as for body. It has been noticed that compared to unhappy people, happy people engage less in superficial talks and more meaningful conversation. Nurture your close relationships by not taking your loved ones for granted. Show them the sort of kindness you show to others, affirming them, playing together and sharing together.

8. Focus beyond Self: Reach out and help those who are in need. Happiness increases helpfulness but doing good also makes one feel good.

9. Count Your Blessings and Record Your Gratitude: Keep a gratitude journal, that is keep a register where at the end of the day, remember and enjoy good moments once again and write in that journal all positive events that occurred that day and why they occurred. You also write express your gratefulness to others in that journal. It is scientifically proven that keeping gratitude journal heightens one's well-being.

10. Being Happy is a Matter of Choice: It is our attitude that makes us feel happy or unhappy. It is true, we meet all kinds of situations during the day, and some of them may not be conducive to happiness. We can choose to keep thinking about the unhappy events, and we can choose to refuse to think about them, and instead, relish the happy moments. If we let outer events influence our moods, we become their slaves. We lose our freedom. We let our happiness be determined by outer forces. On the other hand, we can free ourselves from outer influences. We can choose to be happy, and we can do a lot to add happiness to our lives.

11. Surround yourself with happy people: It is easy to begin to think negatively when you are surrounded by people who think that way. Conversely, if you are around people who are happy their emotional state will be infectious.

Check your progress:
Write short notes on the following-
1. The physiology of emotions
2. Gender and nonverbal expression of emotions
3. Consequences of anger
4. Predictors of happiness
5. Techniques to be happier

5.4 SUMMARY

In this unit, we have touched upon three learning items - need to belong, emotions and happiness.

In need to belong, we looked at the definition and usefulness of need to belong. We also discussed how ostracism is painful for anybody and in social networking topic we discussed how technology has impacted our social communications. We also looked at the ways and means of maintaining a balance between real world and internet world.

In emotions we first talked about its definition, and we discussed four historical theories of emotion to see the link between cognition and emotions. The James Lange theory proposed that first comes bodily response and then we label emotions based on those bodily responses. Cannon-Bard's theory argued that emotions and autonomic responses occur simultaneously but separately. One is not the cause of the other. The individual's appraisal of the emotion producing situation largely determines the emotions.

Schachter and Singer believed that to experience emotions, we must consciously interpret and label them. Zajonc, LeDoux and Lazarus noted that we have many emotional reactions without interference of intellect. Many emotions occur without our being aware of them. Then we discussed the physiology of emotions and how emotions can be detected by others. We also dwelled upon how gender and culture can influence the expression of emotions, and how facial expression can influence the actual experience of emotions.

Lastly, we discussed about experiencing two major emotions, that is, anger and happiness. We saw in detail what are the consequences of anger and how it can be controlled. In case of happiness, we discussed the definition, nature of happiness and how there is a positive yet limited connection between wealth and feeling of well-being. How two psychological phenomena-adaptation and comparison can influence the experience of happiness. Finally, we looked at the predictors of happiness and how happiness can be increased.

5.5 QUESTIONS

1. Explain the usefulness of need to belong and pain of ostracism.
2. What is social networking and how can we maintain balance between real world and virtual world.
3. Define emotion and discuss various theories of emotion.
4. How can we detect emotions in others and what role is played by gender and culture in detecting emotions?
5. What are the consequences of anger and how it can be reduced?
6. "Catharsis may or may not reduce anger". Explain
7. Write a detailed note on happiness.
8. Define happiness. What are the consequences of happiness?
9. "Happiness is relative to our own experience and to others' success. Explain

Write a short note on

a. Effects of social networking
b. Maintaining balance between real world and virtual world
c. Cannon-Bard theory of emotion
d. Schachter & Singer's theory of Emotion
e. Predictors of Happiness
f. Tips to reduce anger

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Unit -6

PERSONALITY - I

Unit Structure :

6.0 OBJECTIVES

After studying this unit, you should be able to understand:

➢ The psychoanalytic view of human mind, its views on division of personality and the stages of personality development.

➢ The work of various Neo-Freudians and modern views of unconscious.

➢ The contribution of humanistic psychologists such as Abraham Maslow and Carl Roger to personality development.

➢ The pros and cons of humanistic theories.

6.1 INTRODUCTION

Though all human beings are similar in many ways they perceive, learn, remember, think and feel, yet there are individual differences and each one of us is unique. These differences and uniqueness is due to personality differences. Personality is an

important dimension of individual differences. Personality has been the area of interest for psychology for more than 100 years. This and the next unit would provide an exposure to different personality theories, ranging from classical to contemporary. This unit discusses psychodynamic and humanistic theories of personality. The next unit discusses trait and socio-cognitive theories of personality.

Personality can be considered as sum-total of who you are – emotions, attitudes, motives, and behaviour. No two people are same because they have different personality.

Personality is unique and relatively stable way in which people feel, think, and behave throughout the life.

Personality can be defined as a person's characteristic pattern of thinking, feeling, and acting (Mayers ,2013).

6.2 PSYCHODYNAMIC THEORIES

Psychodynamic theories of personality consider human behavior as a dynamic interaction between the conscious and unconscious mind and its associated motives and conflicts. These theories originated from Sigmund Freud's psychoanalysis theory and later on Neo-Freudian theories were included. So, let us begin with psychoanalytic perspective.

6.2.1 Freud's Psychoanalytic Perspective: Exploring the Unconscious:

Sigmund Freud was born 1856. That was a Victorian era in Europe – a time of tremendous discovery and scientific advancement, but also a time of sexual repression and male dominance. In general, only male sexuality was acknowledged and that too very discreetly. Freud was very independent, brilliant and voracious book reader right from his teens. He became a doctor specializing in nervous disorders and started a private clinic. Very soon he became famous because of his work in psychiatry. Till today his influence lingers in psychiatry and clinical psychology as well as in many other courses.

Many of his patients were rich females, and while treating them he realized that they had disorders without any neurological base, e.g., a patient may complain that she has lost all sensations in her hand and yet he observed that no sensory nerve was damaged that would numb only the entire hand but nothing else. Freud's search for a cause for such disorders made him realize that some neurological disorders can have psychological causes. He called his theory of personality and the associated treatment techniques as Psychoanalysis. In his personality theory, he

emphasized first of all on division of mind, then on structure of personality, psycho-sexual stages of personality development and defense mechanism.

Division of the Mind:

Freud believed that mind is divided into three parts. The conscious, the preconscious, and the unconscious.

1) The Conscious Mind:

The conscious mind is the uppermost part of the mind. It contains information one is aware of at any given time. This is an Individual's current perceptions, memories, thoughts, fantasies, feelings that he is aware of. It is quite close to *short-term memory* concept which you have studied in earlier chapters. Freud believed that mind is mostly hidden and the conscious awareness is like the part of an iceberg. In other words, what we are aware of is a very small part of our consciousness and beneath this awareness is the large unconscious mind with its thoughts, wishes, feelings and memories.

2) The Preconscious Mind:

The preconscious mind contains ideas, feelings, events, concerns beliefs, thoughts that person is not aware at present but can easily be made accessible to the conscious. This contains memories that are not at the moment in the conscious thought process, but can readily be brought to mind whenever needed. It works closely with the conscious mind. Today, it can be called as explicit long-term-memory. But Freud suggested that these two are the smallest parts of mind.

3) The Unconscious Mind:

The unconscious mind (often called as "the unconscious") is the most central and significant part of Freudian theory. The unconscious is most important determinant of human personality and behaviour. According to Freud, the unconscious is a mass of unacceptable passions and thoughts that he believed we repress or forcibly block from our consciousness because it would be too stressful to acknowledge them. These are the major source of our motivations ranging from simple desires for food, and sex to the complex motives like creativity of an artist. This largest part of mind remains hidden to conscious. Without our awareness, these troubleshooting feelings and ideas powerfully influence us, sometimes getting expressed in disguised form such as dreams, slip of tongue or pen, the work we choose, the beliefs we hold, our daily habits, or other behavior that people carry out without understanding the reasons for it. He believed that nothing is ever accidental and considered jokes as expression of repressed sexual and aggressive tendencies and dreams as the "royal road to the unconscious". In dream analyses, he searched for patients' inner conflicts.

To gain access to patients' unconscious mind, initially he used hypnosis. But that did not work. So, he devised a new method called **"Free Association".** In using this method, he asked his patients to relax and say whatever came to their mind, no matter how embarrassing or trivial it is. He assumed that certain mental blocks from patient's distant past are responsible for his troubled present and free association will allow him to retrace those mental blocks, allowing him to peep into patient's unconscious mind and retrieve and remove painful memories stored from his childhood.

Personality Structure:

According to Freud, personality can be divided into three parts. They dynamically interact with each other. They are: Id, Ego, and Superego.

1) ID:

The first and primitive part of personality is Id. It is present since infancy. It is completely unconscious and amoral. It contains all the basic biological drives to survive, reproduce and aggress. The id is the impulsive, child-like portion of the psyche that operates on the "pleasure principle". The **pleasure principle** states that there should be immediate gratification of the needs without caring about outside world's restrictions or societal conventions of civilized, standard, and moral behaviour. People dominated by ID will concentrate on present pleasure rather than think about future pleasure, e.g., they will enjoy parties, movies now rather than sacrifice today's pleasure for future success and happiness.

Freud believed that human personality is the result of our efforts to resolve these conflicts between impulses and restraints between our aggressive, pleasure seeking biological urges and our internalized social control over these urges.

2) EGO:

This second part of personality is developed to handle the reality. It is partially conscious part of mind that includes our higher cognitive abilities, rationality, perceptions, thoughtfulness, memories, learning, and logical processes. It provides buffer between illogical, amoral impulses of id and societal restrictions. The Ego works on reality principle, which means that the id's drives are satisfied in a realistic way that will avoid negative outcomes and will bring long term pleasure. So, there are times when ego denies the gratification of id's drive because of possible negative consequences. For example, if a very young kid is hungry, then he picks up food from anybody's plate, but slightly older kids will not do that. Instead they would wait for their plate to come or make a request in more formal ways. If they are at stranger's place, then they will prefer to stay hungry than asking for food. This is because ego develops with the age.

3) SUPEREGO:

Freud believed that around the age of 4 or 5 our superego starts developing and ego starts recognizing the demands of superego. **Superego** represents our moral values imbibed from the society. These are the rules and regulations about what is right and wrong taught by parents, teachers, and important others. The superego tells us how we ought to behave. It forces ego to consider not only the real world but also the ideal world. In other worlds, it tells ego to not only avoid punishment but also to strive for ideal behavior. It strives for perfection. It prevents us from doing morally incorrect things, by producing guilt (also called as *moral anxiety*). It produces feeling of pride when we do morally correct things. A person with very strong superego may be virtuous and yet guilt-ridden, while another person with weak superego may be low in using self-restraint and yet may not feel any guilt.

Fig. 6.1
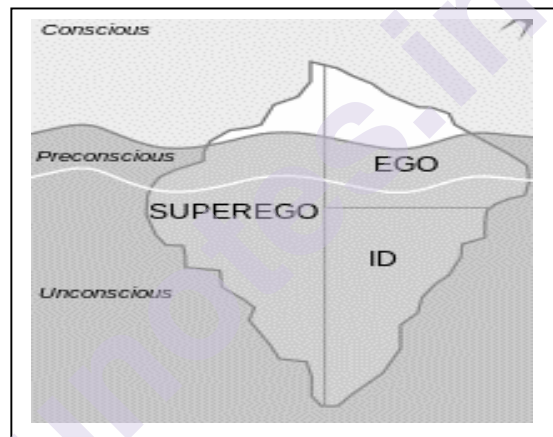
Since the Id is unrealistically impulsive and the superego is unrealistically moralistic, the id and superego's demands are always in conflict, the ego tries to strike a balance between the two. The ego is the "executive" part of the personality. It mediates between the impulsive demands of the id and the restraining demands of the superego and the real life demands of the external world. Anxiety is created when ego cannot meet their needs. Extreme anxiety leads to disorders. The Psychological Defense Mechanisms are used to deal with anxiety and stress created by conflicts between the three components of personality. They are unconscious strategies people use to deal with the anxiety and by distorting the reality. They have been classified as psychotic, immature, neurotic and healthy defense mechanisms. But before talking about defense mechanisms in detail let us look at the developmental stages of personality.

Developmental Stages of Personality:

Freud proposed that development of personality takes place when a child passes through a series of psychosexual stages. Freud has identified particular body parts as a focus of specific

developmental stage. In each psychosexual stage, id's pleasure seeking energies focus on specific body parts that provide sensation of pleasure during that stage. It is called as erogenous zone. In every psychosexual stage, there is a conflict between id, ego and superego. Conflicts unresolved during earlier psychosexual stages could lead to maladaptive behavior in the adult years. These stages are *Oral, Anal, Phallic, Latency, and Genital*.

Table 6.1

Freud's Psychosexual Stages of Development

Stage	Age	Erogenous	Characteristics
Oral	Birth to 18 months	Mouth	Indulges in oral activities like sucking, biting, mouthing, eating, to obtain pleasure.
Anal	18 to 36 months	Anus	Gratification obtained from withholding and expelling fesses, try to handle the pressures of society regarding toilet training. Fixation leads to anal expulsive or anal-retentive personality.
Phallic	3 – 6years	Genitals	Derives pleasure by fondling genitals. Oedipal Conflict is important characteristics, and it is resolved by identifying with same sex parents.
Latency	6 years to Puberty	Adolescence Social skills intellectual abilities.	The sexual feelings are kept latent by repressing them in unconscious.
Genital	Puberty onwards		Maturation of sexual interests - The mature, adult sexuality develops during this stage.

1) Oral Stage:

The duration of first stage of psychosexual development, namely Oral Stage, is from birth to 18 months. The erogenous zone of oral stage is mouth. Children enjoy activities like sucking, biting, mouthing, etc. The conflict that is experienced in this stage is weaning the child from bottle or mother's breast feed. The child will get fixated in the oral stage if the child overindulges (continue to breast/bottle feed for longer duration)or become frustrated (due to early or abrupt weaning) with the oral gratification. This leads to development of oral personality in adulthood. Aggressive-pessimistic traits develop if oral needs are under gratified and dependency-optimism develops if they are over gratified. If they are over gratified, they may continue to seek oral gratification by overeating, talking too much, smoking, etc. If they are weaned away too early leading to under gratification they may act tough or speak in "bitingly" sarcastic way, etc.

2) Anal Stage:

The duration of Anal Stage of psychosexual development is from 18 months to 3 years. The erogenous zone of anal stage is anus. Children at this stage derive pleasure by both withholding and expulsion of fesses at will. In addition to physical pleasure, child also derives pleasure from self-control and the praise from parents. The conflict that is experienced in this stage is toilet training. The child will get fixated in the anal stage if toilet training is too harsh. The conflict leads to development of anal personality in adulthood. They are of two types: *anal expulsive personalities* and *anal retentive personalities*. Anal Expulsive Personality results from child's rebel against toilet training by parents. The adult would show destructiveness, hostility, emotional outbursts, disorganization, rebelliousness and carelessness. They could also become extremely generous and indiscipline. Anal-Retentive Personality develops due to fear of punishment. The child retains fesses and refuses to go to toilet. They develop traits like excessive orderliness, neatness, stubbornness, a compulsion for control and have interest in collecting, holding, and retaining objects.

3) Phallic Stage:

The Phallic Stage is between 3 years to 6 years. The genitals are erogenous zone during this stage. Child derives pleasure by fondling genitals. They develop unconscious sexual desires for their mother and jealousy and hatred for their fathers, whom they consider as their rivals. Similarly, girls develop unconscious sexual desire for their fathers. Boys experience Oedipal Conflict and girls experience Electra Complex in this phase. Father is perceived as powerful, and they develop castration anxiety, a fear that their penis will be cut-off by their fathers, if fathers come to know of their sexual attraction towards their mothers. To resolve this anxiety boys Identify with their fathers and

girls identify with their mothers. This is called as Oedipus complex. According to Freud, girls get attracted to father and experience penis envy, feeling of inferiority for not having that anatomical part. They held mother responsible for this. To resolve this conflictual feeling towards mother, girls identify with mother. Normal sexual development occurs if the conflict is resolved. Immature sexual attitudes, promiscuous or sexually inhibited behaviour, and sexual confusion in adulthood may result from fixation in phallic stage.

4) Latency Stage:

The duration of this stage is from 7 to 12 years. The sexual feeling of child is repressed in unconscious, or kept *latent*, and the child grows physically, intellectually, and socially. This is relatively a calm stage where sexual energy is converted into interest in excelling in school work and sports, etc.

5) Genital Stage:

The duration of this phase is from 13 years onwards till death. The mature, adult sexuality develops during this stage. At this stage, once again the attention is shifted to genitals but sexual attraction is shifted from one's parents to members of the opposite sex. Sexual urges are expressed through socially approved channels. Sex takes a matured form by moving from desire for pleasure only to a desire for reproduction. The sexual and aggressive motives are transferred into energy for marriage, occupation and child rearing.

Defense Mechanisms:

Table 6.2

Defense Mechanism	Unconscious process employed to avoid anxiety-arousing thoughts/feelings	Examples
Regression	Reverting back to more immature behavior from infantile psychosexual stage, where some psychic energy remains fixated.	Throwing temper tantrums as an adult when you don't get your way or reverting back to the oral comfort of thumb sucking.
Reaction Formation	Acting in exactly the opposite way to one's unacceptable impulses.	Being overprotective of and generous towards an unwanted child, or repressing angry feelings, a person may display exaggerated friendliness.

Projection	Attributing one's own unacceptable feelings and thoughts to others and not to yourself.	Accusing your friend on cheating on you because you have felt like cheating on her. There is a saying "The thief thinks everyone else is a thief".
Rationalization	Creating false excuses for one's unacceptable feelings and thoughts to others and not to yourself. In other words, offering self-justifying explanations in place of the real, more threatening unconscious reasons for one's actions.	Justifying cheating in an exam by saying that everyone else does that, or a habitual drinker says he drinks just to be sociable.
Displacement	Redirecting unacceptable feelings from the original source to a safer, more acceptable substitute target.	Taking your anger towards your boss out on your wife or children by shouting at them and not at your boss or a child bangs the door hard instead of shouting back at his mother.
Denial	Blocking external events from awareness. If some situation is just too much to handle, the person refuses to believe or even perceive painful realities.	Smokers may refuse to admit to themselves that smoking is bad for health, or a person may refuse to believe that his son is involved in anti-national activities.

Freud held that anxiety is the price we pay for civilization. There is a constant tug of war between id and superego and ego has to balance both of them. Sometimes, ego fears losing control over this inner war and we experience anxiety. At such times, ego protects itself with defense mechanisms, i.e., the tactics used to reduce or redirect anxiety by distorting reality. All these defense mechanisms work at unconscious level and ego unconsciously defends itself against anxiety. Some of these defense mechanisms are discussed here.

6.2.2 The Neo-Freudian and Psychodynamic Theorists:

Freud's theory has been criticized as well as praised by his contemporaries and by other psychologists later. Those who followed broad framework of Freud and developed their own theories of psychoanalysis are called as Neo-Freudians. Neo-Freudians accepted his basic ideas such as personality structure of id, ego, superego; the importance of the unconscious; the shaping of personality in childhood; and the role of anxiety and defense mechanisms in personality development. However, they did not agree with the idea that only sex and aggression are dominant motives in our lives. They believed that social interaction also plays an important role. Similarly, while accepting the role of unconscious mind they emphasized the role of conscious mind also in interpreting our experiences and in coping with our environment. Some of the important Neo-Freudian theorists are Jung, Adler, Horney, etc.

Carl Jung:

Carl Gustav Jung differed from Freud on the nature of unconscious and parted away from Freud. In addition to Personal Unconscious, he developed the concept of Collective Unconscious. It is the store house of our experiences as a species since ancient ages. We are born with it and are not conscious of it. He called these collective universal human memories as Archetypes, an unlearned inclination to experience world in a particular way. Among the many archetypes, *Mother* (our inner tendency to identify a particular relationship of "mothering"),*Anima/Animus* (feminine component within males/ masculine component within females), *Shadow* (dark side of ego containing sex and life instincts), *persona* (individuals public image) are important.

Jung was initially Freud's disciple but later turned his dissenter. While he agreed with the idea that unconscious exerts a powerful influence on our behavior, he believed that unconscious holds more than our repressed thoughts and feelings. He criticized Freud's theory of the Oedipus complex and his emphasis on infantile sexuality. He said we all have a collective unconscious, a storehouse of repressed memories specific to the individual and our ancestral past. This is a level of unconscious shared with other members of the human species comprising latent memories from our ancestral and evolutionary past. 'The form of the world into which [a person] is born is already inborn in him, as a virtual image' (Jung, 1953, p. 188). Jung called these ancestral memories and images that have universal meaning across cultures as archetypes. These archetypes show up in dreams, literature, art or religion. These past experiences explain why people in different cultures share certain myths and images, e.g., mother as a symbol of nurturance, or fear of the dark, or of snakes and spiders.

Alfred Adler:

Alfred Adler had struggled to overcome his own childhood illnesses and accidents due to which he had suffered from inferiority complex. So, while proposing the concept of inferiority complex he stated that everybody experiences sense of inferiority, weakness and helplessness as a child and struggle to overcome the inadequacies by become superior and powerful adults. He identified 'striving for superiority' as a thrust propelling thought, feelings, and actions of humans. Two important concepts in his theory are: Parenting and Birth Order. According to Adler, the order in which person is born in the family innately influences persons personality. The *first born*, experience crisis as the attention shifts to younger sibling after their births and to overcome this they become overachievers. *Middle born children* are not pampered but get the attention and become more superior. After dethroning older sibling, they have power over their younger siblings and engage in healthy competition. *The youngest children* have the least amount of power in family and are more pampered and protected. This creates a sense that they cannot take responsibilities and feel inferior to others.

Adler identified two Parenting Styles that leads to problems in adulthood: *Pampering and Neglect*. Pampering parents overprotect a child, provide excessive attention, and protect from the dark part of life. As adults, child has poor skills to deal with realities, self-doubts about abilities. A Neglecting Parent do not protect child at all, and they are left to deal with life problems alone. As adults, they fear the world, cannot trust others, and have trouble in developing close relations.

Karen Horney:

Karen Horney differed from Freud on his masculine focus and idea of 'penis envy' and women having weak superego. She substituted the concept of 'penis envy' with her idea of 'womb envy'. She said that "The view that women are infantile and emotional creatures, and as such, incapable of responsibility and independence is the work of the masculine tendency to lower women's self-respect". She considered the basic anxiety, a feeling of fearfulness and anxiety experience in childhood triggers the desire for love and security.

Post Freud's life, most contemporary psychodynamic theorists and therapists do not accept the idea of sex as the basis of personality. They do not accept the idea of id, ego and superego and do not classify their patients in terms of oral, anal or phallic characters. But they do accept that much of our mental life is unconscious, that very often we struggle with inner conflicts among our wishes, fears and values and that our childhood experiences shape our personality and the way we become attached to others in later life.

Neo-Freudians' major disagreements with Freud can be summarized as -

1. Socio cultural factors determine conflicts, not instincts.
2. Infantile sexuality is of little importance compared to socio-cultural factors. Conflicts can be or are predominately non-sexual.
3. Societal factors cause anxiety, not a defense.
4. Dreams have no latent content: could be metaphorical expressions of the patient's real concern or reflect struggles to achieve self-awareness and responsibility.
5. Oedipal complex has no sexual component, is due to interpersonal/ social factors.
6. Technique of treatment: normally emphasize 'here and now', de-emphasis on past, gaining insight etc.

6.2.3 Assessing Unconscious Processes:

To peep into unconscious mind, early childhood experiences and to unearth hidden impulses and conflicts, psychologists have developed certain tools that do not ask direct questions and expect answers in yes-no or true-false format as objective assessment tools do. These tools that measure personality indirectly are known as projective tools. Projective tests are like "psychological X-ray" in which a test taker is asked to tell a story or describe an ambiguous stimulus. It is assumed that any hopes, desires and fears that test taker sees in the ambiguous image are the projections of their own inner feelings or conflicts. One of these projective tests is

Rorschach Inkblot Test:

People are presented a series of 10 inkblots printed on cards and people are asked to describe what they see in these inkblots. The test has been criticized on various counts. For instance, some clinicians believe in the power of Rorschach test so much that they have used it to assess criminal's violence potential and present it to court as evidence. Others consider it as a helpful diagnostic tool, an icebreaker and a revealing interview technique. However, the scoring and interpretation of the test had been criticized often and to overcome this criticism a research based, computerized tool has been designed to bring uniformity in scoring and interpretation. Yet many critics comment that only some of Rorschach based scores, such as scores for hostility and anxiety, have shown validity. So these tests are not reliable as a whole. Other critics believed that this test diagnoses many normal people as pathological as clinician's interpretations of the answers given are based on intuitions of the clinicians.

6.2.4 Evaluating Freud's Psychoanalytic Perspective and Modern Views of the Unconscious:

Recent research disagrees with Freud's ideas on many counts. For instance-

1. Modern developmental psychologists believe that development is a lifelong process and not fixed in childhood only as Freud believed.

2. They do not believe that an infant's neural networks are mature enough to hold as much emotional trauma as Freud assumed that they do.

3. Some critics think that Freud overestimated the parental influence and underestimated the peer influence.

4. Freud's idea that conscience and gender identity develops when children resolve Oedipus complex at the age of5 or 6 was also criticized. It is observed that children develop their gender identity much earlier than age of 5 or 6 and become strongly masculine or feminine even without a same sex parent present.

5. Critics also believe that Freud's ideas about childhood sexuality arose from his skepticism of stories of childhood sexual abuse told by his female patients. He attributed these stories of childhood abuse to their own childhood sexual wishes and conflicts.

6. Freud is also criticized on his methodology of collecting information. The way he framed his questions might have created false memories of childhood sexual abuse.

7. New ideas about why we dream are also contrary to Freud's belief that dreams display hidden feelings and are tools for wish fulfillment. Similarly, slips of the tongue can be explained as competition between similar choices in our memory. When someone says that "I don't want to do it- it's a lot of brothel" may simply be blending bother and trouble.

8. Freud's idea that defense mechanisms disguise sexual and aggressive impulses, and suppressed sexuality causes psychological disorders, is also not supported by modern research. From Freud's time, our sexual inhibitions have gone down but psychological disorders have not gone down.

9. Psychoanalytic theory assumes that the human mind often represses troublesome wishes and feelings, banishing them into the unconscious mind until they resurface. He believed that if we can recover and resolve childhood's conflicts and wishes, emotional healing would follow. However, modern researchers believe that repression is a rare mental response to trauma. Even those who have witnessed a parent's murder or survived Nazi death camps retain their unrepressed memories of the horror. (Helmreich 1992; Pennebaker,1990)

10. It is also argued that Freud's theory does not meet the criteria of being scientific theory. A scientific theory must offer new testable hypotheses and objective way of testing the existing theory.

11. The most serious problem with Freud's theory is that it offers after-the-fact explanations of any characteristic but fails to predict such behaviors and traits, e.g., according to his theory, if you feel angry at your mother's death, it is because your unresolved childhood dependency needs are threatened. On the other hand, if you do not feel angry, it is because you are repressing your anger. Lindzey (1978) rightly commented that it is like betting on a horse after the race is over.

12. Critics said that a good theory should give testable predictions but Freud's supporters said that Freud never claimed that psychoanalysis was a predictive science. He merely claimed that looking back, psychoanalyst could find meaning in our state of mind.

13. His supporters further point out that some of Freud's ideas are everlasting, e.g., he drew attention to the idea of unconscious, irrationality, self-protective defense mechanisms, importance of sexuality, tension between our biological impulses and our social well-being. He challenged our self-righteousness, punctured our pretensions and reminded us of our potential for evil.

6.2.5 The Modern Unconscious Mind

Modern researchers agree with Freud that we have very limited access to all that goes on in our minds, but they think unconscious does not comprise of just seething passions and repressive censorings, rather there is information processing going on there without our awareness. This information processing can involve:

a.) Formation of the schemas that automatically control our behavior

b.) The implicit memories that operate without conscious recall, even among those with amnesia.

c.) The emotions that activate instantly, before conscious analysis.

d.) The formation of self-concept and stereotypes that unconsciously influence the way we process information about ourselves and others.

So, our lives are guided by off-screen, out-of-sight, unconscious information processing. The unconscious mind is huge.

Recent research also supported Freud's idea of defense mechanisms. People tend to see their own faults and attitudes in others. Freud called this tendency as 'Projection", a defense mechanism. Modern researchers call it "False Consensus Effect", the tendency to overestimate the extent to which others share our beliefs and behaviors. For example, people who break traffic rules assume that everyone does it, people who are happy, kind and trustworthy assume all others are also have same attributes. Similarly, another defense mechanism used by people to defend their self-esteem is Reaction formation. Baumeister stated that defense mechanisms are less likely to be used by seething impulses and more by our need to protect our self-images.

Modern research has supported Freud's idea that we unconsciously defend ourselves against anxiety. Greenberg et.al. (1997) rightly said that one source of anxiety is "the terror resulting from our awareness of vulnerability and death". Terror management theory shows that death anxiety increases contempt for others and esteem for oneself (Koole et.al.,2006). Living in a threatening world, people tend to act not only to enhance their self-esteem but also to stick strongly to worldviews that answer questions about life's meaning. For example, the likelihood of death increases religious sentiments and deep religious beliefs enable people to be less defensive (Jonas & Fishcher,2006). When faced with death, people yearn for and stick to close relationships, e.g., when a person is nearing his end, he/she yearns to meet family and friends, and put in extra efforts to reach out to them even if they have not communicated before for years together.

Check your progress:

1. Write short notes on the following-

   a.) Division of Mind

   b.) Personality Structure

   c.) Defense Mechanisms

   d.) Neo-Freudian Psychologists

   e.) Rorschach Inkblot Test

2. Describe in detail the developmental stages of personality according to Psychoanalytic theory

3. Critically evaluate Freud's Psychoanalytic theory.

4. Describe the modern view of unconscious mind.

6.3 HUMANISTIC THEORIES

By 1950s and 1960s, some personality psychologists were dissatisfied with Freud's deterministic and B. F. Skinner's mechanistic explanation of personality. They objected to Freud's ideas that human behavior is determined by forces beyond our control, that human beings are basically evil and would destroy themselves if not restrained by social norms which are internalized in the form of superego. Moreover, Freud's theory was developed on the basis of motives reported by sick people. On the other hand, Skinner viewed human personality through respond-reward prism and emphasized only on learning. He considered human beings like machines, where they respond to environmental inputs on the basis of reward or punishment received in the past. They felt that these theories ignored the qualities that make humans unique among animals. Two psychologists, Abraham Maslow and Carl Rogers, became well known for their humanistic theories. Humanistic theorists focused on the ways 'healthy' people strive for self-determination and self-realization and offered a 'third force' option that emphasized human potential

6.3.1 Abraham Maslow's Self-Actualizing Person:

Maslow developed his theory based on healthy, creative people rather than troubled clinical cases. He proposed that we are motivated by a hierarchy of needs. First, we are motivated to satisfy our physiological needs followed by safety needs, then need to be loved or belong and then self-esteem and finally self-actualization and self-transcendence. Self-actualization refers to a process of fulfilling our potential and self-transcendence refers to searching meaning, purpose and communion beyond the self.

He based his study of self-actualization on the basis of studying people like Abraham Lincoln, who were known for their rich and productive lives. Maslow stated that such people share certain similar characteristics. They are more self-aware, self-accepting, open and spontaneous, loving and caring and not stuck by their own opinions. While working with college students, Maslow said that those who will become self-actualizing adults later on are the ones who are likeable, caring, privately affectionate to their elders and secretly uneasy about the cruelty, meanness and mob spirit.

Maslow's self-actualizing characteristics:

- **Efficient perceptions of reality***: Self-actualizers are able to judge situations correctly and honestly. They are very sensitive to the fake and dishonest, and are free to see reality 'as it is'.

- **Comfortable acceptance of self, others and nature:** Self-actualizers accept their own human nature with all its flaws. The shortcomings of others and the contradictions of the human condition are accepted with humor and tolerance.

- **Reliant on own experiences and judgment:** Independent, not reliant on culture and environment to form opinions and views.

- **Spontaneous and natural:** True to oneself, rather than being how others want. They have outgrown their mixed feelings towards their parents, have found their ultimate goals, have enough courage to be unpopular, to be unashamed about being openly virtuous.

- **Task centering:** Since they are secure in their sense of who they are, their interests are problem-centered and not self-centered. They focus their energies on a particular task and make that task as the mission of their lives. Most of Maslow's subjects had a mission to fulfill in life or some task or problem 'beyond' themselves to pursue

- **Autonomy:** Self-actualizers are free from reliance on external authorities or other people. They tend to be resourceful and independent.

- **Continued freshness of appreciation**: The self-actualizer seems to constantly renew appreciation of life's basic goods. A sunset or a flower will be experienced as intensely time after time as it was at first. There is an "innocence of vision", like that of an artist or child.

- **Profound interpersonal relationships:** The interpersonal relationships of self-actualizers are marked by deep loving bonds.

- **Comfort with solitude**: Despite their satisfying relationships with others, self-actualizing people value solitude and are comfortable being alone.

- **Non-hostile sense of humor:** This refers to the ability to laugh at oneself.

- **Peak experiences:** All of Maslow's subjects reported the frequent occurrence of peak experiences(temporary moments of self-actualization). These occasions were marked by feelings of ecstasy, harmony, and deep meaning. Self-actualizers reported feeling at one with the universe, stronger and calmer than ever before, filled with light, beauty, goodness, and so forth.

According to Maslow, peak experiences are "Feelings of limitless horizons opening up to the vision, the feeling of being simultaneously more powerful and also more helpless than one ever was before, the feeling of ecstasy and wonder and awe, the loss of placement in time and space with, finally, the conviction that something extremely important and valuable had happened, so that the subject was to some extent transformed and strengthened even in his daily life by such experiences." In other words, these are moments of transcendence in which a person emerges feeling changed and transformed.

- **Socially compassionate:** Possessing humanity. They are emotionally mature and have learned enough about life so that they are compassionate towards others.

- **Few friends:** They have few close intimate friends rather than many superficial relationships.

6.3.2 Carl Rogers' Person-Centered Perspective:

Carl Roger also believed that people are basically good and are endowed with self-actualizing tendencies. Unless faced with an environment that hinders growth, each of us is like a fruit, ready for growth and fulfillment. Roger believed that growth promoting climate needs to fulfill three conditions:

1. **Genuineness**: Genuine people are open with their feelings, drop their pretentions or deceptive outward appearance, are transparent and self-disclosing.

2. **Acceptance:** When people are accepting, they offer unconditional positive regard, an attitude of grace that values us even knowing our failings. It is a great relief to drop our pretentions, confess our worst feelings, and discover that we are still accepted, that we are free to be spontaneous without feeling the loss of others' esteem.

3. **Empathy:** Empathic people share and mirror other's feelings and reflect their meanings.

Rogers believed that genuineness, acceptance and empathy are like water, sun and nutrients that help us to grow like a fruit. As people are accepted and prized, they tend to develop a more caring attitude toward themselves. When people are heard emphatically, it becomes possible for them to listen more accurately to the flow of inner experiencing. Unconditional love makes a person optimistic, enthusiastic and helpful. For Carl Rogers and Maslow, the central figure of personality is self-concept. Self-concept refers to all the thoughts and feelings that one has in response to a question-Who am I? If self-concept is positive we view the world positively and if

we have negative self-concept, we view the world negatively and we will feel dissatisfied and unhappy.

6.3.3 Assessing the Self:

To measure personality, humanistic psychologists ask people to fill out a questionnaire that would evaluate their self-concept. The questionnaire has questions asking people to describe themselves both as they would ideally like to be and as they actually are. Rogers said that the self-concept will be positive when ideal self and real self are nearly alike.

Some humanistic psychologists believe that using a standardized assessment tool such as questionnaire, to measure personality is depersonalizing. Instead of forcing a person to respond to narrow categories, it is better to use tools like interviews and intimate conversations for a better understanding of each person's unique experiences.

6.3.4 Evaluating Humanistic Theories:

Just like Freud, Maslow and Carl Rogers also have had a tremendous impact on other psychologists. Their ideas have influenced counseling, education, child-rearing, and management. Unintendedly, they have also influenced today's popular psychology. But there has been some criticism for humanistic theories.

1. Humanistic psychology believes in tenets such as positive self-concept is key to happiness and success, acceptance and empathy nurture positive feelings about oneself, people are basically good and capable of self-improvement, humans are basically rational, socialized and forward moving (striving to be better), humans are constructive, trustworthy, and congruent when they are free of defensiveness. These ideas are well accepted in western cultures but not in all cultures.

2. Critics are of the opinion that humanistic theories are vague and subjective. For example, Maslow's description of self-actualizing people as open, spontaneous, loving, self-accepting and productive is not a scientific description. This description is merely a description of Maslow's own values and ideals, an impression of his personal heroes. However, if another theorist has another set of heroes such as Napoleon or Margaret Thatcher, he would probably describe self-actualizing people as "undeterred by others' needs and opinions", "motivated to achieve", and "comfortable with power". (M. Brewster Smith,1978) . In other words, subjective ideas such as authentic and real experiences are difficult to objectify; an experience that is real for one individual may not be real for another person.

3. Humanistic psychology is not a true science because it involves too much common sense and not enough objectivity. Humanistic concepts are difficult to define operationally and test scientifically. These theories have been criticized for merely describing personality, rather than explaining it

4. Critics also objected to the idea that put by Rogers that the only thing that matters is the answer to a question, "Am I living in a way which is deeply satisfying to me, and which truly expresses me?" Critics said that this encouragement on individualism in humanistic psychology can be detrimental. Emphasizing on trusting and acting on one's feelings, being true to oneself, fulfilling oneself can lead to self-indulgence, selfishness, and an erosion of moral restraints. Those who focus beyond themselves are most likely to experience social support, enjoy life and cope effectively with stress. However, humanistic psychologists defended themselves by saying that a secure, non defensive self-acceptance is the first step towards loving others. If people don't love themselves, how can they love others.

5. There are those who believe humanistic theory falls short in its ability to help those with more sever personality or mental health pathology. While it may show positive benefits for a minor issue, using the approach of Rogers to treat schizophrenia would seem ludicrous.

6. Critics also say that humanistic psychology is naïve, i.e., lacking wisdom. It fails to appreciate the reality of our human capacity for evil. We are living in a world where we are facing the challenges of climate change, overpopulation, terrorism and the spread of nuclear weapons. In such a situation, it is most likely that we may lose optimism that denies the threat and we may drown in dark despair where we think it is hopeless to try to change the situation. Critics say that humanistic psychology does encourage the hope that is needed for taking action but it does not provide equally necessary realism about the evil and how to cope with it.

Check Your Progress:
1. Explain the concept of self-actualization given by Maslow.
2. Discuss Carl Rogers' person-centered perspective to explain personality.
3. Critically evaluate Humanistic theories of personality.

6.4 SUMMARY

In this unit, we have discussed various theories of personality. We began with Freud's theory of psychoanalyses in which he had explained the division of mind, personality structure divided into three parts – id, ego and superego, five psychosexual developmental stages of personality – oral, anal, phallic latency and genital stage, and based on the conflicts and anxieties faced during these developmental stages, people use various defense mechanisms such as projection, reaction formation, denial, regression, rationalization and displacement. These defense mechanisms can be useful to alleviate anxiety, only if they are used in moderation. If they are used in excess they can lead to maladjustment.

However, Freud's theory has been criticized on various counts by Neo- Freudians as well as Humanistic psychologists. Though Neo -Freudians could not shake themselves away from Freud's ideas completely but they significantly held different views. They said that they don't completely agree with Freud's idea that sexuality explains everything. They either modified, extended or revised Freud's original psychoanalytic theory and emphasized the role of social, cultural and interpersonal factors also in shaping the personality. Some of the most well known Neo-Freudians are Alfred Adler, Karen Horney and Carl Jung. While Freud assumed that people have no choice in shaping their personality, Adler believed that people are largely responsible for who they are and they are driven by need reduce inferiority complex. Freud assumed that present behavior is caused by past experiences while Adler believed that present behavior is shaped by people's view of the future. Unlike Freud's emphasis on unconscious mind, Adler believed that psychologically healthy people are usually aware of what they are doing and why they are doing it.

Horney objected strongly to the concept of "penis envy", Oedipus complex, lack of confidence and an overemphasis on love relationships, and said that personality development has got very little to do with the anatomy of sex organs. She also believed that aggression is not inborn, but humans try to protect themselves by it. Similarly, she did not believe that conflict is inbuilt in human nature, rather she felt that it arises from social conditions.

Carl Jung also objected to the idea of Oedipus complex and infantile sexuality and emphasized on collective consciousness.

Maslow and Carl Rogers emphasized on looking at healthy and successful individuals while framing the tenets of personality theory and emphasized that human beings are inherently directed

towards self-actualization. However, their ideas were also not without criticism.

6.5 QUESTIONS

1. Describe Freud's views on Personality.

2. Discuss in detail Neo-Freudian views of personality.

3. Discuss in detail various developmental stages of personality development and defense mechanisms used by people according to Psychoanalytic theory.

4. Critically evaluate Psychoanalytic theory and discuss the modern view of unconscious mind.

5. Discuss in detail humanistic psychologists view personality. What criticism they have faced?

6.6 REFERENCES

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Unit -7

PERSONALITY - II

Unit Structure :

7.0 OBJECTIVES

After studying this unit, you should be able to understand -
1. Personality traits, how trait theories originated and how personality is measured
2. Why astrologers and others in the profession of future gazing should not be believed
3. The concept of Reciprocal determinism and personal control
4. The concept of Positive psychology
5. The concept of Self, Self-esteem and Self-serving Bias

7.1 INTRODUCTION

In the last unit, we have discussed some approaches to understand personality. In this unit, we are going to explore Trait Perspective, social cognitive approach to personality and we will be looking at self in detail. We will see how self-esteem is beneficial for us and how self-serving biases influence our behavior. We will also see how biology is linked to personality.

7.2 TRAIT THEORIES

7.2.1 Exploring and assessing traits

Instead of focusing on unconscious forces and hampered growth opportunities Trait theorists define personality in terms of traits - *traits*, which can be defined as habitual patterns of behavior, thought, and emotion. Traits are relatively stable over time, differ across individuals (e.g. some people are outgoing whereas others are shy), and influence behavior.

The seed of this approach was sown when in 1919, Gordon Allport, a young psychologist met Sigmund Freud, a renowned psychologist of that era, out of curiosity. During that meeting, Freud kept trying to find out what were Allport's hidden motives behind that meeting. That experience led Allport to describe personality in terms of traits. He was not interested in explaining the individual traits, rather he was more interested in describing these traits.

Exploring traits:
Each of us are a unique combination of multiple traits. The question arises which trait dimensions describe personality. Allport and Odbert (1936) counted all the words in a dictionary with which one could describe people. There were almost 18000 such words. It was necessary for psychologists to condense this list to a manageable number of basic traits. To achieve that they used a statistical technique called factor analysis.

Factor Analysis: It is a statistical procedure used to identify clusters of test items that represent basic components of a given trait. For example, people who describe themselves as outgoing also tend to like excitement and practical jokes and dislike quiet reading. Such a statistically correlated cluster of behaviors indicates a basic trait, in this example it is extraversion.

Fig.7.1
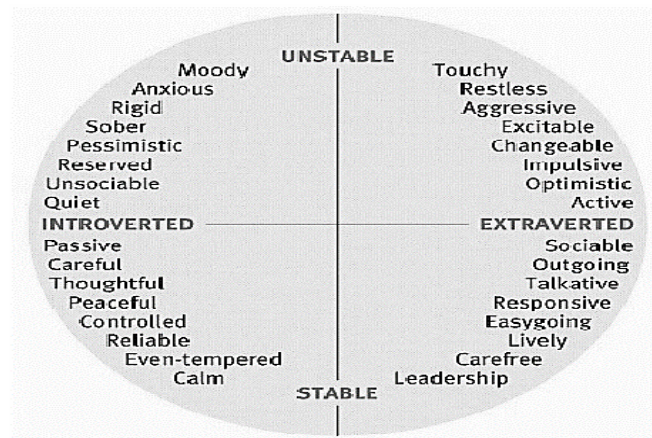
Hans Eysenck and Sybil Eysenck believed that by using factor analysis, we can reduce many of our normal individual variations to two or three dimensions such as extraversion-introversion and stability-instability. (Fig. 7.1)

Biology and Personality: There are many traits and mental states such as extraversion, intelligence, impulsivity, addictive cravings, lying, sexual attraction, aggressiveness, empathy, spiritual experiences, racial and political attitudes, etc. that can be studied with brain-imaging procedures. For example, studies using brain imaging indicate that extraverts seek stimulation because their normal brain arousal is relatively low and frontal lobe area involved in behavior inhibition is less active in them.

Similarly, studies have shown that our genes also significantly influence our temperament and behavioral style. For example, Kagan attributed differences in children's shyness and inhibition to their autonomic nervous system reactivity. If we have highly reactive autonomic nervous system, we respond to stress with greater anxiety and inhibition. On the other hand, the fearless, curious child may become the rock climbing or fast-driving adult. It has been found that not only humans but even animals have stable traits that shapes their personalities and by selective breeding, researchers can produce bold or shy birds.

Assessing Traits:
Once it was established that stable traits influence our behavior, the next question was how to measure these traits in most reliable and valid way. Many trait assessment techniques have been devised, such as personality inventories. Personality inventories are longer questionnaires covering a wide range of feelings and behaviors, i.e., they assess many traits at once. Some of these personality inventories are -

MBTI: Myers and Briggs devised a questionnaire with 126 questions based on Carl Jung's personality types. This questionnaire is known as Myers-Briggs Type Indicator(MBTI). It is available in 21 languages and is used mostly for counseling, leadership training, and work-team development. It counts the test-taker's preferences, labels them as indicating "feeling type" or "thinking type" and gives feedback to the test-taker in complimentary terms. For example, feeling type are told that they are sensitive to values, sympathetic and tactful, while thinking type are told that they prefer an objective standard of truth and are good at analyzing. Each type has its strengths, so everyone is affirmed. Though this test is popular in business and career counseling but it is not a good predictor of job performance.

Minnesota Multiphasic Personality Inventory (MMPI): This test was developed by Starke Hathaway et.al. (1960) originally to assess "abnormal" personality tendencies such as emotional disorders, but now it is used for many other screening purposes, such as work attitudes, family problems, and anger.

To construct this test, the MMPI items (questions) were empirically derived. Hathaway et.al. initially gave hundreds of true-false statements to groups of psychologically disordered patients and normal people. From a large collection of items, they retained only those questions on which both groups differed significantly. Then these questions were grouped into 10 clinical scales such as scales measuring depressive tendencies, masculinity-femininity, and introversion-extraversion.

Personality inventories are better measure of personality than projective tests discussed in previous unit, because projective tests have subjective interpretation while personality inventories can be scored objectively. In fact, so objectively that a computer can administer and score them. Yet these personality inventories do not guarantee high validity. For instance, people taking MMPI for employment purpose may not give truthful answers and may give socially desirable answers to create a good impression on the tester. To overcome this problem the MMPI has a lie scale and those who are not being very truthful may get high lie score revealing to the tester that test-taker has faked his answers. The objectivity of the MMPI has made it more popular than many other tests and it has been translated in more than 100 languages.

7.2.2 Thinking Critically about how to be a "successful" Astrologer or Palm reader:

For centuries now, psychologists have been wondering, can we predict personality traits, career of a person from his horoscope or can we be assured that marriage based on matching horoscope

will be successful and long-lasting. The answer to all these questions is "NO". Research has shown that matching the horoscope is no guarantee that couple will be happy or well-adjusted with each other or that their marriage will last.

Similarly, graphologists (who make predictions from handwriting samples) have been found to be very often inaccurate in judging people's personality and occupation from their handwritings. Yet, millions of people seek out these astrologers, palm readers and graphologists. The question arises how these people are able to fool so many people?

Ray Hyman (1981), a palm reader turned research psychologist revealed the tricks used by these people. Some of these tricks or suckering methods are –

1. Stock Spiel: This method is based on the observation that everyone in this world is different from everyone else and yet they are very similar. Since we are similar to others in many ways, when the astrologer/palm reader makes a generalized statement, it appears to be very accurate to the listeners. For example, he may say, "I sense that you worry about things more than you disclose, even to your best friends" or he may say, "I sense that you're nursing a grudge against someone; you really ought to let that go" or he may say, "you have a strong need for other people to like and to admire you, you have a tendency to be critical of yourself….", etc. These are general statements that can be connected with personality traits. People accept the generalizations that are true of nearly everybody to be specifically true of themselves.

2. Barnum Effect: People have the tendency to accept potentially vague and over-generalized, unsupported information as true, especially if that information is flattering or favorable to them. This is called the Barnum effect. For several decades, psychologists have investigated the 'Barnum effect' (sometimes known as the Forer effect). This phenomenon occurs when people accept personality feedback about themselves because it is supposedly derived from personality assessment procedures. In other words, people fall victim to the fallacy of personal validation. People accept the generalizations that are true of nearly everybody to be specifically true of themselves. For example, Davies(1997) conducted an experiment, in which college students were given a personality test and then given false, generalized feedback for the test that they had taken. When that feedback was favorable and were told that it was prepared just for them, the students always rated that feedback as good or excellent. Studies showed that when favorable personality description was given as a feedback, students who were initially doubtful about astrology were more likely to accept the personality description as well as increased their

belief in astrology as a whole. In other words, those for whom astrological theory provided a more attractive self-portrait were more likely to express belief in the validity of astrologers.

3. Read: Astrologers keep their eyes open. They also use their other senses to judge a client on the basis of clothing, jewelry, mannerisms and speech. For example, if they see a lady dressed in expensive clothes longingly looking at the calendar on the wall with a happy child's photo, the astrologer can judge that lady is rich but does not have or has lost a child of her own.

4. Tell them what they want to hear: Astrologers start with some safe sympathy statements such as "I sense you are having some problems lately. You seem unsure what to do…." Then tell them what they want to hear. They memorize some Barnum statements from astrology manuals and use them liberally.

5. Gain a client's cooperation in advance: They tell clients it is their responsibility to cooperate by relating astrologer's message with their specific experiences. They emphasize that the success of reading their palm or horoscope depends as much upon client's sincere cooperation as upon astrologer's efforts. The clients will connect those statements with their experiences and later on they will think that astrologer predicted those specific details.

6. Fishing: They use the technique of fishing - a method for getting the client to tell the astrologer about himself/herself. One way of fishing is to phrase each statement in the form of a question. Then wait for the client to reply (or react). If the reaction is positive then the astrologer turns the statement into a positive assertion. Very often the client responds by answering the implied question and later forgets that he was the source of astrologer's information.

7. Good Listener: During the session, astrologer listen carefully to his client and later on, in different words, reveal to client what the client himself earlier revealed to the astrologer. He does not realize that what astrologer is saying is exactly what he had told the astrologer a few minutes ago. So, the saying goes, if you dupe the clients, they will come back. Another value of listening is that most clients who seek the services of a reader actually want someone to listen to their problems. In addition, many clients have already made up their minds about what choices they are going to make. They merely want support to carry out their decisions.

7.2.3 The Big Five Factors:

Personality Trait	Representative Traits	
	High	Low
Neuroticism	Emotional, insecure, moody, anxious, angry, depressed, embarrassed, worried	Self-confident, secure, assured, hopeful, encouraging
Extraversion	Talkative, assertive, energetic, social, gregarious, active, lively	Introverted, reserved, withdrawn, silent, inactive, unsocial
Openness to Experience	Curious, imaginative, creative, original, artistic, broad-minded	Stubborn, unimaginative, uncreative, narrow-minded, unoriginal
Agreeableness	Cooperative, forgiving, modest, tolerant, trustworthy, courteous, flexible, soft hearted, altruistic, sensitive	Aggressive, argumentative, suspicious, confrontational, impolite, inflexible, egoistic, insensitive
Conscientiousness	Organized, persistent, thorough, responsible, goal directed, careful	Disorganized, negligent, undisciplined, irresponsible, unsystematic, careless

Modern trait researchers believe that while simple trait factors such as Eysenck's' introverted-extroverted and unstable-stable dimensions are important but they do not cover the entire personality. Costa & McCrae (2009) felt that a slightly expanded set of factors, called the Big Five, does a better job of judging entire personality. The Big Five is the most popular trait theory in personality psychology in modern times, and since 1990s lot of research is being carried out on this theory. These Big Five factors are as shown in the above table.

Research has explored various questions related to Big Five. For example, psychologists wondered:

a.) How stable are these traits? Research shows that in adulthood, these traits are quite stable, with some tendencies (such as emotional instability, extraversion, and openness) decreasing or even disappearing a bit during early and middle adulthood, and some tendencies (such as agreeableness and conscientiousness) rising. Conscientiousness increases most during people's 20s while agreeableness increases during people's 30s and continues to increase through their 60s (Srivastava et.al.2003)

b.) Psychologists were curious to know whether these traits are heritable. It is found that individual differences in each of Big Five factors are attributable to genes up to 50% or little more. Many genes combine to influence our traits. It is also found that certain brain areas are also associated with the various Big Five traits. For example, frontal lobe area is sensitive to reward and is larger in extraverts.

c.) Another question that psychologists asked was, do the Big Five traits predict other behavioral attributes? The answer is yes. For example:

i) Shy introverts are more likely than extraverts to prefer communicating by e-mail rather than face-to-face (Hertel et.al.,2008)

ii) Highly conscientious people earn better marks. They are also more likely to be morning type persons, that is, they get up early in the morning and are fully alert and full of energy in the morning. Evening types are more likely to be extraverted.

iii) People low on agreeableness, stability and openness are more likely to suffer marital and sexual satisfaction.

iv) Big Five traits influence our written language use also. For instance, in text messaging, extraverted people use more of personal pronouns, people high on agreeableness use more of positive emotion words, and those high on neuroticism (emotional instability) use more of negative emotion words.

7.2.4 Evaluating Trait Theories:
The question arises whether research supports the consistency of personality traits over time and across situations. Is our behavior influenced by the interaction of our inner traits with environment? If yes, which is more important – the traits or the environment? Research shows that as people grow older their personality traits stabilize. Their interests, careers, relationships

may change, but their personality traits do not change. It is also empirically recognized that our traits are socially significant. They influence our health, our thinking and our job performance. Longitudinal studies have shown that our mortality, divorce and occupational attainment can be predicted on the basis of our personality traits. Even though our personality traits are stable over time and do influence our behavior, the specific behavior of the people differs from situation to situation. People do not act with predictable consistency. For example, a person will display much more confidence, an outgoing social behavior in a familiar situation when he is with his friends than when he is in unknown, hostile circumstances. However, people's average outgoingness, happiness or carelessness over many situations can be predicted (Epstein, 1983a,b).

Research also shows that we do have genetically influenced traits. And those traits remain in hidden form in our music preference, our preferences in our personal space such as homes or offices, familiar or unfamiliar, formal or informal situations, personal websites, and even e-mails. For instance, it is found that in case of Music preference classical and folk music lovers tend to be open to new experiences and have high verbal intelligence. Religious music lovers tend to be cheerful, outgoing and conscientious (Rentfrow & Gosling, 2003,2006)

Personal Space – Our personal space shows our identity and leaves a behavioral residue. A quick inspection of anyone's room can tell about that person's conscientiousness, openness to new experiences, and even emotional stability (Gosling et.al.2002, 2008).

Personal Website – Personal website or a Facebook profile of a person can reveal that person's extraversion, conscientiousness and openness to new experiences. Even just pictures of people, their clothes, expressions and postures can give us clues about their personality (Naumann et.al. 2009).

E-mail – We can detect personality traits such as extraversion and neuroticism, of people from the writing voice in their e-mails or even blog writing. For example, extraverts use more of adjectives.

Unfamiliar, Formal Situations - When we visit as a guest, the home of a person from another culture, our traits remain hidden as we carefully attend to social cues. In familiar informal situations such as just being with friends, we feel less restricted and allow our traits to emerge (Buss,1989). In informal situation, our expressive styles, our way of speaking and gestures are very much consistent. For instance, Bella DePaulo et.al.(1992) conducted an experiment to evaluate people's voluntary control over their expressiveness.

She ask participants to be either expressive or inexpressive while stating opinions. She found that inexpressive people, even when pretending to be expressive, were less expressive than expressive people who were acting naturally. Similarly, expressive people while trying to pretend to be inexpressive, were less inexpressive than inexpressive people who were acting naturally. It shows that it is difficult to be someone you are not or not to be who you are.

So, to summarize we can say that at any moment the immediate situation (especially strong situation) powerfully influences a person's behavior. For instance, while driving all drivers will stop at red light irrespective of their personality traits. But if we average our behavior across many situations, it does reveal our distinct personality traits.

7.3 SOCIAL COGNITIVE THEORIES

Social cognitive perspective on personality was proposed by Albert Bandura. He said that just like nature and nurture always work together similarly, individuals and their situations also work together. Our behavior is influenced by our learning (social part learnt through conditioning/observing/imitating) and what we think (mental process or the cognitive part) about the situation. It is the way we interpret and respond to external events. Our schemas, memories and our expectations influence our behavior patterns. So let us see some of these influences.

7.3.1 Reciprocal Influence:
Bandura viewed the person-environmental interaction as reciprocal determinism. A person's behavior both influences and is influenced by personal factors and the social environment, e.g., a child's T.V. viewing habits(past behavior) influences his viewing preference(an internal factor) which will influence how TV(an environmental factor) affects his current behavior. These influences are mutual. There are 3 specific ways in which individuals and environments interact-

a.) **Different people choose different environments**: The kind of programs you watch on TV, the kind of friends you choose, music you listen to, etc. are all part of an environment you have chosen based partly on your nature or personality. First you choose your environment and then it shapes you.

b.) **Our personalities shape how we interpret and react to events:** For example, anxious people are more receptive to potentially threatening events. They perceive the world as threatening and react accordingly.

c.) **Our personalities help create situations to which we react:**
How we view and treat other people influences how they in turn treat us. If we expect someone to ignore us, we may give that person a cold shoulder, and in return that person may snub us as we expected. On the other hand, if we have an easygoing positive temperament, we are more likely to enjoy close, supportive friendships. Thus, we are both the product and the architects of our environment. Behavior is an interplay of external and internal influences. See figure 15.2

Fig.7.2
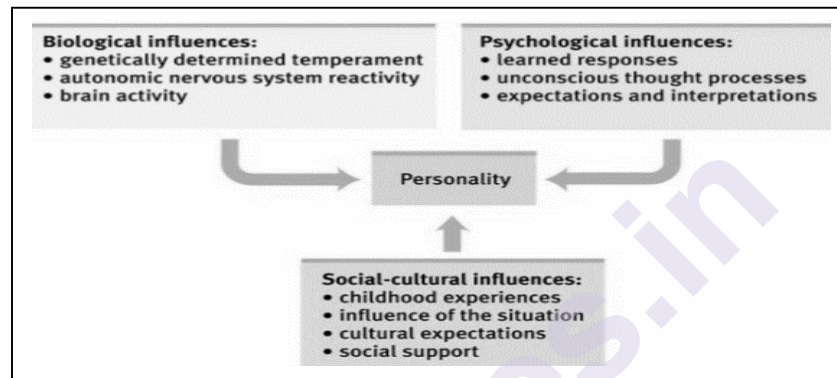
7.3.2 Personal Control:

Personal control refers to whether we see ourselves as controlling or being controlled by our environment. When we believe that we control our environment it is known as internal locus of control and when we believe that we are controlled by our environment, it is called external locus of control. Let us see how these beliefs affect us.

a) Internal vs. External Locus of Control:

Those who have internal locus of control believe that whatever happens to them is chosen by them or is due to their efforts. They believe that they are successful due to their hard work and not because of their fate. On the other hand, people with external locus of control believe that whatever happens to them due to their destiny or other external factors, they have no control over them.

Research studies have shown that people having internal locus of control get better marks, are more independent, have better health, are less depressed, and are better in delaying gratification and coping with stressors including marital problems (Miller & Monge,1986)Such people learn better, perform better at work and are more helpful. Another study found that children who expressed internal locus of control at the age of 10 had less obesity, hypertension and distress at the age of 30.

b) Depleting & Strengthening Self-Control:

Self-control refers to the ability to control impulses and delay gratification. People with high self-control have good adjustment, better marks and social success. Students who plan their day's activities and then stick that plan are less likely to be depressed later on. Baumeister & Exline (2000) held that self-control is like a muscle. It temporarily becomes weak after exertion, gets strong again after rest and becomes stronger with exercise. If we use willpower, it temporarily uses up our mental energy needed for self-control on other tasks. It even uses up blood sugar and neural activity associated with mental focus. For example, experiments showed that hungry people who had resisted the temptation to eat chocolate biscuit gave up sooner on a tedious task later than those who had not resisted and eaten chocolate biscuit. Similarly, people who had used up their mental energy in trying to control their prejudices were less restrained later in being aggressive in response to provocations. They were less restrained in their sexuality after spending willpower on laboratory tasks. However, it was also found that their effortful thinking improved if they were given energy-boosting sugar.

Self-control requires attention and energy. People who practice self-regulation through physical exercise and time-management develop self-regulation capacity. People with strengthened self-control have better self-management in eating, drinking, smoking and household chores (Oaten & Cheng, 2006a,b). In other words, if we develop self-discipline in one area of our lives, this strengthened self-control spills into other areas of life as well. We can grow our willpower muscle by using some willpower.

c) Learned Helplessness vs. Personal Control:

People with external locus of control often feel helpless and oppressed. This perception deepens their feeling of resignation. For example, an elephant who had been shackled right from childhood develops a feeling of helplessness and later on when it becomes strong enough to break the chain and free itself, still does not do it due to learned sense of helplessness. Similarly, among human beings also, when people are repeatedly faced with traumatic events over which they have no control, they start feeling helpless, hopeless and depressed. This is called learned helplessness.

Uncontrollable bad events	⇒	Perceived lack of control	⇒	generalized helpless behavior
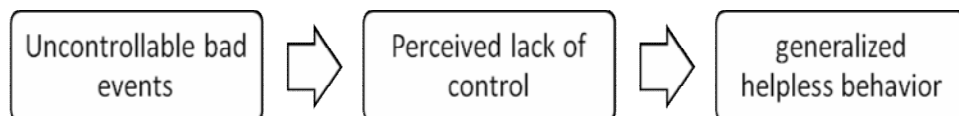
We feel shocked in an unfamiliar culture due to reduced sense of control, we are not sure how others will respond to us. People in prisons, factories, colleges and nursing homes

experience lower morale and increased stress due to lack of control over their environment. Studies showed that when prisoners were allowed to move chairs and control room lights and TV, their health and morale went up. Similarly, when factory workers were allowed to participate in decision making and were allowed to personalize their workspace, their work engagement went up, and when patients in nursing homes were offered choices about their environment and allowed to exert more control over their environment, it significantly improved their health and morale. They became more happy, alert and active.

These studies showed that people thrive when they are given personal freedom and empowerment. This is the reason why people in stable democracies report higher levels of happiness. It shows in their body language also, e.g., even poor people in democracy feel empowered and often laugh more, sit upright rather than slumped. However, Barry Schwartz (2000,2004) concluded from his study that excess of freedom in today's Western cultures leads to decreasing life satisfaction and increases depression and sometimes decisional paralysis. For instance, research showed that people express dissatisfaction when they choose jam or chocolate out of 30 brands than those who choose jam/chocolate our of only 12 brands. The tyranny of choice brings information overload and the chances are more that we will regret over some of the unchosen options and feel dissatisfied.

d) Optimism vs. Pessimism:

Optimism and Pessimism refers to attributional style of the people, their characteristic way of explaining positive and negative events. For instance, if a student fails, he may attribute his failure to his lack of ability or to situations that were beyond his control (Pessimism). Such a student is more likely to continue getting low marks than those who adopt more helpful attitude that hard work and good study habits and self-discipline can make a difference. Similarly, in dating couples, optimists and their partners feel more supported and satisfied with their relationships. Expect good things from others and you will get what you expect is the assumption.

e) Excessive Optimism:

Though positive thinking is beneficial when we are faced with difficulties in life, but realism is equally important. One should not be overly optimistic. Realistic anxiety over possible failure can lead us to put in more energetic efforts to avoid such a failure. A student who is realistically anxious about upcoming exam will study more and make sure that he passes the exam compared to a student who is over confident and does not study much. Studies have indicated that Asian American students show higher pessimism than European-American students. That is why Asian American students have higher academic achievements. To be

successful you need to have enough optimism to give you hope that you can succeed and there should be enough pessimism to prevent complacency. Remember the story of hare and tortoise. Hare was too optimistic and very low on pessimism.

Excessive optimism can blind us to real risks. This an unrealistic optimism about future life events gets fueled by our natural positive thinking bias. For example, most teenagers who are rash drivers see themselves as less vulnerable to meet with the accidents than other average teenager rash drivers. If we are overconfident of our ability to control an impulse such as the urge to smoke, we are more likely to expose ourselves to temptations, and to fail. That is why, you must have often heard smokers to say confidently," there is nothing much to giving up smoking I have done it many times". Those who optimistically deny the power and effects of smoking, get into failed relationships, outwit themselves in many other ways and ring the truth of "blind optimism can be self-defeating".

People also show illusory optimism about their groups. For example, in all IPL matches, we keep guessing that our cricket team has better chance of winning than the other teams even though other teams may be known to be strong. Even when we ourselves are getting prepared to get feedback such as our results from the exams given, we tend to assume that we will pass irrespective of how did we fare in our exams. This is due to natural positive-thinking bias. Similarly, when the match is coming to an end, we are more doubtful of our team winning especially if our team has been ahead than when our team was fairing worse than the other team. Positive illusion also vanishes after a traumatic personal experience. For example, Americans were living with positive illusion that terrorism will not touch their lives till 9/11 happened.

f) Blindness to One's Own Incompetence:

It is rather ironic that most people are most overconfident when they are most incompetent. Justin Kruger and David Dunning(1999) said it takes competence to recognize competence. Our ignorance of what we don't know helps in sustaining our confidence in our own abilities. This ignorance about our own abilities becomes part of our self-concept and then our self-assessment also influences how we perceive ourselves doing. So it is important to ask someone else also to assess our competence and predict our future performance. For example, if you want to assess your leadership abilities, don't assess yourself, ask your batch mates to judge your leadership abilities.

7.3.3 Close-Up: Toward a More Positive Psychology:

Martin E. P. Seligman (2004) has been proponent of positive psychology. Positive psychology can be defined as The scientific study of optimal human functioning. It aims to discover and promote strengths and virtues that enable individuals and communities to thrive.

Positive psychology is an umbrella term for the study of positive emotions, positive character traits and enabling institutions.

a.) Positive emotion is a combination of satisfaction with the past, happiness with the present, and optimism about the future. Seligman stated that happiness is a by-product of a pleasant, engaged and meaningful life.

b.) The Positive character focuses on exploring and enhancing creativity, courage, compassion, integrity, self-control, leadership, wisdom and spirituality. Seligman stated that positive psychology is about building not just a pleasant life, but also a good life that engages one's skills, and a meaningful life that points beyond oneself.

c.) Positive groups, communities and cultures, seek to foster a positive social ecology. This includes healthy families, communal neighborhoods, effective schools, socially responsible media and civil dialogue.

Positive psychologists hope that positive psychology will be able to build healthy minds and cure mental diseases. Just like Humanistic psychology positive psychology also believes in advancing human fulfillment but its methodology is scientific.

7.3.4 Assessing Behavior in Situations:

Social cognitive theories do not believe that future behavior can be predicted by administering a personality test or through an interviewer's intuition. They believe that future behavior of a person, in any given situation, can be predicted by looking at the person's past behavior patterns in similar situation, e.g., the best predictor of future aggressiveness is past aggressiveness and the best predictor of future job performance is past job performance. If it is not possible to check the past performance of a persona to predict his future performance, than we need to create an assessment situation that simulates the task that a person will have to perform on actual job. For instance, to assess a candidate for spy mission, The U.S. Army psychologists made candidates go through simulated undercover conditions. They tested their ability to handle stress, solve problems, maintain leadership, and withstand intense interrogation without blowing up their cover.

This method is time consuming and expensive, but it predicts future behavior more accurately. Seeing the success of simulated method, similar method called assessment center had been developed and is extensively used by military, educational institutes and Fortune 500 companies.

7.3.5 Evaluating Social-Cognitive Theories:

Social cognitive theories are based upon psychological research conducted in the field of learning and cognition. These theories sensitize researchers to how situations affect and how situations are affected by individuals.

Critics of social cognitive theories however argue that these theories give too much importance to situations and do not give much attention to person's inner traits. For instance, a person's unconscious motives, emotions, and general personality triats, biologically influenced traits.

7.4 EXPLORING THE SELF

For more than a century now, psychologists have been vigorously researching the concept of self. There are many studies that have studied topics like self-esteem, self-disclosure, self-awareness, self-schema, self-monitoring, etc. Even neuroscientists have identified a central frontal lobe region in brain that gets activated when people answer self-reflective questions related to their personality traits. The self generates so much interest among researchers because it is assumed that the self as an organizer of our thoughts, feelings, and actions is the center of personality.

Possible selves: Hazel Markus et.al. proposed that when people think about self, they think about their possible selves. Possible selves include a person's vision of the self that he dreams of becoming, e.g., rich self, successful self, loved and admired self, etc. as well as vision of self that he fears of becoming, e.g., the unemployed self, lonely self, failed self, etc. Such possible selves motivate people to set specific goals to be achieved and also to muster up energy to work towards those goals.

Spotlight Effect: When we are self-focused, we easily tend to assume that others are noticing and evaluating us, e.g., a conservative lady, wearing a swim suit for the first time feels self-conscious and assumes that everybody in the swimming pool is watching her. While in reality very few people may have noticed her. There are very few people who notice any variations in our appearance and performance (Gilovich et.al.,2002), our nervousness, irritation or attraction. In fact, even when we make a mistake such as wearing creaky shoes and reaching late for a class, dropping books with a loud noise in library, the number of

people who notice those blunders are far less than what we assume. If you know about this tendency of spotlight effect, it can empower you. For example, if a public speaker understands that his nervousness is not obvious to his audience, his speaking performance will improve.

7.4.1 The Benefits of High Self-Esteem:

Having high self-esteem can be advantageous. For instance, people with high self-esteem:

- Have less sleepless nights
- Do not easily give in to pressures to conform
- Are more persistent at difficult tasks
- Less shy, anxious and lonely.
- Are much happier than others. If they feel bad, they believe that they deserve better and make more efforts to repair their mood.

Effects of Low Self-esteem:

People with low self-esteem tend to be oversensitive and judgmental (Baumgardner et.al.1989).Even if people's self-image is temporarily deflated, they are more likely to belittle others or to express heightened racial prejudice (Ybarra,1999).People with low self esteem are insecure and often become highly critical of others, as if they want to impress others with their own brilliance (Amabile,1983).

Maslow and Rogers proposed that a healthy self-image is beneficial for our growth and happiness. If we accept ourselves as we are, it is easier for us to accept others. If we belittle ourselves, we tend to criticize and reject others also.

7.4.2 Self-Serving Bias:

Carl Rogers (1958) stated that most of the people "despise themselves, regard themselves as worthless and unlovable". Mark Twain seconded his opinion and said, "No man, deep down in the privacy of his heart, has any considerable respect for himself". However, later research indicated exactly the opposite of Rogers' and Mark Twain's views. Research studies done on self-esteem indicated that actually people have a good reputation of themselves. Even low scoring people responded in midrange of possible scores, e.g., a low self-esteem person will respond to statements such as "I have good ideas" by saying "I have somewhat good ideas" while a person scoring high on self-esteem will simply say that "I have good ideas". Modern psychologists believe that people with low self-esteem also respond positively about themselves due to self-serving bias. Self-serving bias can be defined as our readiness to perceive ourselves favorably, accepting more responsibility for success than failure, for good deeds than bad.

A self-serving bias is any thought or perception that is distorted by the need to maintain and enhance self-esteem, or the tendency to perceive oneself in an overly favorable manner. Individuals tend to attribute their success to their own abilities and efforts, but attribute their failure to external factors. When individuals reject the validity of negative feedback, focus on their strengths and achievements but overlook their faults and failures, or take more responsibility for their group's work than they give to other members, they are protecting their ego from threat and injury.

These cognitive and perceptual tendencies perpetuate illusions and error, but they also serve the self's need for esteem. For example, a student gives credit to his own intelligence and preparation when gets good marks in an exam, but if he gets low marks, he blames external factors such as that the teacher did not teach properly or teacher does not know how to teach or question paper was not set properly, etc. Thus, he shows his self-serving bias. Research studies have shown that self-serving bias plays a dominant role in various situations, such as the workplace, interpersonal relationships, sports, and consumer decisions, driving behavior, etc. For instance, a driver will always say that I was driving properly, it is the other driver who was rash and smashed his car into mine, or that pedestrian was not looking carefully while crossing the road.

Most people see themselves as better than average, especially when the behavior is socially desirable. For example, studies have shown that 90% managers and more than 90% professors rate their performance as superior to that of their average peers. Similarly, most business managers say that they are more ethical than their average counterparts. This phenomenon of overestimating self and underestimating others is more common in western countries. It is less prevalent in Asian countries because in Asian culture modesty is valued. It does not mean that it is totally absent in Asian countries. Self-serving bias is a worldwide phenomenon. Pronin (2007) commented that the irony is that most of the people think that others suffer from self-serving bias and they themselves are immune to it, but the reality is that all of us suffer from self-serving bias. Daniel Gilbert (2006) rightly said that " if you are like most people, then like most people, you don't know, you are like most people……one of the most reliable of these facts is the average person doesn't see herself as average".

Some additional findings from research on self-serving bias are:

a.) People remember and justify their past actions in self-enhancing ways.

b.) People show an inflated confidence in their beliefs and judgments.

c.) In situations, where most of people behave in less desirable manner, we overestimate how desirable we would act.

d.) People are quicker to believe flattering descriptions of themselves rather than unflattering ones, and they are impressed with psychological tests that make them look good.

e.) People tend to enhance their self-image by overestimating the commonality of their weaknesses and by underestimating the commonality of their strengths.

f.) We tend to believe that our contribution to our group task is better than average. Since every member of the group believes that his/her contribution to group task is better than average, group members' self-contribution estimates are usually higher than 100%.

g.) We display group pride, that means, that we have a tendency to see our group as superior than others' group.

The Dark Side of Self-serving Bias/ High Self-Esteem:

Self-serving bias can be a major root cause for conflicts in interpersonal relationships or even at world forum, e.g., people tend to blame their spouse for marital discord, or they arrogantly believe and promote their own ethnic superiority (e.g., Nazis believed in "Aryan Pride" and committed atrocities on Jews.) when their self-esteem is threatened, people with large egos, not only run down other people but also react violently. Self-serving biases have the potential to initiate wars and can make ending war more difficult.

Self-serving bias is not restricted to adults only, one can see these tendencies even in children. Most of the fights among children take place, when children with high self-esteem face social rejection. Children with high self-esteem tend to be more aggressive, when other children dislike them and that hurts their ego. Similarly, teenagers or adults who have very high opinion about themselves become potentially very dangerous if their ego is deflated by an insult, e.g., if a boy with very high opinion about himself proposes to a girl and girl out rightly rejects him and may even insult him, he will be become potentially very dangerous for that girl. Brad Bushman & Roy Baumeister (1998) called it "the dark side of high self-esteem". Their experiment showed that threatened egotism, more than low self-esteem, inclines a person towards aggression. When people are encouraged to feel good about themselves when they have not earned it seems to create problems. Baumeister (2001) said, "Conceited, self-important individuals turn nasty toward those who puncture their bubbles of self-love".

In western culture as well as in Asian culture, from 1980s onwards, popular songs have been emphasizing that one should be self-focused and should have high self-esteem to succeed in life. Research shows that college going students are getting influenced

by these songs and their self-esteem has gone up several notches but the adverse effect of increasing self-esteem is that people have correspondingly gone down on empathy. People with high self-esteem do not see things from others' perspective or do not have tender, concerned feelings for people less fortunate than them (Konrath et.al. 2011).

Jean Twenge (2006;2010) reported that modern generation – generation Me shows more narcissism than previous generation. Narcissists are people who believe they are superior than others or that they are special people. Narcissism is closely related with materialism, the desire to be famous, inflated expectations, more hookups with less committed relationships, more gambling and more cheating. All these characteristics are on the rise in modern generation as narcissism is rising.

Use of Self- Disparage:
The question arises that if self-serving bias is so common then why do so many people undervalue themselves. Research shows that people undervalue themselves for four reasons:

a.) Sometimes self-directed put-downs are subtly strategic. They extract reassuring comments from others, e.g., if somebody says "No one likes me", the other person may respond by saying, "But not everyone has met you".

b.) Before a game or an exam, self-belittling statements prepare us for possible failure. If somebody tells you that in an upcoming game your opponent is a very strong one, then if you lose the game, it does not hurt your ego. You blame your losing a game to the unfairness of the competition that is superior strength of your opponent. On the other hand, if you win the game, it enhances your ego that in spite of having a strong opponent you have won the game.

c.) Self- disparaging comments such as "How could I be so stupid" also helps you to learn from your mistakes.

d.) Very often, Self -disparagement is related to one's old self. When people asked to remember their really bad behaviors, they recall things from long ago while good behavior is recalled from recent past. For example, a person may say I used to short- tempered when I was a teenager but now I have cooled down as I have matured. Wilson &Ross(2001) rightly pointed out that people are much more critical of their distant past selves than of their current selves- even when they have not changed.

While researchers acknowledge the dark side of self- serving bias and self -esteem, they also point out that we have two types of self-esteem having two distinct effects.

a.) **Defensive self-esteem**: It is fragile and focuses on sustaining itself, which makes failures and criticism feel threatening. This perceived threat leads to anger and disorders.

b.) **Secure Self-esteem**: It is less fragile and less dependent on external evaluations. People with secure self-esteem feel accepted for who they are and not for their looks, wealth or acclaim. They are not under pressure to succeed and focus beyond themselves. One can gain secure self-esteem by losing oneself in relationships and purposes larger than self.

Check your Progress:
Write a detailed note on –
a.) Assessing traits
b.) The Big Five
c.) Reciprocal Influences
d.) Exploring Self
e.) Self-serving Bias

7.5 SUMMARY

In this unit, we talked about how trait theories originated with Allport's meeting with Freud. Trait theorists had a herculean task of reducing the list of thousands of traits describing human personality into manageable basic traits. For this they used the method of factor analysis. We also looked at how our autonomic nervous system and genes can influence our traits and shape our personalities. The most popular trait theory now days is Big Five that speaks of five traits that describes entire hue of personality. While evaluating trait theories, we looked at the person-situation controversy and found that both are important. Our personality traits also influence our behavior in different situations and if situation is very strong, then situation influences our behavior rather than traits. Out of this controversy originated social cognitive theories.

Social cognitive theories talked about reciprocal determinism and personal control. In personal control, we talked about locus of control, techniques to strengthen self-control, learned helplessness vs. personal control, pessimism and optimism and blindness to one's own incompetence.

We shortly touched upon on benefits of positive psychology and the evaluation of social cognitive theories.

While exploring the self we touched upon the benefits of self-esteem and how self-serving bias protects our self-esteem. However, there can be both advantages and disadvantages of self-serving bias. It can make us narcissist if overused and it can protect our ego if we use self-disparage.

7.6 QUESTIONS

1. Describe in detail and evaluate trait theories.
2. Discuss in detail The Big Five Factors and evaluate trait theories.
3. Write a detailed note on –
    a) Techniques used by successful Astrologers or Palm readers
    b) Reciprocal Influences
    c) Internal vs. External locus of control
    d) Depleting and strengthening Self-Control
    e) Learned Helplessness
    f) Optimism vs. Pessimism
    g) Positive Psychology
4. Discuss in detail personal control from social-cognitive psychology point of view.
5. Why psychologists have been doing extensive research on self and how self-esteem is beneficial to us.
6. Discuss in detail self-serving bias and how it protects our self-esteem.

7.7 REFERENCES

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Unit -8

STATISTICS IN PSYCHOLOGY: UNDERSTANDING DATA

Unit Structure :

8.0 OBJECTIVES

After studying this unit, you should be able to:

➢ Understand as to why psychologists use statistics
➢ Know the various descriptive measures of Statistic
➢ Know the various measures of central tendency
➢ Understand the measures of variability, the concept of Z-score and the normal curve
➢ Understand the concept of inferential statistics as well as the concept of correlation coefficient.

8.1 INTRODUCTION

Statistics and Psychology are intimately connected. Psychology is research oriented. Research requires application of statistical knowledge to summarize the data and to draw certain valid inferences or conclusions. Statistics deals with the method of

collecting, organizing, classifying, analyzing and interpreting numerical data. Statistics is divided in to broad fields: Descriptive Statistics and Inferential Statistics. In this unit, we would discuss the uses of Statistics for Psychologists. Following this we would discuss the Descriptive and Inferential Statistics and topics associated with it.

8.2 WHY DO PSYCHOLOGISTS USE STATISTICS?

Psychologists use statistics for multiple purposes. Some of which are briefly outlined below:

1. Knowledge of statistics helps us in our understanding of issues related to applied and theoretical research.

2. Statistics helps us to summarize the data so as to study the patterns in the given data. The branch of statistics that deals with organizing numbers and summarizing them so that patterns can be determined is called as Descriptive Statistics.

3. Statistics helps us to make scientific interpretations and draw valid inferences. The field of statistics which deals withdrawing valid and scientific inferences is called as Inferential Statistics.

4. Knowledge of Statistics helps in measuring /quantifying human characteristics or abilities.

5. Statistics is of great use in identifying the general pattern of the set of scores. Besides identifying we can also tabulate and make graphic representations of the sets of scores (e.g., Results of Students in a given class for Example XII).

6. It gives an idea as to how each individual's own performance in each area compares with his performance in other areas. For e.g., how has Meena done in Paper IV as compared to Paper V. This going togetherness is known as a measure of correlation.

7. Distribution of scores, also, tells us something about the test or the question paper. For e.g.: Are the scores evenly distributed, too easy or too difficult or do they vary uniformly or differently.

8. It can help us to get the standing of each individual, to see how he/she has performed on each test. This requires a common yardstick to express performance in two different areas.

9. Statistics gives an idea about the average level of a group, makes comparison possible, and gives the typical level of performance in the group. For e.g., how have the 8th standards done on the Math's test?

8.3 DESCRIPTIVE STATISTICS: FREQUENCY DISTRIBUTIONS

Descriptive Statistics refers to various methods of organizing, summarizing, and presenting data in an informative way. Descriptive Statistics is that statistics that is used to describe the given data in a summarized manner. We can summarize the data by using either the numerical method or the graphic method.

Descriptive Statistics includes the following:
a. Frequency Distribution, histogram and Frequency Polygon, the normal curve and other distribution types.
b. Measures of Central Tendency (i.e., Mean, Median, Mode).
c. Measure of Variability (Range, Quartile Deviation, Average Deviation, and standard Deviation).
d. Measure of Relationships.

However, in this part of the unit we are focusing only on Frequency Distribution and related concepts.

8.3.1 Frequency Distribution:
A frequency Distribution is a method of presenting the data in a summarized form. Frequency distribution can be constructed by determining how often (with what frequency) various scores occur. The other way is to set up the categories or classes and check the occurrences of scores in each category or class. Some frequency distribution tables include an extra column that shows the percentage of cases in each category. Frequency distributions are presented as frequency tables, histograms or polygons.

The advantages of using frequency distribution are:

1. Frequency tables help in organizing raw data in such a way that information makes sense at a glance.

2. Frequency tables can help to identify obvious trends within a data set and can be used to compare data between data sets of the same type.

3. Frequency tables are easy to interpret and they can display a large data sets in a fairly concise manner.

4. Frequency tables are used to present a frequency distribution visually, with graphs.

Let us see an example of how frequency distribution table looks for students scoring marks on psychology test

Table 8.1: Raw Data

91	84	80	77	75
72	75	93	73	81
81	91	64	92	82
62	94	84	71	87
62	77	94	89	83
93	83	86	88	84
82	90	86	88	84
83	91	84	92	94

Table No. 2: **A Frequency Distribution Table**

Scores on Test	Frequency (f)
94	3
93	2
92	2
91	3
90	1
89	1
88	2
87	1
86	2
84	5
83	3
82	2
81	2
80	1
77	2
75	2
73	1
72	1
71	1
64	1
62	2

8.3.2 Histogram:

Histogram is a graph that represents the class frequencies in a frequency distribution by vertical adjacent rectangles. It is the most widely used methods of a frequency distribution. The purpose of a histogram is to show the frequencies within class graphically. In a histogram, it is assumed that scores be spread uniformly over their intervals. The frequencies within each class interval of a histogram are represented by a rectangle. The base of which equals the size of the class interval and the height of which equals the number of scores (f) within that interval.

The histogram has following special features:

1. The area of the histogram corresponds to the total (N) of the distribution
2. The area of each bar in a histogram corresponds to the frequency within a given interval.
3. The class intervals shown at the x axis in histogram do not have any gaps. They are continuous and always touch. For example, if we want to draw a histogram of above table, then on x axis, for class interval 50-59 we will begin with 49.5 -59.5, then 59.5 - 69.5 and so on.
4. The bars are always vertical.

To plot a histogram the first step is to create a frequency table. Let us take an example to plot a histogram from the following frequency table

Table No. 3 Frequency Table   *Histogram*

Interval's Lower Limit	Interval's Upper Limit	Frequency
159.5	169.5	1
149.5	159.5	1
139.5	149.5	6
129.5	139.5	11
119.5	129.5	36
109.5	119.5	59
99.5	109.5	78
89.5	99.5	130
79.5	89.5	147
69.5	79.5	107
59.5	69.5	53
49.5	59.5	10
39.5	49.5	3

Fig. 1
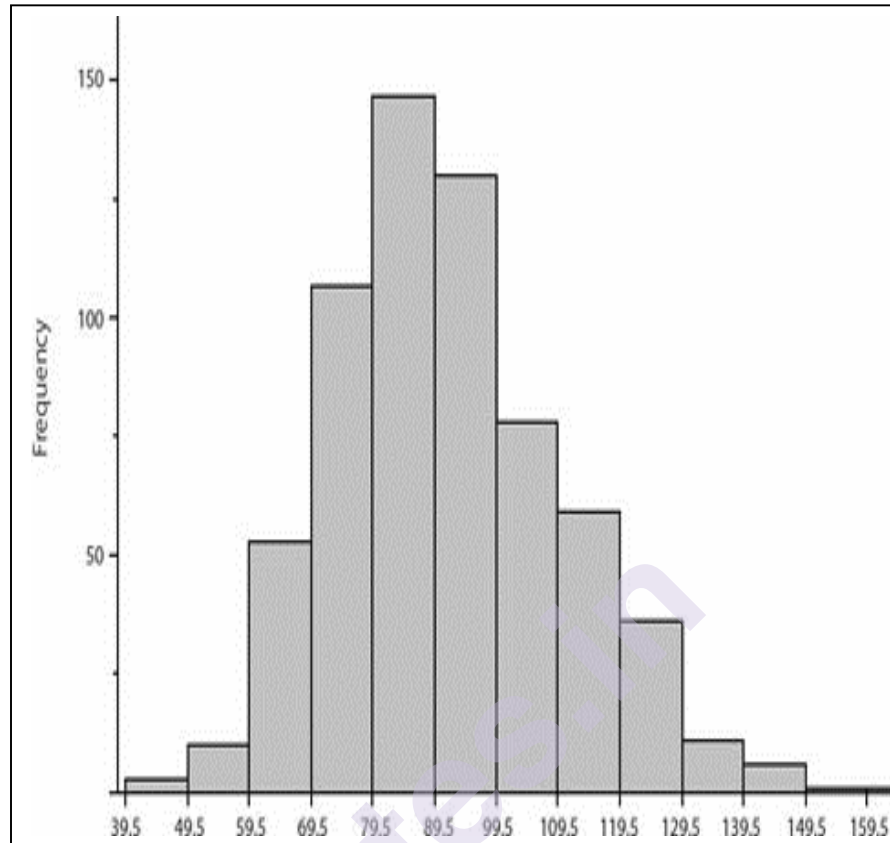
8.3.3 Frequency Polygon:

A frequency polygon is also a graphical presentation of frequency distribution. It is a line graph showing a frequency distribution. The basic difference between histogram and frequency polygon is that in histogram, it is assumed that all scores in a given class interval are spread uniformly over that class interval, while in a frequency polygon, we assume that all scores in a given interval are concentrated at the midpoint of that class interval. In other words, while plotting a frequency polygon, the midpoint of an interval is always taken to represent the entire interval.

To plot frequency polygon, we first need to convert raw data into grouped frequency table as shown above in table no. 1. Then we need to calculate the midpoint for each class interval and put them on x axis. Then on y axis, we need to plot the frequency corresponding to each class interval and then to join all these points by straight line, e.g.,

Table No. 4

Class Interval	Midpoints	Frequency
129.5 -134.5	132	1
124.5 – 129.5	127	1
119.5-124.5	122	7
114.5-119.5	117	13
109.5 – 114.5	112	18
104.5 -109.5	107	8
99.5 -104.5	102	2

Midpoints are found by adding the upper and lower boundaries and dividing by 2. For example, 99.5 + 104.5/ 2 = 102,104.5+109.5/ 2 = 107, and so on.

Fig.2 Polygon
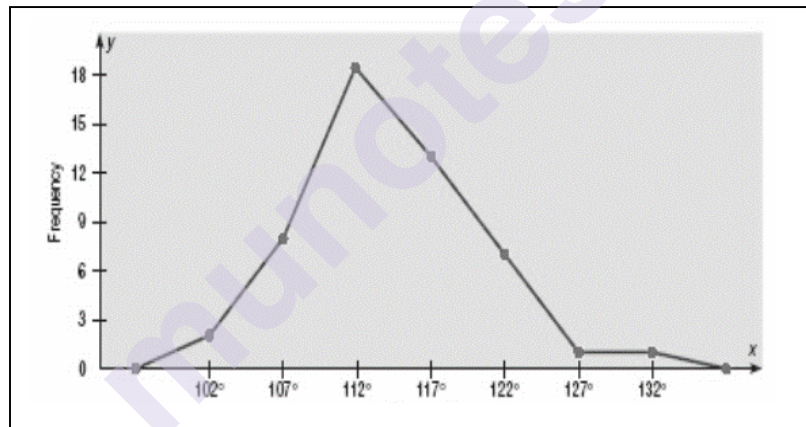
Some statistician, however, prefer to close both the ends of the polygon by extending them to the base line as shown in above figure. To do this, two hypothetical classes (one on each end) are added to the frequency table, each with a frequency of zero.

The polygon is closed at the base by extending it on both its sides (ends) to the midpoints of two hypothetical classes, at the extremes of the distribution, with zero frequencies. See Fig.2

On comparing the Histogram and a frequency polygon, you will notice that, in frequency polygons the points replace the bars(rectangles). Also, when several distributions are to be compared on the same graph paper, frequency polygons are better than Histograms.

Comparison of Histogram and Polygon:

Though no one type of graph is good for all purposes, each one has its own advantages and disadvantages.

1. Histogram is easier and best pictorial presentation if only one distribution is to be shown. If two or more distributions are to be compared, then polygon is better. For example, if we want to show graphically the performance of a particular class on one particular subject such as psychology, we can use histogram and we will be able to say how many marks majority of the students have got on that exam. On the other hand, if we want to graphically present performance of the same students on number of subjects such as English, Psychology, Political Science, etc. then using polygon will be better for easier comprehension of the results.

2. Frequency polygons are good for showing the shape of a distribution. However, a frequency polygon is less precise than a histogram because it assumes all the scores within a class interval are at the midpoint which is not an accurate representation.

8.4 MEASURES OF CENTRAL TENDENCY

Though frequency distribution tells us how scores are distributed in a given data but this does not give us a single score that is "typical" of that data. Measures of Central Tendency are those numbers that best represent the most typical scores of a frequency distribution. These measures of Central Tendency are used to represent the entire distribution of scores which are usually found near the center of the data when arranged in order of size. Different measures of central tendency are more or less average values that represent a group value. Such a value is of great significance because it depicts the characteristic of the whole group.

The most common measures of Central Tendency are Mean, Median and Mode. The various measures of central tendency have two important uses in psychology.

• They are an average which represent all of the scores made by a group and as such gives a concise description of the performance of the group as a whole.
• It enables us to compare two or more groups in terms of typical performance. This comparison can be within one group or between groups of data.

Now let us see how to compute mean, median and mode.

8.4.1 Mean:

Mean is also called as arithmetic mean or average. It is the most commonly used measure of central tendency. It is simply the sum of the numbers divided by the number of numbers. For example,

a) The mean of 7, 12, 24, 20, 19 is (7 + 12 + 24 + 20 + 19) / 5 = 16.4.
b) The mean of the numbers: 1+2+3+6+8=20/5=4.

The formula for mean is

$$\overline{X} = \frac{\sum X}{N}$$

In this formula, each letter and symbol has a specific meaning:

X =It is the symbol of mean.

∑ = It is sigma, the Greek letter for S, and it stands for "sum", i.e., total.

X = It represents the scores in the distribution, so the numerator of the formula says "sum up all the scores".

N = N is the total number of scores in a distribution.

So, according to the formula, the mean is equal to the sum of all the scores divided by the total number of scores, as shown in above example.

This formula is useful when the data is not too big and is not grouped in frequency distribution. But if the data is too large and needs to be grouped then we need another method of computing the mean.

Although the mean is usually the most representative measure of central tendency because each score in a distribution is included in the computation but mean is susceptible to the effects of extreme scores in a distribution. It means, any unusually high or low score will pull the mean in its direction and you will not get correct representation of the distribution.

8.4.2 Median:

Median is that value of a variable which divides a series in two equal parts in such a manner that the number of items below it is equal to the number of items above it. The median is a positional average referring to the place of a value in a series. Median is influenced by the position of items in a series and not by the size of the items like the mean.

Median is used under following conditions:
(i) Median is used when the exact midpoint of the distribution is wanted.

(ii) The median is useful for distribution containing open ended intervals, since these intervals do not enter its computation.

(iii) The Median, is almost useful when the distribution has extreme scores i.e.,

Median is most useful when a given distribution is skewed.

Computation of the Median:
When there is an odd number of scores in an ungrouped data, the median is simply the middle number. For example, the median of 2, 4, 7 is 4. Similarly, the median of 3, 5, 6, 9, 15 is 6.

When there is an even number of numbers, the median is the average of the two middle numbers.

Thus, the median of the numbers 2,4,7,12 is 4+7 divided by 2 = 5.5.

Similarly, the median of 2, 7, 15, 20 is (7+15)/2 = 11.

8.4.3 Mode:
Mode is defined as the most frequently occurring value in a given data. There are many situations in which arithmetic mean and median fail to reveal the true characteristic of data. For example, when we take the common habitat, attitude, behaviour, etc., we have in mind mode and not the mean or median. The mean does not always provide an accurate reflection of the data due to the presence of extreme items. Median may also prove to be quite unrepresentative of the data owing to an uneven distribution of the series. Both these shortcomings can be overcome by the use of the mode which refers to the value which occurs most frequency in a distribution. Mode is used under following conditions:

• We use mode with a quick and approximate measure of central tendency is wanted.
• We use mode when information regarding the most typical case, such as style of dress or shoes is all that is wanted.
• Mode is employed when the most typical value of a distribution is desired.
• It is the most meaningful measure of central tendency in case of highly skewed or non-normal distribution as it provides the best indication of the point of maximum concentration.

Example:

a) For individuals having the following ages — 18, 18, 19, 20, 20,20, 21, and 23, the mode is 20.

b) Problem: Find the mode from the following data: 7, 13, 18,24, 9, 3, 18

Solution: Ordering the scores from least to greatest, we get: 3,7, 9, 13, 18, 18, 24

Answer: The score which occurs most often is 18, Mode = 18

c) Determine the mode of the following scores: 8, 11, 9, 14, 9,15, 18, 6, 9, 15. The mode of the above data is 9 as it is the most frequently occurring value.

8.5 MEASURES OF VARIABILITY

Measures of variability are also called as the measures of dispersion or averages of the second order. Average is not always a good measure of a given distribution. Two or more groups may have the same average but different variabilities. Too much of dispersion or spread of the data is not good. Hence, measures of central tendency should always be accompanied by measures of variability.

We can define measures of variability as statistics that describe the amount of difference and how scores are spread out in a data set. It is a measurement of the degree of differences within a distribution.

There are many measures of variability. In this section, we would discuss the two measures of variability which include the Range, Standard Deviation. The Z-scores and normal curve we shall discus in next section.

These various measures of variability are used for four basic purposes:

- To determine the reliability of an averages;
- To serve as a basis for the control of the variability;
- To compare two or more series with regard to their variability;
- To facilitate the use of other statistical measures that depends on the variability;

8.5.1 Range:

The Range is one of the crudest, simple and straight-forward measures of variability which can be defined as the difference

between the value of the smallest item and the value of the largest item included in the distribution. In other words, range is the difference between the highest and the lowest scores in a distribution. (See the first step in frequency distribution in table no. 1)

- Range is not suitable for precise studies.

- It is only a rough measure of dispersion. It is useful to compare groups roughly, when the measures are small. It can't be used to compare large groups.

- It takes into account the extreme measures only. It is generally used when we need to know the highest and the lowest scores so as to know the total variation.

- It is not a reliable measure of variability.

- It can't be used when there are many gaps in the distribution.

- It can be used when the data are too scant or too scattered to justify the computation of a precise measure of variability or when we just want to know the extreme scores of the total spread.

8.5.2 Standard Deviation:

The standard deviation indicates the "average deviation" from the mean, the consistency in the scores, and how far scores are spread out, around the mean of the distribution. In other words, it can be defined as the square root of the sum of the squared deviations from the mean of scores and divided by the number of scores, in a distribution.

- It is one of the most reliable measures of variability.
- It is always positive.
- It is based on all the observations/scores of the data.
- It is a basic building block for analyzing our data.
- It provides insights into identifying outliers.
- It is important in inference.
- It is less affected by the fluctuations of sampling than most of other measures of dispersion.

Let us take an example to see what are the steps needed to compute standard deviation.

Formula for standard deviation is :

$$SD = \sqrt{\frac{\sum(X - \overline{X})^2}{N}}$$

Where

SD = the standard deviation of a sample

$\sum$ = means sum of

X = each score in the data set

$\overline{X}$ = mean of all scores in the data set

N = number of scores in the data set

Steps to compute standard deviation (Refer Table No. 5)

Table No. 5

Score X	Mean $\overline{X}$	Score – Mean $X - \overline{X}$	(Score-Mean) Squared $(X - \overline{X})^2$
155	124	31	961
149	124	25	625
142	124	18	324
138	124	14	196
134	124	10	100
131	124	7	49
127	124	3	9
125	124	1	1
120	124	-4	16
115	124	-9	81
112	124	-12	144
110	124	-14	196
105	124	-19	361
102	124	-22	484
95	124	-29	841
Sum ($\sum$) =1860 Mean ($\overline{X}$) =124		$\sum$ = 0	$\sum$ = 4388

$SD = \sqrt{4388/15}$ = 17.10

1. Arrange the data in ascending order.
2. Add up all the scores in first column (you get sum = 1860).
3. To get the mean, divide the sum of all the scores in first column with the number of scores in that column. (1860/15 = 124).
4. Put the mean of the data against each score in second column.
5. In third column, for each score (X), we find the difference between the X and X. When the mean is subtracted from a score a score, the result is a deviation from the mean. Scores that are above the mean would have positive deviations and the scores that are below the mean would have negative deviations. If the deviations from the mean are added together, the sum will be 0 because the negative and positive deviations will cancel each other out.
6. In mathematics, if a negative number is squared, it becomes positive. So, to get rid of the negative deviations, we will square off each deviation and put it fourth column. Then we calculate the sum of these squared deviations.
7. To get standard deviation, we take the sum of squared deviations and divide by the total number of cases, and take the square root.

Standard Deviations a measure of absolute distribution, the greater the amount of dispersion, the greater the standard deviation. standard deviation is generally used under following conditions:

- When further computations that depend on SD are needed.
- When we have to compare individuals score on two or more tests.
- When interpretations related to the normal probability curve are desired.

One of the greatest limitations of standard deviation is that it is sensitive to extreme values.

8.6 Z – SCORES AND NORMAL CURVE

8.6.1 Z – Scores

Z - scores are one type of standard scores which represents the differences between individual scores and the mean score expressed in units of standard deviations. Z-scores are a conversion or transformation of individual scores into a standard form, where the transformation is based on knowledge about the population's mean and standard deviation.

Z – Score can be defined as a statistical measure which indicates how far away from the mean a particular score is in terms of the number of standard deviations which exists between the mean and that score.

A positive Z-score means that the score is above the mean, while a negative Z-score means that the score is below the mean. The larger the z-score, the farther away from the mean the score is.

There are two major uses of Z-score:

- It tells the exact location of a score in a distribution: For example, Vijay is09 yrs. old and weighs 40 Kilograms. How does his weight compare to other children of his age groups?

- Z-score allows us to compare two scores coming from different distributions. Geeta scored 72 on her Psychology test and 61 on her biology test, on which test did she perform better? It would not automatically mean that she did better on Psychology test. You cannot simply compare two marks from the two classes because each class is composed of a different population. If most of the students from Psychology class get scores in 90s, then Geeta might be just performing in below average range and if in biology most of the students have got marks in 50s then Geeta's performance comes in above average range. So the only way to find out would be to convert her scores in the two subjects into Z-scores.

- Z-scores take data of any form and put them into a standard scale. High score in a distribution always has a positive z-score and a low score in a distribution always has a negative z score.

The formula for computing Z-score is:

$$z = \frac{X - \overline{X}}{SD}$$

$\overline{X}$ = Raw score
X = Mean
SD = Standard Deviation
Let us take an example from table no. 4

z = 149 -124 / 17.10 = 1.46
z= 115-124/17.10 = -.53

A z score of +1.46 indicates that a person scoring 149 marks falls about one and a half standard deviation above the mean. On the other hand, a person scoring 115 marks falls below the mean and has negative z score. A score of 115 is a little more than one-half a standard deviation below the mean.

8.6.2 Standard Normal Curve:

It is also called standard normal distribution. Normal Curve is also called as the Normal Probability Curve, the Gaussian Curve (after a great German mathematician who investigated its properties and wrote the equation for it).

Fig.3

Normal Curve

Approximately 34% of the scores fall between the mean and one standard deviation below the mean.

Approximately 34% of the scores fall between the mean and one standard deviation above the mean.

Approximately 14% of the scores fall between one standard deviation and two standard deviations below the mean.

Approximately 14% of the scores fall between one standard deviation and two standard deviations above the mean.

34.13%   34.13%

13.59%   13.59%

2.14%   2.14%

−3s	−2s	−1s	X̄	+1s	+2s	+3s
Two standard deviations below the mean	One standard deviation below the mean		Mean (median and mode)	One standard deviation above the mean	Two standard deviations above the mean	

If the mean is 3.0 (X̄ = 3.0) and the standard deviation is 1.0 (s = 1.0) the scores are as follows:

0.0	1.0	2.0	3.0	4.0	5.0	6.0
(−3s)	(−2s)	(−1s)	(X̄)	(+1s)	(+2s)	(+3s)

It is also called as the Bell-Shaped Curve or Mesokurtic Curve (Meso means middle or medium). Normal Curve is a special frequency polygon in which the scores are symmetrically distributed around the mean.

In this curve the mean, median and mode are located exactly in the middle of the curve with scores decreasing as the curve extends from the mean. If a line is drawn down its center, one side of the curve is a mirror image of the other side.

Features of Normal Curve:

1. The normal curve is symmetrical about the mean. The number of cases below the mean in a normal distribution is equal to number of cases above the mean.

2. The height of the curve is maximum at its mean. Thus, mean, median, and mode are equal in normal probability curve.

3. There is one maximum point of the normal curve which occurs at the mean. The height of the curve declines as we go in either direction from the mean. This dropping off is slow at first, then rapid, and then slow again. This pattern is the reason the normal curve is often described as "bell shaped". Theoretically, the curve never touches the base line. Its tail approaches but never reach the base line. Hence, the range is unlimited.

4. The point of inflection i.e., the points where the curvature changes in direction are each plus or/and minus one standard deviation from the mean ordinate.

5. If a variable is normally distributed, that is, if it has the standard bell-shaped pattern, a person's z-score can tell us exactly where that person stands relative to everyone else in the distribution.

6. The total interval from plus one standard deviation to minus one standard deviation contains 68.26% of the cases. Similarly, 99.44% of the total area will be included between the mean ordinate and an ordinate 2 standard deviation from the mean. Similarly, 99.74% of the total area will be included between the mean ordinate and a point 3 standard deviation away from the mean.

8.6.3 Other Distribution Types

Besides the normal distribution, there are many different types of distributions that we may get from a given data. Two such distributions are Skewed Distributions (also called as Skewness) and Bimodal Distributions:

Skewed Distribution:

It can be defined as a frequency distribution in which most of the scores fall to one side of the distribution or the other side. The word skewed means lacking symmetry or distorted.

Skewness shows the direction of symmetry. A distribution is said to be skewed when the mean and the median fall at different points in the distribution and the balance or center of gravity is shifted to one side or the other. In normal distribution, the mean equals the median and the skewness is of course, zero, the more nearly the distribution approaches the normal form, the closer together are the mean and the median and the less the skewness.
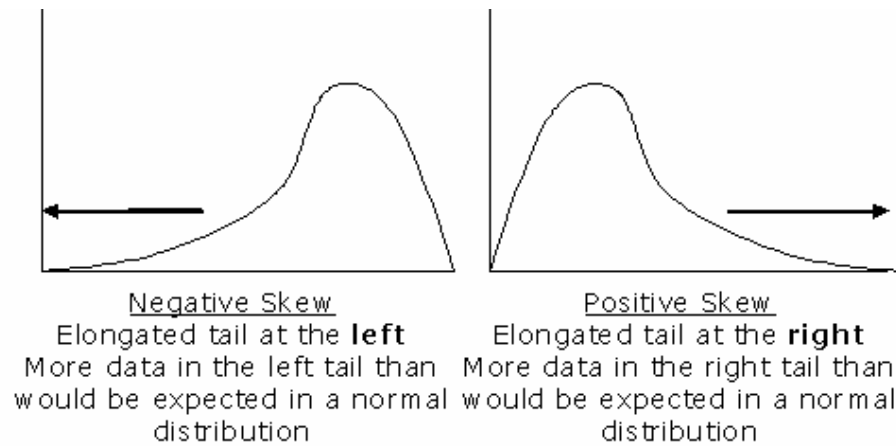
Types of Skewed Distributions: There are two types of Skewed Distributions:
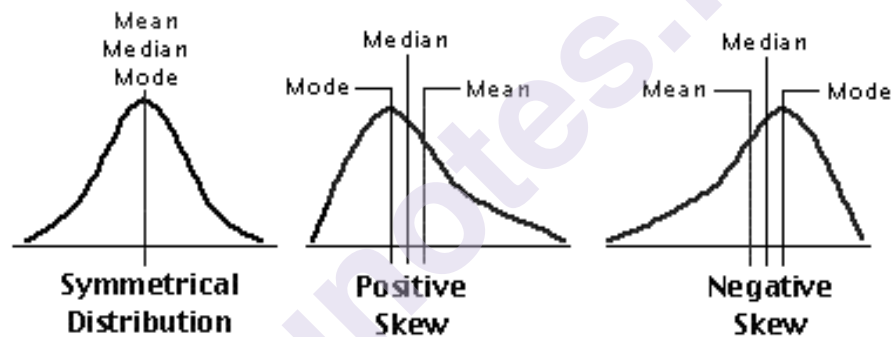
Negatively Skewed

The mass of distributions is concentrated on the right end of the figure and are spread out more gradually towards the left. The left tail is the longest.

Positively Skewed

The mass of distribution is concentrated on the left of the figure and are spread out more gradually towards the right. The right tail is the longest. See Fig.4

Fig.4

Negative Skew
Elongated tail at the **left**
More data in the left tail than
would be expected in a normal
distribution

Positive Skew
Elongated tail at the **right**
More data in the right tail than
would be expected in a normal
distribution

All three types of distribution will look like Fig. 5

Fig.5

Mean
Median
Mode

Median
Mode — Mean

Median
Mean — Mode

Symmetrical
Distribution

Positive
Skew

Negative
Skew

Bimodal Distributions:

　　Some frequency polygons show two high points rather than just one, such a distribution is called as bimodal distribution. A bimodal distribution is a frequency distribution in which there are two high points rather than one. In a bimodal distribution, there are two peaks in occurrences, so you should see two humps or spikes. For example, a bimodal distribution would look like figure 6

Fig.6
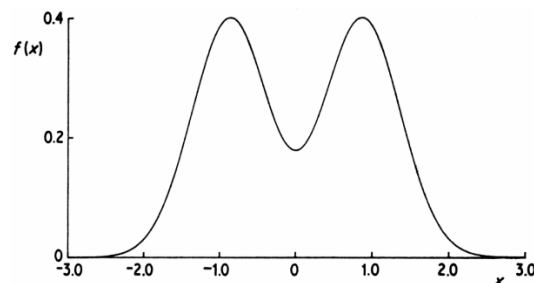
8.7 THE CORRELATION COEFFICIENT

Correlation refers to the relationship between two variables. It is a method of summarizing the relationship between two sets of data. Correlation is expressed in terms of coefficient of correlation or Correlation Coefficient. It is denoted as "r".

Correlation requires two scores from the SAME individuals. These scores are normally identified as X and Y. The pairs of scores can be listed in a table or presented in a scatter plot. Usually the two variables are observed, not manipulated.

A correlation coefficient is a number that represents the strength and direction of a relationship existing between two variables that tells us to what degree one variable varies with the variations in the other.

Coefficient of correlation is a single number that varies from +1.00 to 0.00 to -1.00. The number tells us about the magnitude or degree of relationship whereas signs, plus or minus, tells us about the direction of relationship. A number close to 1 (whether positive or negative) indicates a strong relationship, while a number close to 0 indicates a weak relationship. Thus +1.00 denotes perfect positive correlation, whereas -1.00 denotes perfect negative correlation. In psychology and other social sciences, it is very difficult or rather impossible to get perfect correlation. Such perfect correlations are usually obtained in physical sciences.

- A correlation coefficient close to zero indicates a weak linear relationship between two variables.

- A correlation coefficient of zero would indicate that there is no correlation, or relationship, between two variables. For example, the correlation coefficient between shoe size and number of books read.

- A positive correlation coefficient occurs when the values of both variables increase together. That is, an increase in one variable tends to be associated with an increase in the other variable. For example, relationship between studying hard and high grades in school. Those who study more, get higher grades in school. Take another example of height and weight. Taller a person is, heavier he will be.

- A negative correlation coefficient occurs when the increase of one variable corresponds with the decrease of another variable. That is an increase in one variable tends to be associated with a decrease in the other variable in the same proportion. For example, the more you study, less the chances of failure. Take another example, the relationship between the height above the

sea level and temperature. As the height above the sea level increases, the temperature drops and it gets colder.

So, when increase in one variable lead to simultaneous increase in another variable or vice versa, it is called as positive correlation. On the other hand, when increase in one variable leads to decreases in other variable or vice versa it is called as negative correlation. When increase or decrease in one variable does not affect the other variable in any manner, then it is called as zero correlation.

Correlation coefficient is computed by using following formula:

$$\text{Correlation coefficient} = \frac{\sum Z_x Z_y}{N}$$

Steps in Computation of Correlation Coefficient:

1. As mentioned above, correlation is computed between two variables and for computation purpose we call them X and Y. To compute a correlation coefficient, the data from both variables can be converted to z scores. So, each individual will have two z scores – one for X variable and one for Y variable.

2. Each person's two z scores are multiplied together.

3. All these cross products are added up

4. The sum of all cross products is divided by the number of individuals.

Thus, correlation coefficient is the mean of the sum of the products of the z scores for the two variables. In terms of z scores -

- In positive correlation, high z scores on one variable tend to be multiplied by high z scores on the other variable and the low z scores on one variable tend to be multiplied by low z score on the other variable. However, the sum of cross products is always positive in both cases, because when two negative numbers are multiplied, they result in a positive number.

- In negative correlation, high z scores (which are positive) on one variable tend to be multiplied by low z scores (which are negative) on the other variable, and vice versa. This results in negative cross products. So, when the sum of these negative cross products is divided by N, the result is a negative correlation coefficient.

The following figure depicts the graphic representation of different types of correlation. Plotting two variables together creates a scatter diagram or scatter plot.

As you can see in fig. 7 and Fig. 8, positive relationship generally forms a line running from lower left to upper right. A perfect negative relationship generally forms a line running from upper left-hand corner of the graph to lower right-hand corner of the graph.

The minimum coefficient is .00, which indicates there is no consistent relationship between the two variables. From a z-score point of view, when two variables are not related, the cross-products are mixed, that is, some are positive and some are negative. In other words, sometimes high z scores on one variable go with high z scores on the other and low z scores on one variable go with low z scores on the other. When the cross products for the two variables are summed, the positive and negative numbers cancel each other out, resulting in a 0 correlation.

From this minimum value, the coefficients increase in both directions until -1.00 is reached on one side and +1.00 is reached on the other side. Both -1.00 and +1.00 indicate perfect and close relationship between the two variables. The sign of plus or minus indicates the direction of the relationship while the number indicates the magnitude of the relationship.
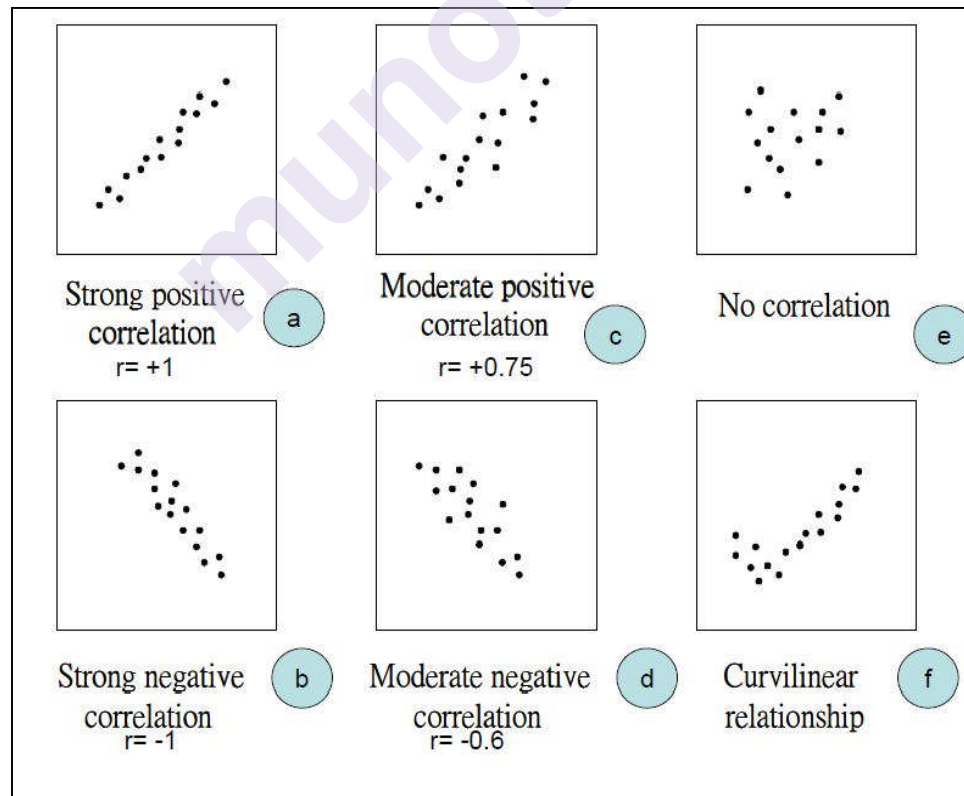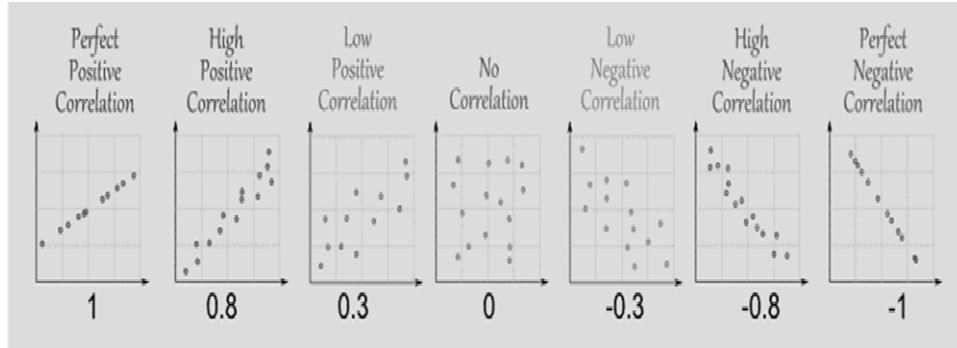
Fig.7

Strong positive correlation r= +1 (a)

Moderate positive correlation r= +0.75 (c)

No correlation (e)

Strong negative correlation r= -1 (b)

Moderate negative correlation r= -0.6 (d)

Curvilinear relationship (f)

Fig.8

Uses of Correlation Method:

1. **Relationship:** Correlation allows the researcher to investigate naturally occurring variables that maybe unethical or impractical to test experimentally. For example, it would be unethical to conduct an experiment on whether smoking causes lung cancer. Correlation allows the researcher to clearly and easily see if there is a relationship between variables. This can then be displayed in a graphical form.

2.**Prediction:** The coefficient is useful in predicting the performance on the second variable by knowing the score on the first variable.

Causality: However, correlation does not necessarily mean causation. The fact that two variables are highly correlated does not necessarily mean that one variable directly causes the other. For example, there might be a strong correlation between ice-cream sales and the sale of sunglasses. Can we say buying ice-cream causes people to buy sunglasses also? NO, there can be other reasons for positive correlation between the sale of ice-cream and sunglasses and that is hot weather.

Experimental method is the only method that can give strong scientific evidence of cause-and-effect relationship between two or more variables.

8.8 INFERENTIAL STATISTICS

Inferential statistics is a branch of statistics which helps us to draw inferences about the population on the basis of sample. It enables us to make confident decisions in the face of uncertainty. Inferential statistics consists of statistical techniques that allow researchers to determine how likely it is that a study's outcome is due to chance and whether the outcome can be legitimately generalized to a larger population.

There are many different kinds of inferential statistical methods. The method that is used depends on the design of the experiment, such as number of independent and dependent variables or the number of experimental groups. It allows researchers to determine the difference between results of a study that are meaningful and those that are merely due to chance variations.

Statistical Significance:

Inferential statistics allows researchers to determine how much confidence they should have in the results of a particular experiment. If inferential statistics indicates that the odds of a particular finding occurring are considerably greater than mere chance, we can conclude that our results are statistically significant. Statistically significant results indicate that we can conclude with a high degree of confidence that the manipulation of the independent variable, rather than simply chance, is the reason for the results. In other words, statistical significance is a way to test differences to see how likely those differences are to be real and not just caused by the random variations in behavior that exist in everything animals and people do.

Inferential statistics uses wide variety of statistical tests, some of which include the T test, the F test, Chi Square, etc. For example, t-tests are used to compare the means of two groups. Analysis of variance(ANOVA) is used to compare the means of more than two groups.

Type I & Type II Error:

In psychology, we can't be fully sure that our intervention/manipulation only was responsible for the results that we have got. We always have to deal with probabilities and not certainties. Since researchers are dealing with probabilities, there is always a small but real possibility of erroneously concluding that study results are significant. Here the term error does not mean mistakes or inaccuracies which may be committed in making observations, counting and calculations, etc. It refers to the difference between the true value of a parameter and its estimate provided by an appropriate sample statistic. There are two types of errors that may occur – Type I error and Type II error.

A Type I error occurs when the results show that a difference exists but in reality, there is no difference. So, the results of one study should never be trusted completely. It is asserting something that is absent, a false hit. To have greater confidence in a particular effect or result, the study should be repeated or replicated. If the same results are obtained in different studies, then we can be more certain that our results about a particular effect are correct.

A Type II error occurs when a researcher fails to find a significant effect, yet that significant effect really exists. It is failing to assert what is present, a miss. A Type II error occurs when a study does not have enough power. In other words, the study is not strong enough to find the effect the researcher is looking for. Higher power may be achieved by improving the research design and measuring instruments or by increasing the number of participants being studied.

Population vs. Sample:

A population is a complete set of something- people, nonhuman animals, objects or events. For example, if I want to conduct a study on the study habits of students in the age group of 18 to 25, residing in Mumbai, and irrespective of stream they belong to. They may be students of Arts, Science, Commerce, Medical or Engineering stream or any other stream. Logistically, it won't be possible for me to cover each and every student in that age group and residing in Mumbai. So to conduct such a study, the best way is to take a small portion of this population, to serve as subjects in this study.

A subset of population is known as Sample. The researchers conduct study on the carefully chosen sample. They analyze the results of this sample, using inferential statistics to make guesses about what they would have found had they studied the entire population. Inferential statistics enables researchers to take the findings they get from a sample and apply them to a population. Population here does not mean the population of a country. Population is also defined as a specific segment of the society as stated in above example.

8.9 SUMMARY

This unit began by discussing as to why psychologists use statistics, followed by the definition of descriptive statistics and its types. In descriptive statistics, we discussed the concept of frequency distribution, histogram and frequency polygon. The concept of normal curve as well as its characteristics was also discussed. We have also discussed the skewed distribution and its types as well as bimodal distributions. Measures of central tendency such as mean median and mode were discussed and its computation for ungrouped data was demonstrated. Measures of variability such as range and standard deviation were also discussed. The concept of Z-score was explained. The concept of inferential statistics as well as correlation coefficient was also discussed. Inferential statistics included types of tests used, types of errors and difference between population and sample.

8.10 QUESTIONS

1. Define Frequency distribution, Histogram and Frequency Polygon with graphic representations.

2. Explain the following terms:

   a. Normal Curve

   b. Skewed Distribution

3. Discuss the different Measures of Central Tendency

4. Discuss the different Measures of Variability.

5. Write short notes on the following

   a. Inferential Statistics – Statistical Significance
   b. The Correlation Coefficient.

8.11 REFERENCES

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Modified Pattern of Question Paper for Semester End Assessment implemented from 2020-2021 For Psychology courses at F.Y.B.A.

Duration = 3 hours　　　　　　Total Marks = 100 (per semester)

All 5 questions carry 20 marks and are compulsory.
There will be internal choice in each Question.

Q1.　Attempt any two questions (module 1)　　　　20　marks
A
B
C

Q2.　Attempt any two questions (module 2)　　　　20　marks
A
B
C

Q3.　Attempt any two questions (module 3)　　　　20　marks
A
B
C

Q4.　Attempt any two questions (module 4)　　　　20　marks
A
B
C

Q5.　Attempt any two questions (module 1, 2, 3, 4 One question from each module)　　　　20 marks
A
B
C
D

❖❖❖❖