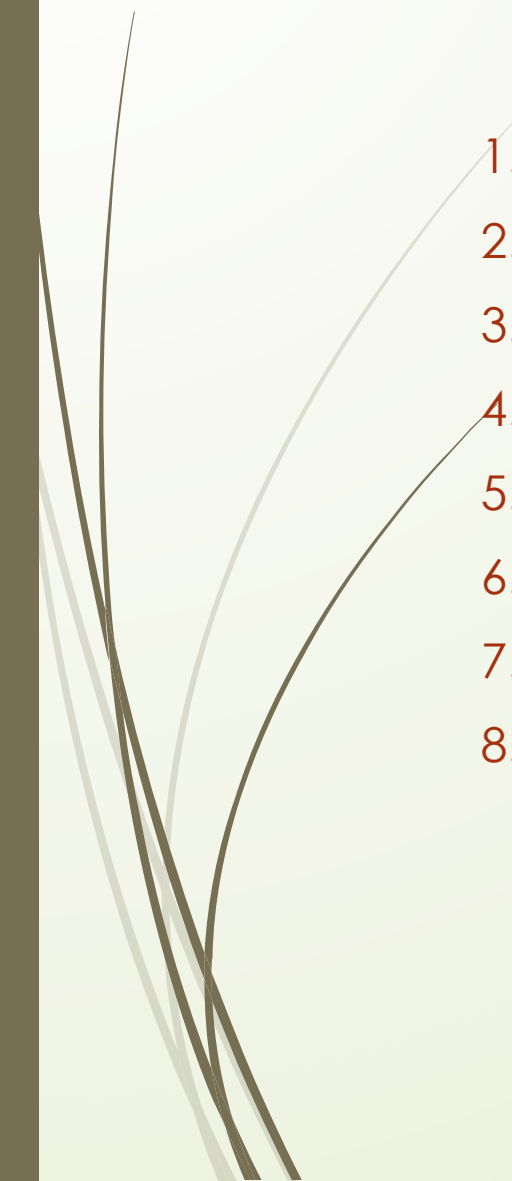


UNIT IV INTELLIGENCE





SUB TOPICS

1. CONTRASTING VIEWS OF IT'S NATURE
 2. MEASUREMENT OF INTELLIGENCE
 3. COGNITIVE BASIS OF INTELLIGENCE
 4. NEURAL BASIS OF INTELLIGENCE
 5. ROLE OF HEREDITY IN INTELLIGENCE
 6. ROLE OF ENVIRONMENT IN INTELLIGENCE
 7. EMOTIONAL INTELLIGENCE
 8. CREATIVITY
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INTELLIGENCE



- It is an individual's ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by careful thought.
- Intelligence involves some different mental abilities including logic, reasoning, problem-solving, and planning.
- The term "intelligence quotient," or IQ, was first coined in the early 20th century by a German psychologist named William Stern.
- intelligence testing has emerged as a widely used tool that has led to developing many other tests of skill and aptitude.

1. CONTRASTING VIEWS OF ITS NATURE

- Intelligence was considered to be unitary and was believed to have a single dimension. Spearman believed that it depended on a primary **general** factor or **g factor** and contained specific factors. However this research is not supported by modern scientists.
- Others believed in a **multi factor view** . Thurstone suggested that intelligence is composed of seven distinct primary mental abilities, like verbal meaning, number, space etc.

Four influential views of multiple intelligence are :

1. GARDNER'S THEORY OF MULTIPLE INTELLIGENCE
2. STERNBERG'S TRIARCHIC THEORY
3. CATTELL'S THEORY OF FLUID AND CRYSTALLIZED INTELLIGENCE
4. PASS THEORY OF INTELLIGENCE



1. GARDNER'S THEORY OF MULTIPLE INTELLIGENCE

- A better tactic to study intelligence was provided by Howard Gardner. He proposed to study not only average intelligence but also the extreme ends of intelligence. The challenged and gifted ones .


The intelligences given by him are: -

- Linguistic intelligence (“word smart”)
- Logical-mathematical intelligence (“number/reasoning smart”)
- Spatial intelligence (“picture smart”)
- Bodily-Kinesthetic intelligence (“body smart”)
- Musical intelligence (“music smart”)
- Interpersonal intelligence (“people smart”)
- Intrapersonal intelligence (“self smart”)
- Naturalist intelligence (“nature smart”)



2. STERNBERG'S TRIARCHIC THEORY

- Robert Sternberg proposed that there are three basic forms of intelligence: componential, experiential, and contextual.
- Componential or analytic intelligence involves the ability to think critically or analytically. Eg. Persons high in this dimension are excellent students.
- Experiential or creative intelligence emphasises insight and the ability to formulate new ideas. Eg. persons high in this dimension excel at combining seemingly unrelated facts like Einstein.
- Contextual or practical intelligence in pairs adaptive sense. Eg. Persons high in this dimension are adept at solving problems of everyday life- street smarts




3. CATTELL'S THEORY OF FLUID AND CRYSTALLIZED INTELLIGENCE

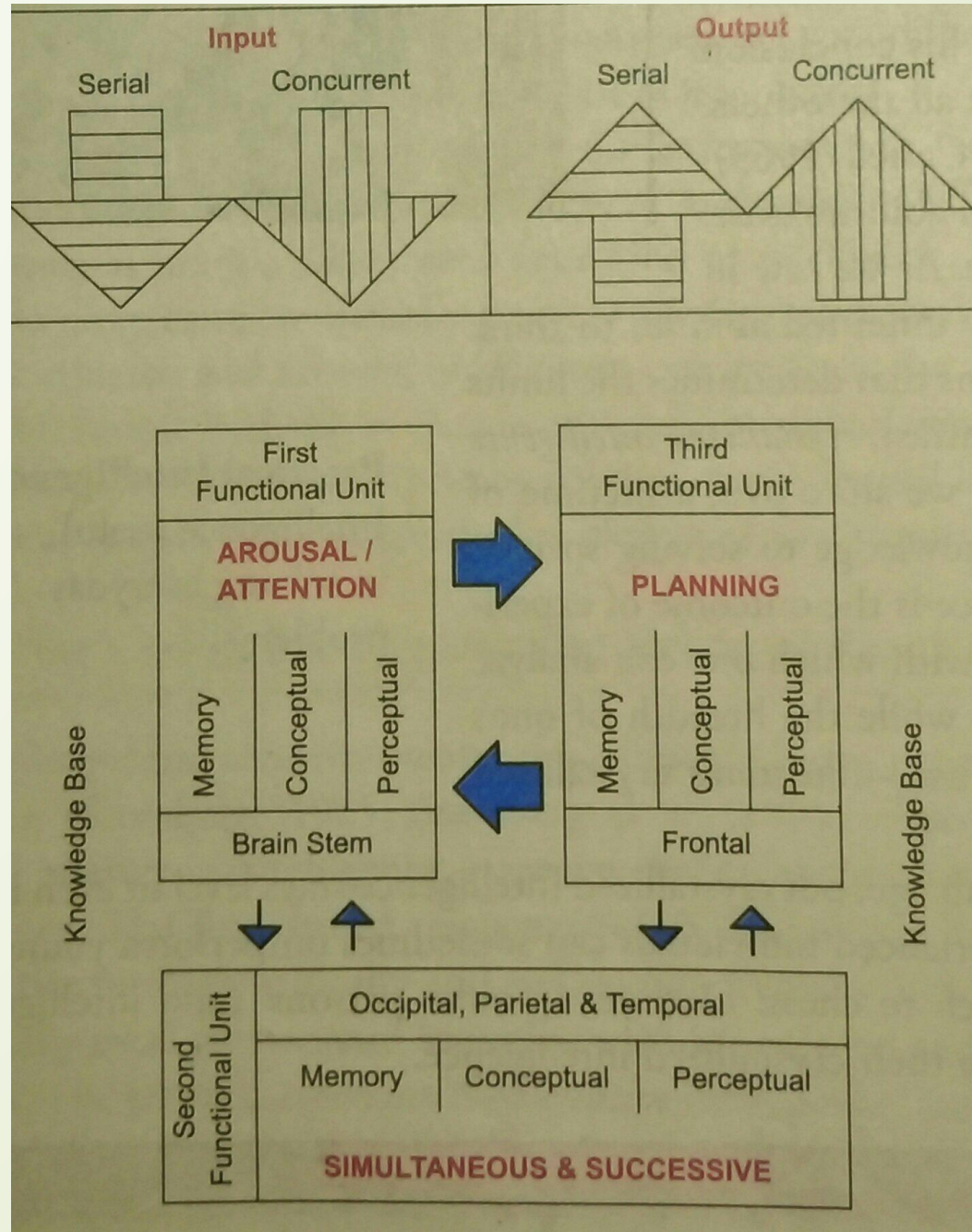
- Factor analysis technique is used to find several components of intelligence. It identifies a cluster of related items on test and finds the common underlying factor.
- Cartel proposed through this technique that two major clusters of mental abilities exist :
 - a) Fluid intelligence : It refers to our largely inherited abilities to think and reason. Eg. The speed with which one can analyse. It seems to decrease with age.
 - b) Crystallized intelligence : It refers to accumulated knowledge stored over a lifetime. Eg. How many words one can put to use. It seems to increase with age . Thus old people can outperform younger ones.

4.PASS THEORY OF INTELLIGENCE

- ❑ In cases of brain damage the cognitive functions are often spared while others are impaired. People with damaged frontal lobe may have a normal IQ . Addressing these concerns Das, Naglieri, and Kirby proposed the **planning , attention, simultaneous and successive (PASS) theory**.
- ❑ **Input:** Information is received from external sources through senses and from internal sources such images memories. External put can be presented serially or concurrently. When the sensory information is sent the four processes become active.
- ❑ **Planning:** Location: Frontal lobe. It's required to make decisions ranging from specific actions to general goals and plans. It guides the other components.
- ❑ **Attention and arousal:** Location: Frontal lobe and thalamus. It keeps people alert and awake and allows them to selectively attend to some stimuli.

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- Simultaneous processing: Location: occipital and parietal lobe. It integrates stimuli into groups as result they are seen as a whole.
 - Successive processing: Location: frontal temporal lobe. It integrates stimuli in a specific serial order. Eg. To understand the meaning of a sentence one has to process words.
 - These components must be active on one's knowledge base. **Tacit knowledge** (experiential) and **explicit knowledge** (instructed) are the two types of knowledge bases.
 - Output: It is expressed as behaviour either through mimetics(dance, music) or movement or language.
 - This model is used for understanding various cognitive processes such as reasoning, memory,imagery and language.

PASS THEORY OF INTELLIGENCE:



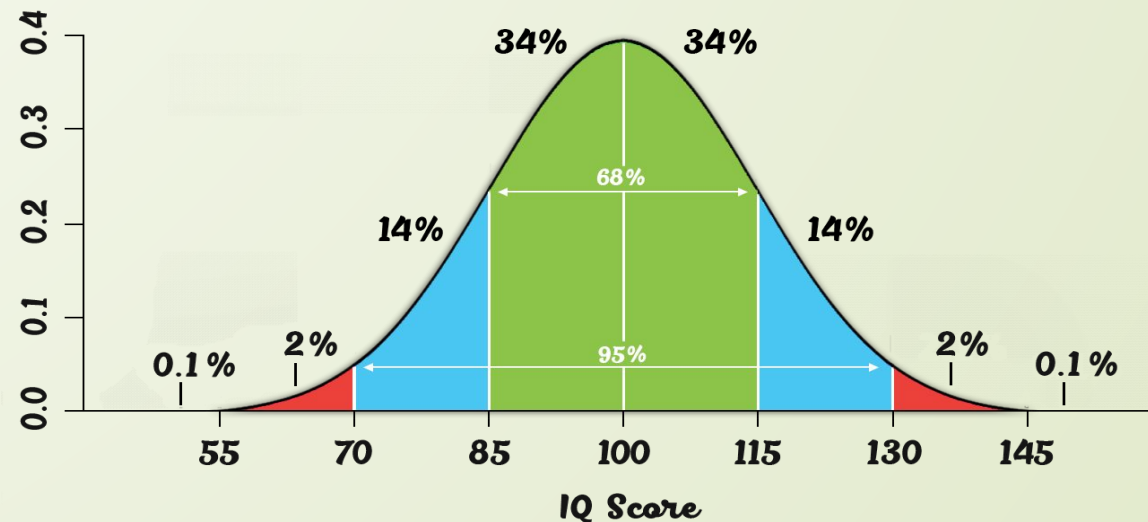


2. MEASUREMENT OF INTELLIGENCE

- The first test for measuring intelligence was made by Alfred Binet when he was approached by a school in Paris. Alfred Binet and Theodore Simon then designed a test and decided to use items of two basic types, new and unusual and familiar ones. The children were given simple instructions to name objects, to repeat sentences etc.
- The first version was published in 1905 and it contained 30 items. It was quite effective in identifying children in need of help.
- Another revised version was published in 1908 and contained six items at each level from 3-13 years.
- Lewis Terman at Stanford University revised it and made the widely used Stanford-Binet test. Its measure was IQ (intelligence quotient)

IQ

- Intelligence quotient is a number that examiners derived by dividing an individual's mental age by their chronological age. Now, it simply indicates an individual's performance on an intelligence test relative to others.
- At some point mental growth level stops while chronological age continues to grow. As a result IQ scores begin to decline after early teen years.
- Thus now they reflect an individual's performance relative to that of persons of the same age.





THE WECHSLER SCALES

- To overcome problems of Stanford-Boner test David Wechsler devised a set of tests for both children and adults that include nonverbal and verbal items. This test developed when the multifaceted view was not popular, still this test is the most frequently used test for intelligence in the world.
- Using Wechsler Intelligence Scale For Children (WISC) we are able to identify children suffering from various learning disabilities. Children who score high on tests such as picture completion, object assembly but lower on arithmetic, information and vocabulary are more likely to suffer from learning disabilities.
- Such tests are designed to measure aptitude- the ability to acquire new information in contrast to achievement.



INDIVIDUAL TESTS OF INTELLIGENCE

- Stanford-Binet and WISC tests are costly and time consuming but they are still administered to find children with special needs. They are used to find children at extremes i.e. mentally retarded and gifted children.
- Mental Retardation refers to the considerably below average intellectual functioning combined with varying degrees of difficulty in meeting demands of everyday life. They may be classified into mild, moderate, severe, and profound. They are determined based on at least two factors: their test scores and their success in carrying out activities of daily living expected of persons their age.
- Some causes may be genetic such as **Down's Syndrome** which is caused by the presence of an extra chromosome and they have an IQ below 50. Mental retardation may also result from environmental factors such as inadequate nutrition, drugs alcohol etc.
- Gifted children possess an IQ of 130 and above. They may be able to adjust well, earn more etc.

GROUP TESTS OF INTELLIGENCE

- Since individual tests take longer to evaluate group tests for measuring intelligence were designed during world war 1.
- Arthur Otis developed two tests: **Army Alpha** for persons who could read and **Army Beta** for persons who could not read. These tests were used to select candidates for officer training school.

Difference between Individual & Group test	
Individual test	Group test
<ul style="list-style-type: none">➤ A individual test can be administered to only one person at a time.➤ The individual test mainly done to observe characteristic to of individual.➤ Expensive to administrate .➤ These test involves one to one consultation with individual and verbal and non verbal subsets. <p>Example: intelligence test by school psychologist</p>	<ul style="list-style-type: none">➤ Group test can be administered to a group of persons at a time.➤ Group test mainly done to meet the practical needs.➤ Cheaper to administrate.➤ These tests include multiple choice items. <p>Example: traditional college exams</p>



3. COGNITIVE BASIS OF INTELLIGENCE

- Researchers wanted to identify the basic cognitive mechanism and processes that underlie intelligence. This work led to two major developments.
- 1. Several tests have been constructed that are based on psychology and aspects of cognition. Eg. *Kaufman Assessment Battery for Children and Kaufman Adult Intelligence Test, Woodcock- Johnson Test of Cognitive abilities (based on fluid and crystallized intelligence)*
- 2. It was found that the speed with which an individual performs tasks (called the reaction time) is correlative to scores on intelligence test. Another aspect called the inspection time is the minimum amount of time a particular stimulus must be exposed for an individual to make a judgement about it that meets some pre-established criterion of accuracy. Thus it measures the amount of time individuals require for intake of new visual information. This is also correlative to intelligence.



4. NEURAL BASIS OF INTELLIGENCE

- It was observed that differences in neural functioning led to differences in intelligence.
- 1. The **nerve conduction velocity**- the speed with which nerve impulses are conducted in visual system correlates significantly with measure of intelligence.
- 2. The brains of persons scoring highest on written measures expend less energy because intelligence is related to an efficient brain functioning. So the more intelligent people are, the less energy their brains spend.
- 3. Findings suggest that there's a link between brain structure and intelligence. Scores on standard measures of intelligence such as WAIS are related to the size of certain portions of brain including left and right temporal lobe and left and right hippocampus.

5. ROLE OF HEREDITY IN INTELLIGENCE

- Several researches offer support for this view.
 1. Research has confirmed that the more closely two people are related the more similar their IQs are similar.
 2. Studies were conducted to see whether the IQ of adopted children resemble their biological parents IQ than their adoptive parents. This prediction was confirmed.
 3. In a study conducted, it was confirmed that I) the correlation between adopted children's intelligence and their biological parent's intelligence increased over time II) the correlation between biological children's intelligence and their biological parent's intelligence increased over time III) the correlation between adopted children's intelligence and adopted parents intelligence decreased over time.
 4. Recent studies that there is a particular gene which when present in an individual would increase the IQ. However it only affects 2 percent of the variance in general intelligence.
 5. Another study was done on twins separated at birth. In the same economic status, it was seen that the IQ of the identical twins reared apart correlated almost as highly as those of identical twins reared together.



6. ROLE OF ENVIRONMENT ON INTELLIGENCE

- A finding suggested that the performance on IQ tests has risen substantially around the world at salvage levels in recent decades. This phenomenon is called as **Flynn effect**. Such increases have averaged about 3 IQ points per decade worldwide. So what is average intelligence now would have been high level of intelligence in past.
- This increase may be due to better environmental conditions such as eradication of diseases, better nourishment etc.
- Environmental deprivation would hinder IQ development. A study had confirmed this. Some children who were removed from an institution of reverted women excelled better than the ones who were left in the institution with no contact with the world.
- Exposure to drugs, alcohol, lead, malnutrition would decrease the IQ.
- Interventions can be conducted to increase the IQ of children.

7. EMOTIONAL INTELLIGENCE

- Some children excel at studies but they find it difficult to make friends and adjust with others. They may have a Huge temper and could be emotionally unstable. These types tend to have low EQ.
- Emotional intelligence is a cluster of traits or abilities relating to the emotional side of life abilities such as recognizing and managing one's own emotions, being able to motivate oneself and restrain one's impulse, recognizing and managing others emotions and handling interpersonal relationships in an effective manner.



MAJOR COMPONENTS OF EMOTIONAL INTELLIGENCE

1. **KNOWING OUR EMOTIONS:** One must always be aware of one's own emotions. This is not always the case, some are highly aware whereas others are oblivious to it. It is important to be aware of one's emotions to make intelligent choices (choosing career options spouses etc) and to be expressive to others.
2. **MANAGING OUR EMOTIONS:** Once we recognize our emotions we must be capable of controlling them accordingly. Eg. Suppressing our anger in critical situations. Otherwise people may avoid us.
3. **MOTIVATING OURSELVES:** We must try to motivate ourselves, as only we can raise ourselves by ourselves, we are our own and our own friend. We must try to be optimistic and keep our hopes high.
4. **RECOGNIZING AND INFLUENCING OTHERS EMOTIONS:** We should try to understand others emotions and recognise their mood. If we can identify this then we can approach others at a right time to ask for a favour. Such people are efficient in sales.
5. **HANDLING RELATIONSHIPS:** Some people excel at getting along with others. Such people are good team players. They are able to get along with their spouse.

Emotional intelligence can be enhanced by self-monitoring, self-regulation, communication, and problem solving.



8. CREATIVITY

- It's the ability to produce work that is novel and appropriate.
- Mundane creativity is the everyday creativity . Eg. Uttering new sentences
- Exceptional creativity is the emergence of something drastically new. Eg. Discovery of fire
- Creativity is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions.
- Creativity involves two processes: thinking, then producing.



CONTRASTING VIEWS OF CREATIVITY

- According to Perkins, everyday creativity may rise from past experiences. Exceptional creativity arises from Klondike spaces- Thinking out of the box.
- Psychologists perceive creativity to be a product of mental and social process.
- The cultural aspect is the domain, social aspect is the field and mental process occurs in the person. Thus creativity occurs when a person makes a change in domain.
- Changes are not adopted until they are sanctioned by a social group. Eg teachers, editors etc. On order to be creative our idea must be socially valued.
- Thus creative process takes five steps:
 - PREPARATION- becoming involved in issues
 - INCUBATION-churn ideas
 - INSIGHT- the 'Aha' moment
 - EVALUATION- deciding if the insight is valuable
 - ELABORATION- translating the insight to final work
- Conceptual approach- suggests that for creativity to occur multiple components must converge. Like intellectual abilities, knowledge, certain styles of thinking, personality attribute and a supportive environment.



FOSTERING CREATIVITY

- The following are approaches to foster creativity:
 1. Establishing purpose and intention.
 2. Building basic skills
 3. Encouraging acquisitions
 4. Stimulating and rewarding curiosity and exploration
 5. Building motivation, especially internal motivation
 6. Encouraging confidence and willingness to take risks
 7. Focusing on mastery and self-completion
 8. Promoting supportable beliefs about creativity
 9. Providing opportunities for choice and discovery
 10. Developing self management (metacognitive skills)
 11. Teaching techniques and strategies for facilitating creative performance
 12. Providing balance

There are four key abilities involved in creativity solution : a) fluency (elaboration of ideas) b) flexibility (process information in different ways) c) originality(getting away from obvious) d) Elaboration (to embellish ideas with details)