
UNIT 3 CONCEPT OF INTELLIGENCE AND EMOTIONAL INTELLIGENCE*

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3.1 OBJECTIVES

After going through this Unit, you would be able to:

- Discuss the meaning and definition of intelligence;
- Know the concept of IQ and intelligence testing;
- Explain the influence of both genetic and environmental factors on intelligence;
- Know the different approaches (psychometric and cognitive) to understand the nature of intelligence;
- Explain the concept of emotional intelligence; and
- Recognize the factors contributing to the development of intelligence.

3.2 INTRODUCTION

If we observe our surrounding, we will find diversity in human behaviour with regard to how do people think, learn, reason and perform activities. For example, some people

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are better than others at remembering facts; some can control their attention process and so on. Such individual differences can be noticed in the course of our daily lives. Individual differences in intelligence are one of the psychological attributes which has been of great interest to psychologists. If you observe your friends or classmates, you will find how they differ from each other in their ability to understand concepts, learn from environment, use different forms of reasoning and adapt to the environment.

Intelligence is one of those concepts which is easier to recognize than to define. Different people are likely to agree fairly well in describing intelligent people as sharp, bright, clever, or quick. However, it is very difficult to give a precise definition of intelligence. In the present Unit, we will focus on defining and understanding intelligence. The nature-nurture issue will be highlighted. Different perspectives/approaches to intelligence will also be mentioned. Finally, the concept of emotional intelligence highlighting individual differences in intelligence will be discussed.

3.3 DEFINING INTELLIGENCE

Intelligence is a hypothetical construct, which is usually equated with higher level abstract thought processes. It is generally agreed that those who are good at abstract reasoning, problem solving and decision making are more intelligent than those who are poor at these mental activities. In general, intelligence underlies how well we learn, plan, solve problems and make decisions. In short, it impacts how well we do different things, deal with challenges and manage our everyday life. Not directly observable, intelligence is verified only by the tests used to measure it.

Intelligence has been defined in several ways. Psychologists are yet to agree on a single definition of intelligence. However, a commonly accepted definition of intelligence refers to the ability to learn from one's experiences, acquire knowledge, and use resources effectively in adapting to new situations or solving problems (Sternberg & Kaufman, 1998; Wechsler, 1975). Now, psychologists are of opinion that the definition of intelligence should include skills valued by the culture or society in which one lives. And the above said characteristics are those which the people need to be able to survive in their culture. Culture gives a context for the development of intelligence. Western culture promotes skills of performance, speed, and achievement motivation. In contrast, Indian culture emphasizes self-reflection and connectivity with people.

Let us see some of the important definitions of intelligence.

- *The aggregate or global capacity of an individual to think rationally, to act purposefully and to deal effectively with the environment (David Wechsler, 1944)*
- *The ability to carry on abstract thinking (Lewis Terman, 1921)*
- *The ability to solve problems and to create products, that are valued within one or more cultural settings (Howard Gardner, 1983)*
- *A person's capacity for goal-directed adaptive behaviour (Robert Sternberg & William Salter, 1982)*
- *Intelligence refers to what is measured by tests of intelligence (Boring, 1923)*
- *Intelligence includes sensation, perception, association, memory, imagination, discrimination, judgment and reasoning (Haggerty, 1921)*
- *Ability to adapt oneself adequately to relatively new situations in life (Pentler, 1921).*

Thus intelligence is referred as the ability to perceive information and retain it as knowledge for applying it towards adaptive behaviours in the environment. It is also described as individual's capacity for self-awareness, understanding and problem solving. It is the general mental capability that involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas and learn from experience.

A more comprehensive and widely used definition of intelligence is given by Gottfredson (1997a). It is described as a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings – 'catching on', 'making sense' of things, or 'figuring out' what to do.

3.4 MEASURING INTELLIGENCE

The concept of measurement of intelligence started when educators in France attempted to identify children who were unable to learn as quickly or as well as others in school. Alfred Binet and his colleague, Theodore Simon designed a test of intelligence that distinguished fast learners and slow learners as well as between children of different age groups (Binet & Simon, 1916). They gave the concept of mental age (MA).

Mental age is a measure of person's intellectual development relative to people of his/her age group. A mental age of 8 means that a child's performance on an intelligence test equals the average performance level of a group of 8 year olds. Let us imagine that a child who can answer questions that an 8 year old can answer. Can we tell how smart he/she is? No, we cannot say about it, because we have no idea about how old the child is? If he/she is 12 years old, he/she's not that smart. If he/she's 6, then she is regarded as a bright child. So, in order to estimate a child's intelligence we need to have knowledge about his *chronological age* (biological age in years) and mental age. The mental age is calculated on the level of individual's answer to the questions which are ranked according to the age of an individual.

Mental age indicates nothing about whether the intelligence of the individual is high or low in comparison to other people of the same age. We also need to consider a person's biological age, to find out what a particular mental age means. Then only, we can relate the mental age to the actual biological age of the individual. This gives an Intelligent Quotient or IQ. This concept was devised by William Stern in 1912. Terman, in 1916, used this concept with revised Binet scale which was later referred as Stanford – Binet scale.

Intelligent quotient (IQ) refers to mental age (MA) divided by chronological age (CA) and multiplied by 100. Multiplying by 100 helps to avoid the decimal, as it changes the IQ into a whole number.

So $IQ = MA/CA \times 100$

A merit of the IQ as used by intelligence tests was that, it helped to compare the intelligence of individuals with different chronological and mental age. For example, let us calculate a 13 year old person's IQ who has a mental age of 16.

Example 1: $IQ = MA (16)/CA (13) \times 100 = 123$.

Now suppose a 16 year old person also has a mental age of 16. So, his IQ will be 100.

Example 2: $IQ = MA (16)/CA (16) \times 100 = 100$.

An IQ score of 100 is regarded as average intelligence, because in this case a person's mental age and chronological age is equal (example 2). It is the mathematical average or mean for IQ scores. IQ scores will be over 100 when mental age is higher than chronological age (as seen in first example). When a person's chronological age exceeds his mental age, IQ scores are below 100. Let us now discuss an illustration of this situation, in which 14 year old Rajat has a mental age of 11. So Rajat's IQ will be 78, as $IQ = MA(11)/CA(14) \times 100 = 78$.

Modern intelligence tests use deviation IQ instead of a ratio IQ. In deviation IQ, the IQ is obtained statistically from a person's relative standing in his/her group. In simpler words, they tell us how far above or below average the person's score was, relative to others scores. For example, if a person score at 50th per centile, then half of the people of his/her age who take the test score are higher than his/her IQ and half score lower.

Distribution of IQ scores

We all know that individuals differ in the level of intelligence. Some individual may be very dull, some may be average and some other people may be more intelligent. But can we know, how many of them in a group are dull or intelligent or average? We can get the answer to this question by knowing the distribution of intelligence scores in a given population.

The frequency distribution for the IQ scores tends to approximate a normal distribution. This normal distribution is symmetrical in nature around the central value, called the mean. If we plot the IQ scores of large number of people on a graph, it assumes the shape of a normal distribution curve or otherwise called as bell shaped curve. The distribution of IQ scores in the form of a normal distribution is shown in the Figure 3aF.

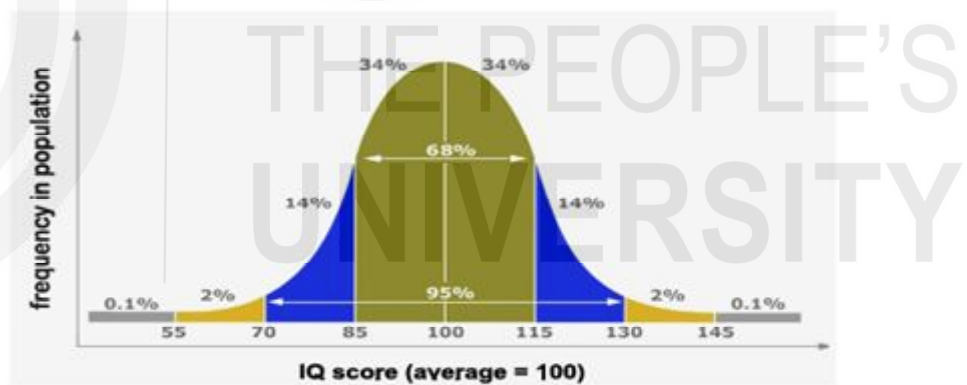


Figure 3aF: Distribution of IQ scores in the population

The IQ scores are distributed in such a manner that the majority of individuals' scores tend to fall in the middle range of the distribution. Only a few people have either very high or very low IQ scores in the population. The average IQ score in the population is 100. The people with IQ scores in the range of 90 – 110 have normal intelligence. Those individuals having an IQ score above 130 are considered as having exceptional talents (intellectually gifted); whereas IQ below 70 may mean that the person may have mental retardation/intellectual disability. These two groups (intellectually gifted and intellectually disabled) deviate from the normal population with respect to their cognitive, emotional and motivational characteristics. The following Table 3aT shows the classification of people on the basis of IQs.

Table 3aT: Classification of people on the basis of IQ

| IQ Range | Description of IQ level |
|-----------------|--|
| Above 130 | Very superior |
| 120-130 | Superior |
| 110-119 | High Average |
| 90-109 | Average |
| 80-89 | Low average |
| 70-79 | Borderline |
| Below 70 | Mentally retarded/ intellectually disabled |

Self Assessment Questions I

- 1) State whether each of the following statements is ‘True’ (T) or ‘False’ (F).
- a) Binet developed the concept of IQ.
 - b) A person with an IQ of 100 is intellectually superior.
 - c) A dull child’s chronological age is same as his mental age.
 - d) When biological age and mental age are same, IQ is 100.

3.5 INFLUENCE OF NATURE AND NURTURE ON INTELLIGENCE

You must have experienced situations in which some individuals find it difficult to solve a simple problem whereas some have the ability to solve complex problems very quickly. There is a wide variety of individual differences in the level of intelligence. Why such differences exist in people’s intellectual ability? At the most general level, two factors could be responsible: heredity and environment. Heredity consists of genetic materials and codes that we inherit from our parents. Environment consists of the socio-cultural conditions and experiences of people in the course of their lives.

There is debate among researchers, whether heredity or environment has the larger role in determining intelligence of an individual. This is known as the *nature - nurture controversy/debate* on intelligence. Here, nature refers to heredity and nurture to environment. At present, researchers agree that individual differences in intelligence are clearly the result of the interplay between genetic factors and the environmental conditions. Now let’s consider some evidence pointing to this standpoint.

Evidence for the Influence of Nature

The research evidence supporting the view that heredity plays an important role in human intelligence comes from family studies majorly involving twin studies and adoption studies.

The Bryan Brothers: Similar Genes or Similar Training?



Figure 3bF: Tennis players Bob Bryan and Mike Bryan

Retrieved from https://www.tennisworldusa.org/tennis/news/Tennis_Interviews/58388/mike-bryan-bob-will-have-surgery-sixmonth-recovery-for-him/

The Bryan Brothers are identical twin brothers Robert Charles “Bob” Bryan and Michael Carl “Mike” Bryan, American professional doubles tennis players, and are the most successful duo of all time. They were born on April 29, 1978, with Mike being the elder by two minutes. The Bryans have won multiple Olympic medals, including the gold in 2012 and have won more professional games, matches, tournaments and Grand Slams than any other men’s pairing. They have held the World No. 1 doubles ranking jointly for 438 weeks (as of October 25, 2015), which is longer than anyone else in doubles history, and have also enjoyed that World No. 1 ranking together for a record 139 consecutive weeks. (Source: Wikipedia)

Twin studies

Various studies have used monozygotic and dizygotic twins to assess the role of heredity in determining the IQ of an individual. Monozygotic or identical twins begin from a single fertilized ovum, and so they have identical genotypes (individual’s genetic potential). In contrast, the dizygotic or fraternal twins are conceived from two separate fertilized ova. They share about 50 per cent of their genetic makeup, with the other 50 per cent being unique to each twin. If heredity influences intelligence, then identical twins would have more similar IQ scores than fraternal twins.

Bouchard and McGue (1981) reviewed many studies, and found that the mean correlation between IQs of identical twins was $+0.86$, and it was $+0.60$ for the fraternal twins raised in the same home. Whereas, it was $+0.72$ for identical twins raised in different homes.

Thus the identical twins have high mean correlation between their IQ scores ($+0.86$). Researchers argue that this result may be due to the fact that, most twins are raised together by the same parent(s) and in the same home, and so they share similar environments as well as similar genes. Yet, even when identical twins are raised separately, they typically tend to have similar IQ scores ($+0.72$) than fraternal twins reared together ($+0.60$). The fact that identical twins are more similar than fraternal twins support for the role of heredity factors in determining the individual differences in intelligence.

Family Studies

Researchers have also measured IQ with respect to family relationships. A number of studies have attempted to assess the similarity of IQ between different groups of relatives. If heredity influences intelligence, then we would expect that the more closely two persons are related, the more similar their IQs will be. Meta-analysis of research findings carried out by Bouchard and McGue (1981) pointed out the following mean correlation in IQ:

| Relationship | Mean Correlation |
|----------------------------------|-------------------------|
| Siblings reared together | + .47 |
| Siblings reared apart | + .24 |
| Parent and child living together | + .42 |
| Parent and child reared apart | + .22 |
| Adopted parent- child | + .19 |

These findings suggests that the closer the biological relationship of the two individuals, the higher the correlation between their IQ scores.

Adoption studies

Another line of support for the impact of heredity on intelligence is provided by research studies involving adopted children. It tries to compare adopted children with both their biological and adoptive parents. Researchers have found out that adopted children's IQ scores are more highly correlated with their biological parents' IQs than with their adoptive parents' IQs. A long term study results revealed that, the correlations between the adopted children's intelligence and their biological parents increased over time, and those between the children and their adoptive parents decreased over time (Plomin, Fulker, Corley, & DeFries, 1997). This suggests that heredity factors have influence on the human intelligence.

Heritability

In order to be more specific about the contribution of heredity in determining intelligence, researchers have used the concept of heritability of intelligence. It refers to the proportion of variance in intelligence within a given population that is attributable to genetic factor. It ranges from about 35 per cent in childhood to around 75 per cent in adulthood (McGue et al., 1993). Plomin & Defries (1998) have determined the estimated heritability for intelligence as 50 per cent. What could be the reason for the increase in the contribution of genetic factors to intelligence with increase in age? One possible explanation could be, as people grow older, individuals can select and control their environment to a great extent, which in turn reduces the impact of environment on intelligence.

Evidence for the Influence of Nurture

Influence of hereditary factors does not give an entire picture of human intelligence. Environmental variables do play an important role in intelligence. Now we will try to analyze the research findings of family studies from an environmental perspective.

Relooking at twin studies and adoption studies

Let us look again at the IQ correlations for identical twins raised in the same home

versus in different homes (as explained earlier). The mean correlation for twins raised in different homes is .72, whereas that for twins raised in the same home is .86. In other words, we can say that twins raised in different homes have less similar IQs than the twins raised in the same home. It can be inferred that, the different environments that the different families provide do have some influence on intelligence of the individuals.

Adoption studies, too, indicate that intelligence is not determined entirely by heredity. For instance, in one study (Scarr & Weinberg, 1976), some children of poor parents (with unknown IQs) were adopted by middle-class parents with IQs averaging 118–121. Other children remained with their biological parents who formed the control group. At later stage, the IQ averages of the adopted children were 105 and that of non-adopted children were 90. Although the adopted children's IQ scores were lower than those of their adoptive parents, they were about 15 points higher than the scores for the control group children, who were raised by their biological parents.

Results of various research studies indicate that environmental factors (nurture) have a significant impact on IQ scores. We will discuss about the research findings pointing out the Flynn effect, effect of nutrition, home environment, and early intervention which provide additional support for the influence of environment on human intelligence.

The Flynn effect

Evidence that environmental factors can have influence on human intelligence was reported by Flynn (1987). His research evidence showed that there is a rapid rise in individuals' average performance on IQ tests in several western countries in the recent decades. This trend is referred as the Flynn effect. It referred to increase in IQ scores over generations. It is also called 'secular rise' in IQ scores. This increase cannot be due to genetic factors as a massive shift in human heredity from one generation to the other is quite unlikely. So, what aspects of the environment account for the Flynn effect? Better nutrition, greater access to television and internet which provides informative stimulations, increase in the number of years of education (for parents as well as children), more cognitively demanding jobs, increased urbanization and higher quality home environment are some likely factors which account for this Flynn effect (Flynn, 1999; Neisser, 1998).

Environmental Deprivation and Enrichment

There is evidence that environmental deprivation lowers intelligence while rich nutrition, quality schooling and good family background increases intelligence. Intelligence can be reduced by absence of different forms of environmental stimulation in early life of children. 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).

In terms of enrichment, placing children in favorable settings seems to enhance intelligence than growing up in a restricted environment. Research studies indicate that stimulating home environments — those in which parents interact frequently with their children, make numerous learning and reading materials available, encourage the development of new skills, and so on — have positive impact on intelligence of the children.

The impact of nurture can prominently be seen in case of children with disadvantaged background. The environmental stimulation can make a difference for such children. Once they have similar environment, biology may have an impact on their intellectual ability.

Right to Education Act (RTE)

On 4th August 2009, Government of India implemented the Right of Children to Free and Compulsory Education Act or Right to Education Act (RTE). It aims to provide free and compulsory elementary education for children between 6 and 14 years of age. The motto of this act is to generate equal opportunity of education to all children irrespective of their economic status, social class and gender.

As a psychologist, what's your stand on this act? Do you think it can make a positive impact on the intelligence level of the children belonging to disadvantaged group?

Research studies support the benefits of schooling, which influences children's intellectual capacities. Schooling improves IQ as it engages the children in cognitive processes of memorizing, rehearsal, organization and so on. School provides an enriched environment that allows their thought processes to deal with the problems effectively.

Unfortunately, as we all know, not all children live in homes which provide stimulation and nurturance for their development. When children live in impoverished or neglectful home environments, enriching early intervention can make an appreciable difference. For instance, early childhood education programs, such as, Head Start can lead to IQ gains and other cognitive and academic benefits which can help them from falling behind in school.

Biological Influences

Additional support for the influence of environmental factors in intelligence is provided by research findings on biological factors. Many biological factors that the individual encounter while growing up can affect their intelligence. The biological influences act on the physical body of the individual. It includes nutrition, exposure to toxic substances like lead, prenatal factors such as mother's use of alcohol and drugs. Nutrition has been shown to affect human intelligence. Prolonged malnutrition during critical early periods of growth (particularly the prenatal period and early years of life) can adversely affect the neurological development and cognitive development of the children. A number of toxic substances in children's prenatal or early postnatal environments, like alcohol, drugs, radiation, lead-based paint dust, can affect neurological development and thus also affect children's later IQ scores. Prenatal environment such as mother's nutrition, emotional state (presence of stress) and use of drugs affects the health of developing fetuses and their intelligence). An example of such effects is *fetal alcohol syndrome (FAS)*, in which children whose mothers have consumed alcohol during pregnancy show retarded physical and mental growth.

There is considerable evidence that both nature and nurture play a role in intelligence. This view is now accepted by most psychologists. So, we can conclude that intelligence is a product of both heredity (nature) and environment (nurture). Heredity sets a range within which an individual's intellectual development is shaped by the environment.

Self Assessment Questions II

1) What do you mean by the "nature- nurture debate on intelligence"?

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2) What is heritability?

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3) Define Flynn effect.

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3.6 APPROACHES TO INTELLIGENCE

Like most scientific theories, the approaches to study intelligence have also evolved through a succession of models. Psychologists have developed different theories of intelligence in order to understand the nature of intelligence. Two of the most influential approaches have been the psychological measurement, also known as psychometrics/ structural approach; and cognitive / information processing approach, which focuses on the processes by which the human mind functions. You will learn about the various theories of intelligence in detail in the next Unit 4, but here we will briefly highlight the two main approaches for your understanding.

3.6.1 Psychometric Approach

The question of whether intelligence is a single characteristic, or a collection of specific abilities, is hard to answer. This may be partly due to the fact that it involves intellectual capacities that we cannot see directly. We can only infer it from individual’s observable surface behaviour, such as intellectual tests. The psychometric approach considers intelligence as an aggregate of abilities and expresses the individual’s performance as a single index of cognitive abilities. It tries to understand the structure of intelligence or its underlying dimensions. Factor analysis and related techniques are used to locate a smaller number of dimensions, clusters, or factors from a larger set of independent variables or items on a test.

One of the earliest of the psychometric theories came from the British psychologist **Charles E. Spearman** (1927). He proposed a two factor theory of intelligence. Spearman used a statistical technique called factor analysis and concluded that intelligence consists of two factors that explain the individual differences in test scores: general factor (g factor) and specific factors (s factors). The g factor includes mental operations which are primary and common to all performances requiring intelligence. The second factor (s factor) is specifically related to each particular test.

In contrast to Spearman, several theories have concluded that intelligence has multiple components. One of the multifactor theories grew out of the work of Thurstone. The American psychologist **E.L. Thurstone** (1938) proposed the theory of primary mental ability. He analyzed the inter-correlations of a set of 56 mental tests and identified seven factors, each of which are referred to as the primary mental ability. These seven abilities are:

- i) *Verbal comprehension* (grasping meaning of words, concepts, and ideas)
- ii) *Verbal fluency* (using words fluently and flexibly)
- iii) *Numerical ability* (solving numerical computation and arithmetical reasoning problems with speed and accuracy)
- iv) *Spatial ability* (visualizing and manipulating objects)
- v) *Inductive reasoning* (ability to derive general rules and principles from presented facts)
- vi) *Memory* (ability to recall information)
- vii) *Perceptual speed* (the speed of perceiving the details).

Raymond Cattell (1963) used factor analysis technique to show that general intelligence can be divided into two relatively independent components: crystallized intelligence and fluid intelligence. Crystallized intelligence is the type of intelligence which consists of the knowledge a person has already acquired and the ability to use that knowledge whenever required. In contrast, fluid intelligence is the type of intelligence used when dealing with novel situations and problems. Fluid abilities are the reasoning and problem-solving abilities which are measured by tests such as analogies, classifications, and series completions. Crystallized abilities include vocabulary, general information, and knowledge about specific fields.

Arthur Jensen (1969) proposed a hierarchical model of intelligence, which consists of abilities operating at two levels: Level I and Level II. The level I ability is called as associative learning which consists of rote learning and memory, in which the output is more or less similar to the input. Level II is called as cognitive learning, which involves higher order skills such as abstract thinking and symbolic thought. These skills help to transform the input to produce an effective output.

The above mentioned theories are representations of psychometric approach to understand the nature of intelligence. The psychometric approaches to intelligence, thus basically study the statistical relationships between different measures of mental testing.

3.6.2 Cognitive Approach

The preceding theories attempt to understand intelligence by finding out its component parts. This is one path to an understanding of intelligence. An alternative approach in understanding the concept of intelligence was taken by many theorists, who focused on intellectual processes – that is, the patterns of thinking that individuals use when they reason and solve problems. They are more interested in the cognitive processes which focus on how people go about solving problems and figuring out the answers. The cognitive approaches to intelligence do not focus on the structure of intelligence, but on the processes underlying intelligence of the individual. They apply the information processing approach to understand the nature of intelligence. Now, let us discuss in brief some theories of intelligence which follow this approach.

Robert Sternberg (1985) emphasizes the importance of cognitive processes in problem solving. His model of information processing consisted of three types of components:

- i) *Knowledge Acquisition Components*: It is used for encoding and comparing information as well as for learning new facts.
- ii) *Performance Components*: It is used for problem solving strategies and techniques.
- iii) *Metacognitive Components*: It involves selecting a strategy and monitoring the progress of cognitive processing.

According to this theory, there are three basic types of intelligence:

- i) *Componential or analytic intelligence* involves the abilities to think critically and analytically. It is reflected in IQ scores and college grades.
- ii) *Experiential or creative intelligence* focuses on insight and the ability to formulate new ideas. It is involved in using past experiences creatively to solve new problems.
- iii) *Contextual or practical intelligence* emphasizes on the ability to deal with the environmental demands faced during day-to-day affairs. It is otherwise referred as street smartness.

Howard Gardner (1983) believed that intelligence is not a single entity; rather it consists of numerous abilities, each of which is equally important. He described different types of intelligence concerning the following ability:

- i) Linguistic/verbal ability: skills involved in production and use of language.
- ii) Logical - mathematical ability: skills in scientific thinking and problem solving.
- iii) Spatial ability: skills involved in forming visual images and patterns.
- iv) Musical ability: skills in tasks involving musical rhythms and patterns.
- v) Bodily – kinesthetic ability: skills used for using whole or portions of the body flexibly and creatively.
- vi) Interpersonal ability: skills in interacting and understanding people by being sensitive to their emotions.
- vii) Intrapersonal ability: skills involved in understanding oneself.
- viii) Naturalistic ability: skills for being sensitive to the features of the natural world.
- ix) Existential ability: skills concerning the broader meaning of life.

Planning, Attention-Arousal, Simultaneous and Successive (PASS) model has been developed by **J.P. Das, J. Naglieri, and Kirby** (1994). According to this model, human cognitive processes involve three functional units of brain. These units are responsible for arousal/attention, coding or processing and planning. The three functional units are as follows:

- i) First functional unit is responsible for arousal and attention. This is associated with activities of brain stem and lower part of cerebral cortex.
- ii) Second functional unit is involved in analyzing, coding, and storing information using simultaneous and successive processes. Simultaneous processing is associated with parietal and occipital lobes and successive processing is associated with frontal temporal lobes.

- iii) Third functional unit is used for planning, self-monitoring and structuring of cognitive abilities. It is associated with activities of prefrontal lobes.

Attention-Arousal: This process involves the ability to selectively attend to stimuli while ignoring other distractions. Arousal keeps people awake and alert. An optimal level of arousal focuses our attention to the relevant portion of a problem.

Simultaneous Processing: This involves the ability to integrate separate concepts to our knowledge system as an interrelated whole. Simultaneous processing helps us in finding relationship between the given abstract figures.

Successive Processing: This involves the ability to remember and integrate information into a sequential order. Learning of digits, alphabets and multiplication tables are examples of successive processing.

Planning: This is the ability to make decisions about problem solving and how to carry out the task. It involves setting goals, to think of courses of action to reach the goal and evaluate their effectiveness.

All the above described theories represent the cognitive approach to understand the intelligence of human being.

Self Assessment Questions III

State whether each of the following statements is 'True' or 'False':

- 1) Jensen proposed the concept of fluid and crystalized intelligence.
- 2) Psychometric approach examines the processes underlying intelligence.
- 3) Gardner's theory is an example of psychometric approach.
- 4) Theory of multiple intelligences exemplifies the cognitive approach to intelligence.
- 5) Contextual intelligence is otherwise referred to as practical intelligence.

You will learn more about the theories in Unit 4 which specifically deals with the theories of intelligence. Now let us see how individuals differ in their level of intelligence.

3.7 INDIVIDUAL DIFFERENCES IN INTELLIGENCE

Intelligence has significant implications for our everyday life, and it influences our effective functioning. It is related to various life outcomes such as academic achievement, job performance, health etc, however, it is difficult to establish a causal relationship. There are other individual differences in personality, mood, motivation, leadership, creativity etc. that may affect the outcome in a particular aspect/area. Nevertheless, individual differences in intelligence does matter and we need to know the implications of it.

As we have discussed above in section 3.3, intelligence is assessed in terms of IQ scores and we get a range of IQ in terms of the normal distribution curve. Those who score at the extreme high end of normal curve for intelligence are having extreme high IQ and called as 'gifted'. Individuals who fall at the other extreme of the normal curve and have extreme low IQs come under the 'intellectual disability' group, earlier known as mental retardation.

The *gifted* usually have an IQ of 130 and above. Terman's (1925) longitudinal study of 1528 children having IQ more than 130, demonstrated that they were more successful

in different domains including education, career, social skills and adjustment. However, studies (Torrance, 1993) have also found that other factors such as a high energy level, persistence, a sense of purpose in life etc. do play a role in the various life outcomes of gifted people.

Intellectual disability is marked by an extreme low IQ of 70 or below on a test when the mean IQ score is 100. In addition to it, the child also should have deficit in daily adaptive behaviour such as self-care skills, communicating with others, being able to live on one's own etc. Since intellectual disability is known as a neurodevelopmental disorder, the condition is manifested during the developmental stage, i.e., below 18 years of age. Thus, there are three main clinical features of intellectual disability: (a) significant below average IQ, (b) deficiency in age-appropriate adaptive behaviour, and (c) occurs during the developmental period.

Intelligence as assessed in the psychometric tests is used to define the gifted and the intellectually disabled. It is mostly correlated with the traditional academic achievement or being book smart. However, you may be knowing many cases where despite having academic success, such individuals were not so successful in their social relations and other real life situations (Mehrabian, 2000). Thus, individual differences in being people smart accounts more for success in life. It involves *emotional intelligence*, the ability to recognize emotions in oneself and others, and to manage the emotions in an effective way (Mayer & Salovey, 1997).

Let us now discuss this concept of emotional intelligence in little more detail.

3.8 CONCEPT OF EMOTIONAL INTELLIGENCE

As we mentioned earlier, we may find people who are academically talented, but are quite unsuccessful in their own life. They may experience problems in interpersonal relationships at home as well as workplace. Having a good intelligence level and scholastic record is not enough to be successful in life. So what do they lack? Some psychologists believe that the lack of emotional intelligence may be the source of their difficulty to adjust to the environment. The concept of emotional intelligence was first introduced by Salovey and Mayer (1990). It was later popularized and expanded upon by Daniel Goleman (1995) with the publication of his book "Emotional Intelligence: Why it can matter more than IQ". Goleman proposed that emotional intelligence has a more powerful influence on success in life than the traditional views of intelligence.

Salovey and Mayer (1990) described emotional intelligence as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions". It refers to the capacity to reason about emotions and emotional information, and thereby, to enhance thought. As IQ is used to express intelligence, Emotional Quotient (EQ) is used to express emotional intelligence. According to Salovey and Mayer, people with high EQ, could solve a variety of emotion-related problems accurately and quickly. For example, people with high emotional intelligence can accurately perceive emotions in faces. They also understand the meanings that emotions convey.

Emotional intelligence is often described as the capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships empathetically. It is generally said to include skills like emotional awareness, the ability to make productive use of emotions by applying them in thinking and problem solving tasks, and the ability to manage and regulate emotions. In simpler terms, emotional intelligence refers to the capability of individuals to recognize their own emotions and those of others, discern

between different feelings and label them appropriately, use emotional information to guide thinking and behaviour, and manage and/or adjust emotions to adapt to environments or achieve one's goal(s). All these skills are more important for success in life.

3.8.1 Models of Emotional Intelligence

There are different scientific approaches to emotional intelligence. They can be characterized as the ability model, trait model and mixed models.

The *ability model* views emotional intelligence as a standard intelligence. They argue that the construct of emotional intelligence meets the traditional criteria for intelligence. People using this model measure emotional intelligence as a mental ability with performance assessments that have a criterion of correctness (i.e., there are better and worse answers, which are determined using complex scoring algorithms).

The *trait model* encompasses behavioural dispositions and self-perceived abilities and is measured through self-report questionnaire.

Mixed models are so called because they mix the ability conception with personality traits and competencies such as optimism, self-esteem, and emotional self-efficacy. Researchers using this mixed approach use self-report instruments as opposed to performance assessments to measure emotional intelligence. For example, instead of asking people to demonstrate how they perceive an emotional expression accurately, self-report measures ask people to judge and report how good they are at perceiving others' emotions accurately.

Mayer and Salovey's Model of Emotional Intelligence

This ability-based model views emotions as useful sources of information that help one to make sense of and navigate the social environment. The model claims that emotional intelligence includes four types of abilities:

- i) Perception of emotion: It includes the ability to identify and differentiate emotions in the self and others. A basic aspect of this ability is identifying emotions accurately in physical states (including bodily expressions) and thoughts. This ability also enables one to identify emotions in other people, to detect and decipher emotions in pictures, voices, and cultural artifacts also.
- ii) Use of emotion to facilitate thinking: This refers to using emotions to facilitate cognitive activities such as reasoning, problem solving, and interpersonal communication. It includes skills for generating emotions to aid judgment and memory processes. It also includes the ability for producing emotional states to foster different thinking styles.
- iii) Understanding and analyzing emotions: This includes the ability to comprehend the language and meaning of emotion, as well as an understanding of the antecedents of emotions. Skills in this component include labeling emotions with accurate language as well as recognizing similarities and differences between emotions. Interpreting origins of emotions, recognizing transitions between emotions, and understanding blending of different emotions are also component of this ability.
- iv) Reflective regulation of emotions: It includes the ability to regulate and modify an emotional response in oneself and others. It also includes the ability to experience a range of emotions while making decisions about the appropriateness or usefulness of an emotion in a given situation. Monitoring and reflecting on one's own emotions and those of others represents more complex problem solving ability.

A comprehensive performance test of emotional intelligence is the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2003) for adults and the Mayer–Salovey–Caruso Emotional Intelligence Test, Youth Version (MSCEIT-YV; Mayer, Salovey, & Caruso, 2004). These are performance tests as they require individuals to solve tasks pertaining to each of the four abilities as defined by their theory; for example: identifying the facial emotions of people, imagining a person’s feeling when appropriate emotion is experienced, to know how emotions develop and change over time and the process of evaluating the courses of actions in different emotional situations.

Goleman’s Theory of Emotional Intelligence

Goleman broadened Mayer’s and Salovey’s model to incorporate five essential components of emotional intelligence:

- i) *Self-Awareness*: It refers to the ability to recognize and understand one’s moods, emotions, and drives, as well as their effect on other people. People with emotional self-awareness understand their own strengths and weaknesses, as well as how their actions affect others.
- ii) *Self-Regulation*: It involves controlling or redirecting one’s disruptive impulses and emotions. It also includes the skill to think before acting. A person with self-regulation has the ability to exercise control when expressing their emotions.
- iii) *Motivation*: It drives the individual to achieve things. It gives a passion to achieve goals with energy and persistence. People with high emotional intelligence are self-motivated and internally driven rather than being influenced by outside forces, such as money or status.
- iv) *Empathy*: It is the ability to understand the emotions of other people as well as to feel what others are feeling. We need to treat other people according to their emotional reactions. A person with empathetic understanding has the ability to connect with people and genuinely respond to their concerns.
- v) *Social skills*: It helps in managing relationships and building social networks. It is the ability to inspire others and induce desired responses from them in a given situation. It helps the person to build rapport and trust with others.

3.8.2 Factors Contributing to Emotional Intelligence

Are people born with all of the emotional intelligence they will ever have, or does experience affects their development. Researchers have provided empirical support for the concept of emotional intelligence and its relatedness with general intelligence (Mayer et al., 2003). While we acknowledge that genetics is likely to play an important role in the development of emotional intelligence, we need to also note that nurture does influence the nature (as in case of general intelligence). The genetic expression itself appears to be shaped by the social and emotional experiences of the individual. Bar-On (2000) has found out that successively older cohorts tend to score higher on scale of emotional intelligence, suggesting that, to some extent, emotional intelligence may be learned through life experience. However, the development of social and emotional competencies takes commitment and sustained effort of the individuals, and not just improvement in emotional intelligence with maturation.

Goleman (1995) includes a set of emotional competencies within each construct of emotional intelligence. Emotional competencies are not innate talents, but rather learned

capabilities that must be worked on and can be developed to achieve outstanding performance. Goleman views that individuals are born with a general emotional intelligence that determines their potential for learning the emotional competencies.

A wide range of findings from the fields of psychotherapy, training programs and executive education (Barlow, 1985; Marrow, Jarrett, & Rupinski, 1997; Boyatzis, Cowan, & Kolb, 1995) provide evidence for people's ability to improve their social and emotional competence with sustained effort and a systematic program. The findings in the emerging field of affective neuroscience are focusing on researches that demonstrate that the brain circuitry of emotion exhibits a fair degree of plasticity, even in adulthood (Davidson, Jackson, & Kalin 2000). Recent research on "mindfulness" training (emotional self-regulation strategy) has also reported that training can actually alter the brain centers that regulate negative and positive emotions (Davidson et. al., 2003). The mindfulness training basically focuses on helping people to stay focused on the present, thus keeping distressful and distracting thoughts (e.g. worries) away, and to pause before acting on emotional impulse. These results support our notion that emotional intelligence competencies can be developed; in other words the environment plays an important role in the development of emotional intelligence.

In this section we have attempted to understand the concept of emotional intelligence. While the progress of the emotional intelligence paradigm has been impressive, much remains to be discovered. One problem with emotional intelligence tests is that they often do not show a great deal of reliability or construct validity. Researchers have questioned the construct validity of the measures, arguing that emotional intelligence measures knowledge about what emotions are, but not necessarily how to use those emotions, and that emotional intelligence is actually a personality trait, a part of g, or a skill that can be applied in some specific work situations — for instance, academic and work situations. Hopefully, upcoming research will facilitate continued refinement of the theory which will help us to understand the concept of emotional intelligence factors contributing to its development.

Self Assessment Questions IV

Complete the following with suitable words:

- 1) The concept of emotional intelligence was popularized by
- 2) Mayer and Salovey's model of emotional intelligence has used model.
- 3) Goleman's theory of emotional intelligence has components.
- 4) The ability to feel what others are feeling is referred to as
- 5) Name any one test of emotional intelligence

3.9 LET US SUM UP

In the present Unit, we learned about the concept of intelligence and how it has been defined in many ways. It refers to the individual's ability to think rationally, understand complex ideas, learn from experience, and adapt to the environment. It is measured in terms of the Intelligent Quotient (IQ), which is obtained by dividing mental age by chronological age and multiplying by 100. We also learned that intelligence is the product of complex interplay of hereditary factors (nature) and environmental factors (nurture). Evidence for the role of nature is provided by findings on twin studies and adoption studies. Evidence for the role of nurture is provided by studies on Flynn effect, environmental deprivation and enrichment.

Approaches to explain the nature of intelligence can be broadly grouped under (a) psychometric approaches, and (b) cognitive approaches. The psychometric approaches to intelligence give emphasis on studying intelligence as consisting of abilities which can be expressed in quantitative term. The theories representing cognitive approaches, e.g. the PASS model or Gardner’s multiple intelligences describe the processes underlying intelligent behaviour.

Further, the Unit also described individual differences in intelligence in terms of intellectual disability, giftedness and emotional intelligence. The concept of emotional intelligence, models and factors affecting emotional intelligence were discussed.

3.10 KEY WORDS

- Intelligence** : refers to the aggregate or global capacity of an individual to think rationally, to act purposefully and to deal effectively with the environment (David Wechsler, 1944).
- Mental age** : is a measure of person’s intellectual development relative to people of his/her age group.
- Intelligent quotient (IQ)** : refers to mental age (MA) divided by chronological age (CA) and multiplied by 100.
- Flynn effect** : refers to increase in IQ scores over generations. It is also called ‘secular rise’ in IQ scores.
- Crystallized intelligence** : is the type of intelligence which consists of the knowledge a person has already acquired and the ability to use that knowledge whenever required.
- Intellectual disability** : is marked by three main features such as (a) significant below average IQ, (b) deficiency in age-appropriate adaptive behaviour, and (c) occurs during the developmental period.
- Emotional intelligence** : refers to the capacity to be aware of, control, and express one’s emotions, and to handle interpersonal relationships empathetically.

3.11 ANSWERS TO SELF ASSESSMENT QUESTIONS

Self Assessment Questions I

- 1) a) False
b) False
c) False
d) True

Self Assessment Questions II

- 1) The question of whether heredity or environment is important in determining intelligence is known as the nature- nurture debate on intelligence.

- 2) The proportion of the variance in any trait (here it is intelligence) within a given population that is attributable to genetic factors is called as heritability.
- 3) Flynn effect is the rapid rise in the average IQ of individuals in several western countries in recent decade.

Self Assessment Questions III

- 1) False
- 2) False
- 3) False
- 4) True
- 5) True

Self Assessment Questions IV

- 1) Goleman
- 2) Ability
- 3) 5
- 4) Empathy
- 5) Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT)

3.12 UNIT END QUESTIONS

- 1) Explain the concept of intelligence.
- 2) Critically examine the psychometric and cognitive approaches to understand the nature of intelligence.
- 3) Examine the role of heredity and environment in the development of intelligence.
- 4) Elaborate the different components of emotional intelligence.

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