

MEASUREMENT OF INTELLIGENCE

Intelligence Quotient (I.Q.): The term was initiated by the German Psychologist William Stern and put into wide practice by Terman. It appeared to Stern that if a child was 6 years old (Chronologically) but could do what an 8 years old normally does he could be either $8/6$ or 1.33 as bright as the average. He made the ratio, M.A / C.A a measure of the rate of mental development of an individual. The ratio was given the name Intelligence Quotient, I.Q. To do away with decimal point the ratio was again multiplied by 100 and thus the formula to calculate I.Q. was known as

$$\text{I.Q.} = \frac{\text{Mental Age}}{\text{Chronological Age}} \times 100$$

Mental Age: The term was used by Binet first of all. It expresses the individual's general ability as measured by the test at any given time. It compares one child's intelligence with the average children of the same chronological age. Mental age is only a statement of the child's mental maturity at the time the test is given.

The following classification of I.Q.'s has been formulated by Terman and has been generally accepted by psychologists.

<u>I.Q.</u>	<u>Category</u>
Below 70	Mentally defectives
70 - 75	Borderline or feeble minded
75 - 90	Dull and Backward
90 - 95	Below Average
95 - 105	Average
105 - 125	Superior
125 - 140	Very Superior
140 - and above	Genius
Of the mentally defectives:	40 - 70, Morons
	20 - 40, Imbeciles
	0 - 20, Idiots

IQ always are based on the individual's interaction with the environment. They never measure innate intelligence exclusively. IQ change in the course of development. IQ scores are used as predictors of educational achievement, special needs, job performance and income. They are also used to study IQ distributions in populations and the correlations between IQ and other variables.

EMOTIONAL INTELLIGENCE

Emotional Intelligence, as a psychological theory, was developed by Peter Salovey and John Mayer, but was popularized by Daniel Goleman. Emotional intelligence is the capacity to be

aware of, control, and express one's emotions, and to handle interpersonal relationships wisely and empathetically. EI also refers to an individual's self-perceptions of their emotional abilities. Emotional intelligence is the ability to recognize one's own emotions, understand what they're telling, and realize how ones emotions affect people around. Emotional intelligence also involves our perception of others: when we understand how they feel, this allows us to manage relationships more effectively. People with high emotional intelligence are usually successful in most things they do. Because they're the ones that others want on their team. They make others feel good, they go through life much more easily than people who are easily angered or upset.

Definitions

"Emotional intelligence is the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth."- Mayer & Salovey, 1997

"The capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationship."-Goleman

Shortly, emotional intelligence is the capacity to understand emotional information and to reason with emotions.

Salovey and Mayer proposed a model that identified four different factors of emotional intelligence and they are:-

1. **Perceiving Emotions:** The first step in understanding emotions is to accurately perceive them. In many cases, this might involve understanding nonverbal signals such as body language and facial expressions.
2. **Reasoning With Emotions:** The next step involves using emotions to promote thinking and cognitive activity. Emotions help prioritize what we pay attention and react to; we respond emotionally to things that gather our attention.
3. **Understanding Emotions:** The emotions that we perceive can carry a wide variety of meanings. If someone is expressing angry emotions, the observer must interpret the cause of their anger and what it might mean. For example, if your boss is acting angry, it might mean that he is dissatisfied with your work; or it could be because he got a speeding ticket on his way to work that morning or that he's been fighting with his wife.
4. **Managing Emotions:** The ability to manage emotions effectively is a key part of emotional intelligence. Regulating emotions, responding appropriately and responding to the emotions of others are all important aspect of emotional management.

DANIEL GOLEMAN'S FIVE COMPONENTS OF EMOTIONAL INTELLIGENCE

The following steps describe the five components of emotional intelligence at work, as developed by Daniel Goleman. Goleman is a science journalist who brought "emotional intelligence" on the bestseller list and has authored a number of books on the subject, including "Emotional Intelligence," "Working With Emotional Intelligence," and, lately, of "Social Intelligence: The New Science of Human Relationships."

The Five Components of Emotional Intelligence

1. **Self-awareness.** The ability to recognize and understand personal moods and emotions and drives, as well as their effect on others. Self-awareness include self-confidence, realistic self-assessment, and a self-deprecating sense of humor. Self-awareness depend on one's ability to monitor one's own emotion state and to correctly identify and name one's emotions.
2. **Self-regulation.** The ability to control or redirect disruptive impulses and moods, and the propensity to suspend judgment and to think before acting. Hallmarks include trustworthiness and integrity; comfort with ambiguity; and openness to change.
3. **Internal motivation.** A passion to work for internal reasons that go beyond money and status -which are external rewards, - such as an inner vision of what is important in life, a joy in doing something, curiosity in learning, a flow that comes with being immersed in an activity. A propensity to pursue goals with energy and persistence. Hallmarks include a strong drive to achieve, optimism even in the face of failure, and organizational commitment.
4. **Empathy.** The ability to understand the emotional makeup of other people. A skill in treating people according to their emotional reactions. Hallmarks include expertise in building and retaining talent, cross-cultural sensitivity, and service to clients and customers. (In an educational context, empathy is often thought to include, or lead to, sympathy, which implies concern, or care or a wish to soften negative emotions or experiences in others.) It is important to note that empathy does not necessarily imply

consideration. Empathy can be 'used' for compassionate or cruel behavior. Serial killers who marry and kill many partners in a row tend to have great empathic skills!

5. **Social skills.** Proficiency in managing relationships and building networks, and an ability to find common ground and build rapport. Hallmarks of social skills include effectiveness in leading change, persuasiveness, and expertise building and leading teams.

Emotional Quotient

The term Emotional quotient (EQ) was coined by Baron in 1988 as a counter part of intelligence quotient (IQ). EQ is the measure of one's emotional intelligence. Emotional Quotient is the level of a person's emotional intelligence, often as represented by a score in a standardized test.

Definition

According to **Dozier**, *"EQ is the ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion, and regulate emotion in the self and others."*

Emotional quotient is defined as a relative measure of one's emotional intelligence possessed by him at a particular period of his life. I.Q Scores are often used for selection, classification, and promotion of individuals in various programmes, courses, and job placements etc. The importance of I.Q is replaced by the concept of emotional intelligence and its measure (E.Q). Researches and experiments revealed that a person's emotional intelligence measured through his E.Q may be a greater predictor of success than his or her I.Q.

Emotionally Intelligent person is –

- Sensible to his own feelings and emotions
- Understand or identify other's emotions
- Incorporate the perceived emotions in thought
- Have proper understanding of nature, intensity, outcomes of emotions
- Proper control and regulation over emotions
- Know, feel, use, communicate, monitor the emotions
- Tackling of emotional upsets in a healthy way
- Adequate self concept & self respect
- Can exercise his/her emotions on correct time- to correct persons – at correct place-with correct intensity.

Importance of EQ:

1. E.Q is more powerful than I.Q where as I.Q contributes 20% of success in life, the other forces contribute the rest.
2. E.Q is the best predictor of success in life.
3. E.Q can be increased and thus make their life more healthy, enjoyable and successful in the future.
4. E.Q helps us to lead a productive and happy life.
5. School children can succeed in their academics more by social and emotional measures than by I.Q.
6. In working situations too E.Q helps more than I.Q. A person with low E.Q may suffer in dealing with one self and getting along properly with others.

7. E.Q helps a person in all spheres of life through its various constituent components namely knowledge of emotions (self awareness) managing the emotions, motivating oneself, recognizing emotions in others (empathy), and handling relationships.

A teacher could promote EI in following manner-

- Teach the art of managing emotions using class room situations
- Use emotions as the motivating factor not as an obstacle
- Teach lessons of empathy
- Practice social skills
- Give chances to develop affective skills
- Teach some techniques to overcome the emotional "ups & downs"
- Teacher as a model & companion for emotional maturity

SOCIAL INTELLIGENCE

Social Intelligence (SI) is the ability to get along well with others, and to get them to cooperate with you. Sometimes referred to simplistically as "people-skills," SI includes an awareness of situations and the social dynamics that govern them, and a knowledge of interaction styles and strategies that can help a person achieve his or her objectives in dealing with others. It also involves a certain amount of self-insight and a consciousness of one's own perceptions and reaction patterns. Social intelligence is the capacity to effectively navigate and negotiate complex social relationships and environments. Social Intelligence develops from experience

with people and learning from success and failures in social settings. It is more commonly referred to as "common sense."

Definitions

Edward Thorndike (1920) "the ability to understand and manage men and women, boys and girls, to act wisely in human relations"

Sean Foleno" Social intelligence is a person's competence to understand his or her environment optimally and react appropriately for socially successful conduct."

Key elements of social intelligence

1. **Verbal Fluency and Conversational Skills.** " The highly socially intelligent person can carry on conversations with a wide variety of people, and is tactful and appropriate in what is said. Combined, these represent what are called "social expressiveness skills."

2. **Knowledge of Social Roles, Rules, and Scripts.** Socially intelligent individuals learn how to play various social roles. They are also well versed in the informal rules, or "norms," that govern social interaction. In other words, they "know how to play the game" of social interaction. As a result, they come off as socially sophisticated and wise.

3. **Effective Listening Skills.** Socially intelligent persons are great listeners. As a result, others come away from an interaction with an SI person feeling as if they had a good "connection" with him or her.

4. **Role Playing and Social Self-Efficacy.** The socially intelligent person knows how to play different social roles – allowing him or her to feel comfortable with all types of people. As a result, the SI individual feels socially self-confident and effective is called “social self-efficacy.”

5. **Impression Management Skills.** Persons with SI are concerned with the impression they are making on others.

MORAL INTELLIGENCE

Moral intelligence is the capacity to understand right from wrong and to behave based on the value that is believed to be right. There are seven main points that build someone's moral intelligence, such as empathy, conscience(ethics), self-control, respect for others, kindness, tolerance, and fairness (justice).

Moral intelligence refers to the ability to apply ethical principles to goals, values and actions. It is the ability to know right from wrong and behave ethically. Moral intelligence is newer and less studied than the more established cognitive, emotional and social intelligences, but has great potential to improve our understanding of learning and behavior.

Definitions

Lennick and Kiel define moral intelligence as “*the mental capacity to determine how universal human principles —like those embodied by the “Golden Rule”— should be applied to our personal values, goals, and actions”*.”

The Association of Supervision and Curriculum Development (ASCD) Panel on Moral Education defines "a moral person as one who respects human dignity, cares about the welfare of others, integrates individual interests and social responsibilities, demonstrates integrity, reflects on moral choices and seeks peaceful resolution of conflict".

Competencies of moral intelligence

Their construct of moral intelligence consists of four competencies related to integrity, three to responsibility, two to forgiveness and one to compassion (Lennick and Kiel, 2005).

The four competencies of **integrity** are:

- 1) acting consistently with principles, values, and beliefs,
- 2) telling the truth,
- 3) standing up for what is right, and
- 4) keeping promises.

Responsibility's three competencies are

- 1) taking personal responsibility,
- 2) admitting mistakes and failures, and
- 3) embracing responsibility for serving others.

Forgiveness involves

- 1) letting go of one's own mistakes and
 - 2) letting go of others' mistakes, and
- compassion** is actively caring about others.

SPIRITUAL INTELLIGENCE AND SQ

Spiritual Intelligence is "The ability to act with Wisdom and Compassion while maintaining inner and outer peace (equanimity), regardless of the circumstances." Spiritual intelligence is an innate human intelligence that is readily made available to us if we are willing to ask for it and practice it. It is the manifestation of behaviors, skills and choices that show a strong, dependable connection to something "bigger than me". This intelligence as is considered as the highest of 4 intelligences – all of which are critical for being effective in this level of physical reality. The other three intelligences are: physical intelligence, emotional intelligence and mental or intellectual intelligence. Dana Zohar & Ian Marshall introduced the spiritual intelligence in the year 2000, as the intelligence to solve problems of meaning and value of life. It is the ultimate intelligence because it is about the growth of human being, moving on in life, having an aim, healing ourselves, discovering freedom, understanding ourselves as the manifestations of the ultimate reality. It is the ability and behaviour to develop & maintain a relationship with the ultimate. SI gives meaning in life, help us to find a moral & ethical the real values and its meaning, and help us to relate with the creator.

Definitions

Zohar and Marshall defined as "*spiritual intelligence as the intellectual ability to question why we are here and to be creative in our pursuit of answers.*"

Yang defined as “ *Spiritual intelligence as the ability to construct meaning through intuitively seeing interconnectedness between life world experience and the inner spheres of the individual psyche.*”

Emmos defined as “ *Spiritual intelligence as the adaptive use of spiritual information to facilitate everyday problem solving and goal attainment.*”

Signs of high SQ :

- Flexibility
- Self-awareness
- Ability to face, use, find meaning in sufferings
- Thinking holistically
- Do not become a cause of harm to others
- Ability to ask fundamental questions
- Ability to work against convention

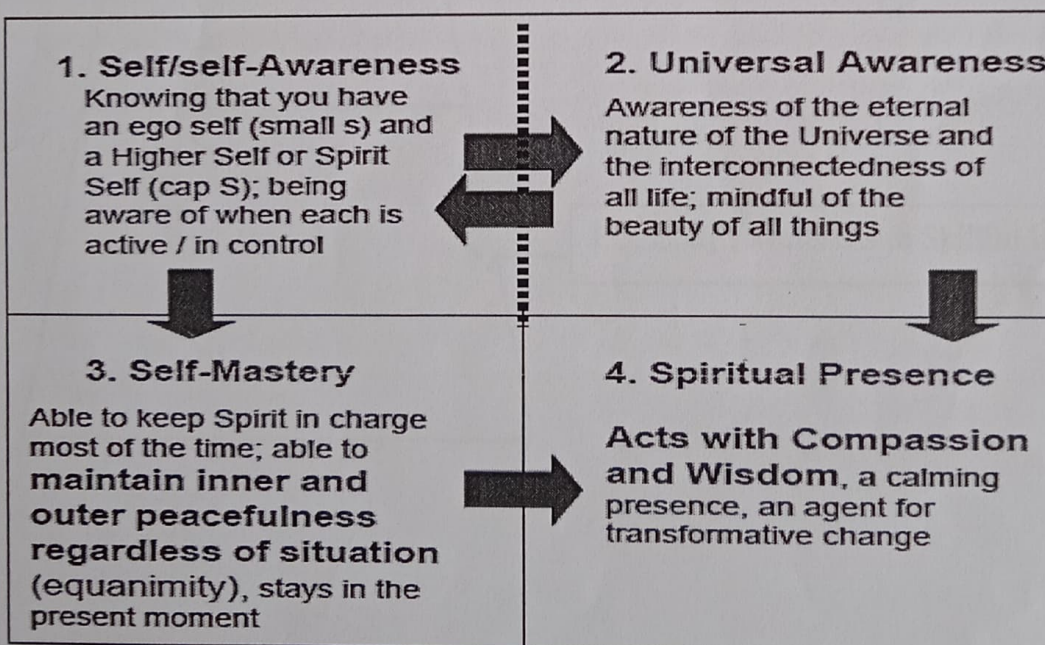
Components of spiritual intelligence

Zohar and Marshall introduced 12 **qualities** of SQ. (Danah Zohar defined **12 principles** underlying spiritual intelligence)

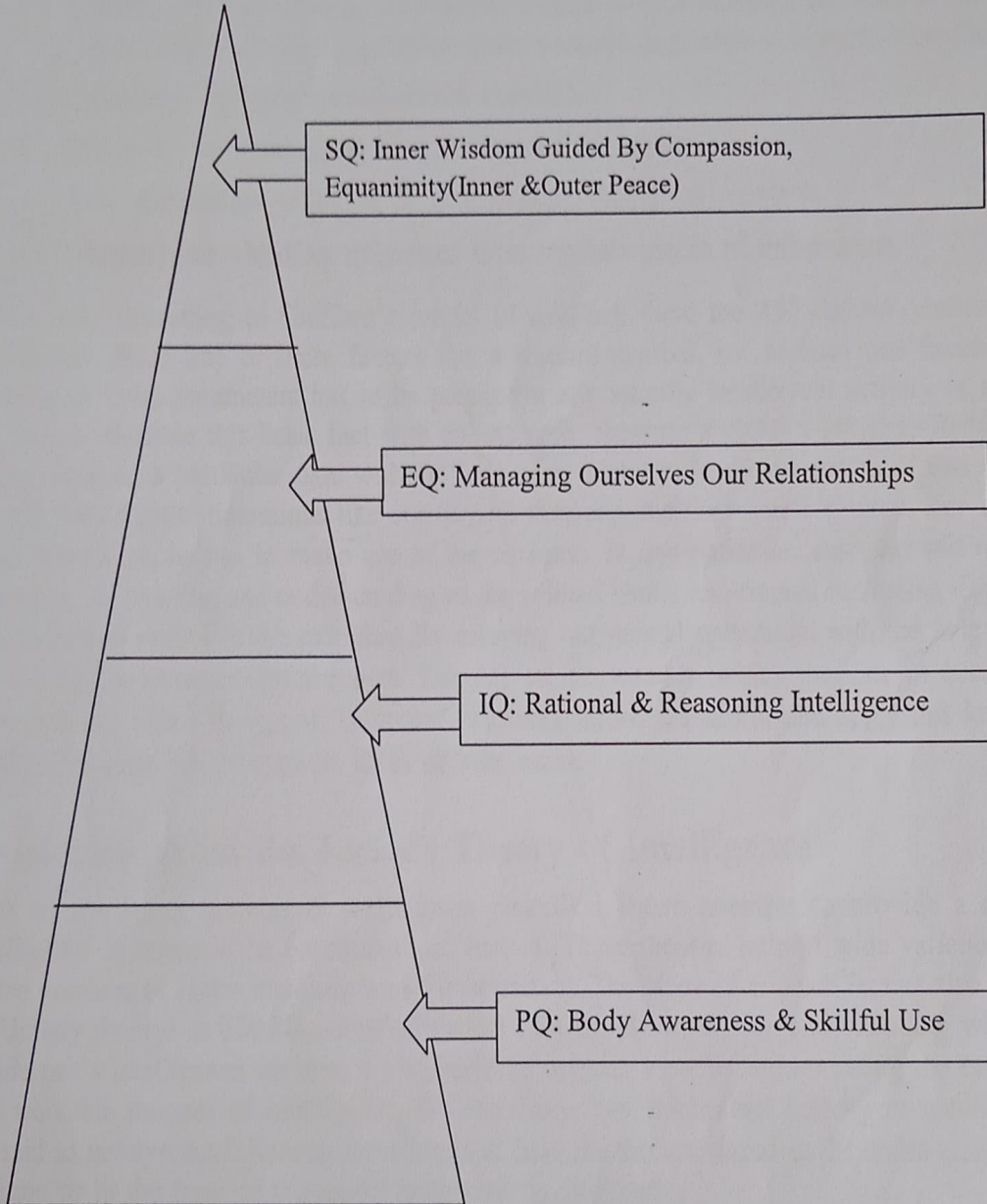
1. Self-awareness: Knowing what I believe in and value, and what deeply motivates me.
2. Spontaneity: Living in and being responsive to the moment.
3. Being vision- and value-led: Acting from principles and deep beliefs, and living accordingly.

4. Holism: Seeing larger patterns, relationships, and connections; having a sense of belonging.
5. Compassion: Having the quality of "feeling-with" and deep empathy.
6. Celebration of diversity: Valuing other people for their differences, not despite them.
7. Field independence: Standing against the crowd and having one's own convictions.
8. Humility: Having the sense of being a player in a larger drama, of one's true place in the world.
9. Tendency to ask fundamental "Why?" questions: Needing to understand things and get to the bottom of them.
10. Ability to reframe: Standing back from a situation or problem and seeing the bigger picture or wider context.
11. Positive use of adversity: Learning and growing from mistakes, setbacks, and suffering.
12. Sense of vocation: Feeling called upon to serve, to give something back.

SQ Competencies are:



Different Intelligences in its developmental sequence:



- **Convergent production**—Producing a single best solution to a problem.
- **Evaluation**—Taking decision about the nature of the intellectual contents or gathered information whether it is positive or negative, good or bad etc.

Products (The results obtained through Operations).

- **Units**—Individual pieces of information limited in size, e.g. a single number, letter or word.
- **Classes**—Groups of units information related to each other on the basis of some common characteristics involving a higher order concept (e.g. men + women = people).
- **Relations**—A connection between concepts.
- **Systems**—An ordering or classification of relations.
- **Transformation**—Altering or restructuring intellectual contents.
- **Implications**—Making inferences from separate pieces of information.

In this way, according to Guilford's model of intellect, there are 150 factors operating in one's intelligence. Each one of these factors has a trigram symbol, i.e. at least one factor from each category of three parameters has to be present in any specific intellectual activity or mental task.

Let us illustrate this basic fact with an example. Suppose a child is asked to find out the day of the week on a particular date with the help of a calendar. In the execution of this mental task, he will need mental operations like convergent thinking, memory and cognition. For carrying out these operations, he has to make use of the contents. In this particular case, he will make use of semantics, i.e. reading and understanding of the printed words and figures indicating days and dates of a particular month in the calendar. By carrying out mental operations with the help of contents he will finally arrive at the products. The day of the week to which the date in question refers, represents the factor known as "relations". He may further transform and apply this knowledge to identify the days for contiguous dates or vice versa.

Conclusion about the Factor's Theory of Intelligence

Each of the seven theories of intelligence described above attempts to provide a structure of intelligence in terms of its constituents or factors. These theories exhibit wide variations in terms of the numbers of factor that they consider important. The range of all such factors also varies from 1 (Unitary theory) to 150 (Guilford's Intellect Model). However, for understanding what goes on inside one's intelligence we must try to build an eclectic view by incorporating the essence of all the workable theories of intelligence. Consequently, any intellectual activity or mental task may be said to involve the following three kinds of basic factors (arranged in the order as suggested by Vernon or in the form of the model suggested by Guilford).

1. General factor g (Common to all tasks)
2. Specific factors s_1, s_2 , etc. (Specific to the tasks)
3. Group factor G (Common to the task belonging to a specific group)

MEASUREMENT OF INTELLIGENCE

We are only familiar with that intelligence of an individual which is manifested by him on an intelligence test or tests. Psychologists have devised many such tests for the measurement of intelligence.

Classification of Intelligence Tests

1. As far as the administrative point of view is concerned the intelligence tests can be classified into two broad categories namely—

(a) **Individual tests:** In which only one individual is tested at a time.

(b) **Group tests:** In which a group of individuals is tested at a time.

2. Another way of classifying the intelligence tests is based on the form of the test. Accordingly there are two types of tests:

(a) **Verbal or Language tests:** These tests make use of language. Here the instructions are given in words (either in written or oral form or both). Individuals are required to use language as well as paper and pencil for giving the responses. The test content of these tests is loaded with verbal material.

(b) **Non-Verbal and Non-Language tests:** These tests involve such activities in which the use of language is not necessary. The use of language is eliminated from test content and response except in giving directions.

The typical examples of such non-verbal tests are Performance Tests. The principal characteristics of these tests are given below:

- (i) Test contents of these tests are in the form of material objects.
- (ii) What an individual has to do is indicated by the tester either through oral instructions or by pantomime or signs.
- (iii) Individual's responses depend upon what he does or performs than by what he says or writes.
- (iv) Generally these tests are individual tests. As Dr. Pillai observes. "These cannot be used as group tests, chiefly because it is necessary to supervise the individual testee at work and give him necessary direction." (1972, p. 265).

If we try to have a final picture of all the types of tests in intelligence we will have to keep in view both the ways of classifying them as mentioned above. All these types of intelligence tests can be represented diagrammatically as in Fig. 22.4.

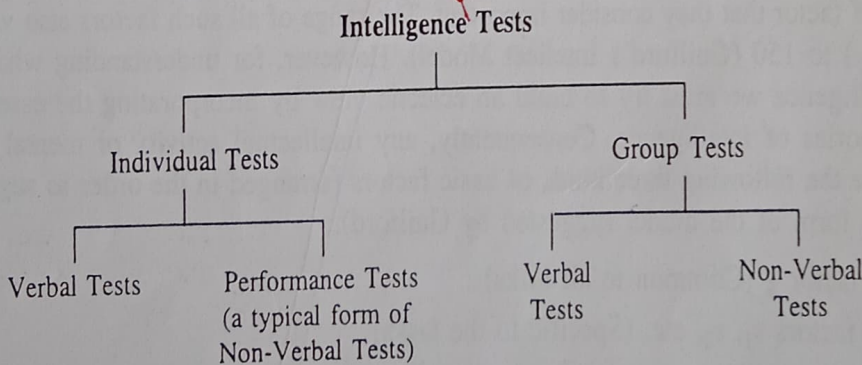


Fig. 22.4 Classification of intelligence tests.

Now we will discuss these types one by one.

Individual Verbal Tests

The tests involving the use of language and administered to an individual at a time belong to this category. As an example of such tests we can refer to **Stanford-Binet Scale**. It is the revised form

Verbal or language tests. In these the subjects make use of language in which the instructions are given in words, written, oral, or both. The individuals being tested are required to use language, verbal or written, for their responses. The test content is loaded with verbal material which may include varieties of the items listed below:

- **Vocabulary tests.** In these the subject is required to give the meanings of words or phrases. For example, what is the meaning of the word 'eventually'? What is the difference between bear, wear and bare? What does the phrase 'many roads to Rome' convey?
- **Memory tests.** These are designed to test the subject's immediate and long-term memory, and include recall and recognition type of items. He may be called upon to tell the full names of teachers who teach him different subjects; his phone number, the number of his vehicle, the dates of birth of his siblings and so on.
- **Comprehension tests.** By means of these, the subject is tested for the ability to grasp, understand and react to a given situation. The questions, for example, may be like: Why do big ships float in the sea while a small needle would sink in it? Why are the nights longer and the days shorter in winter?
- **Information tests.** The subject is tested on his knowledge about the things around him by means of these tests, e.g., Where is the Taj Mahal situated? Name the countries which surround Iraq.
- **Reasoning tests.** In these tests the subject is asked to provide answers which demonstrate his ability to reason—logically, analytically, synthetically, inductively or deductively as outlined below:
Complete the series: 1, 2, 4, 7, 11, 16, 22, 29, ?, ?, ?
A picture is to frame as an island is to . . .
- **Association tests.** Through these test items the subject is tested for his ability to point out the similarities or dissimilarities between two or more concepts or objects. For example:
 1. In what ways are animals and plants alike?
 2. Which of the items mentioned below is the odd one?
—gold, silver, copper, iron, glass.

Non-verbal and non-language tests. These tests involve activities in which the use of language is not necessary except for giving directions. Performance tests are a typical example of such tests. The main features of these are:

1. The contents of the tests are in the form of material objects.
2. What is required of the subject is conveyed by the tester through oral instructions, or by pantomime and signs.
3. The subject's responses are assessed in terms of how he reacts or what he does rather than what he says or writes.
4. Generally these are individual tests. As Pillai (1972) observes: "These cannot be used as group tests, chiefly because it is necessary to supervise the individual testee at work and give him necessary directions".

A comprehensive representation of all kinds of intelligence tests is provided in Table 16.2.

Table 16.2 Classification of Intelligence Tests

<i>Individual tests</i>		<i>Group tests</i>	
Verbal test	Performance tests (a typical form of non-verbal tests)	Verbal tests	Non-verbal tests

Now we will discuss these types one by one.

INDIVIDUAL VERBAL TESTS

Tests involving the use of language, which are administered to one individual at a time belong to this category. The Stanford Binet scale, which is the revised form of the scale, is an example. It is the revised form of the original Binet-Simon test. Actually, French Psychologist Alfred Binet (1916) is the father of the intelligence tests construction movement. He, alongwith Theodore Simon, prepared a test as early as in 1905, consisting of 30 items (arranged in order of increasing difficulty) graded for different levels. The test included such items as:

At age 3—point out nose, eyes and mouth.

At age 7—say what is missing in the unfinished picture.

The first American revision of this test was published in 1931 by Terman at Stanford University and in 1937 another revision was carried out with the help of Maud A. Merrill. This, as well as the 1960's revision is known as the Stanford Binet Scale and is widely used as an individual intelligence test.

The tests in this scale are graded into age levels, extending from age 2 to 22 years. The tasks to be performed by the subject in these tests range from simple manipulation to abstract reasoning.

The Binet tests have been adopted in India also. The first such attempt was made by C.H. Rice in 1922 when he published his "Hindustani Binet performance point scale". This was an adaptation of the Binet test with some additional performance tests. The State *manovigyanshala* of Uttar Pradesh has made a Hindi version of the Stanford-Binet test. This test is divided into several age groups and is known as, *budhi pariksha anushilan*.

The other common verbal individual intelligence test used in India is *Samanya budhi pariksha* (parts 1 and 2). This test is an Indian adaptation of the well known test of William Stephenson and has been prepared by the State Bureau of Educational and Vocational Guidance, Gwalior (M.P.).

Individual performance tests. As stated earlier, the complete non-verbal or non-language tests of intelligence for testing one individual at a time come under this category. In these tests the contents and responses are in the form of performance and language is not used and include items which require responses in terms of motor activities. Generally the activities, on which the performance of an individual is tested are of the following types:

of the Binet-Simon test. Actually, French psychologist Alfred Binet is said to be the father of intelligence test construction movement. He, along with Theodore Simon, prepared a test in as early as 1905, comprising 30 items (arranged in order of increasing difficulty) graded for different levels. The test included items like:

At age 3—Point out the nose, eyes and mouth.

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The other common Verbal Individual Intelligence test (used in India) is *Samanya Budhi Pariksha* (Pt. 1 and 2). This test is an Indian adaptation of the well-known test of William Stephenson. It has been prepared by State Bureau of Educational and Vocational Guidance, Gwalior (M.P.).

Individual Performance Tests

As said earlier, the complete non-verbal or non-language tests of intelligence for testing an individual at a time come into this classification. In these the contents and responses are in the form of performance and language is not used at all. In these tests the items which require responses in terms of motor activities are included. Generally the activities, on which the performance of an individual is tested, are of the following types:

- (i) **Block building or cube construction.** Here the subject is asked to make a structure or design by means of blocks or cubes supplied to him. The examples of the tests involving such type of activities are Merrill Palmer Block Building, Koh's Block Design Test, Alexander's Pass-along Test etc.
- (ii) **To fit the block in the holes.** Test material of such types provides numerous blocks and a board in which there are holes corresponding to these blocks. The subject has to fit the blocks in these corresponding holes (in the board). Examples are Seguin Form Board Test and Goddard Form Board Test.
- (iii) **Tracing a maze.** Test material consists of a series of mazes of increasing difficulty, each printed on a separate sheet. The subject is required to trace with pencil the path from entrance to exit. Porteus Maze Test is an example involving such type of activities.
- (iv) **Picture arrangement or picture completion.** In picture arrangement test, the task is to arrange in series the given picture whereas in picture competition test, the subject is required to complete the pictures with the help of given pieces cut out of each picture. The Healy pictorial completion test is a good example of such test which provides a good estimate of the intelligence of the subject without making use of language.

As seen above, these tests try to emphasize upon one or the other types of performance. Instead of using one or two tests a group of performance test, organized either into a scale or battery, may be used for a comprehensive picture of an individual's mental ability. Some of the popular known scales are:

- (i) The Pinter Patterson Scale.
- (ii) The Arthur Point Scale.
- (iii) Alexander's Battery of Performance Tests.

In India too, attempts for constructing such batteries have been made. Dr. Chander Mohan Bhatia's work in this regard deserves special mention. He has developed a battery of performance tests known as '**Bhatia's Battery of Performance Tests**'. It contains the following five sub-tests:

- (i) Koh's Block Design Test.
- (ii) Alexander's Pass-along Test.
- (iii) Pattern Drawing Test.
- (iv) Immediate memory test for digits (with an alternative form suitable for illiterates).
- (v) Picture Construction Test.

The last three tests in this battery have been constructed by Mr. Bhatia himself while the former two have been borrowed.

WECHSLER BELLEVUE INTELLIGENCE SCALE

This scale is available in two forms. While the WISC form is used for children, the WAIS form is for adults. It is an individual test that has a unique quality of being named as verbal and performance scale simultaneously.

The scale consists of eleven sub-tests—six sub-tests make up a verbal scale and five performance scale. These tests are listed below in the order in which they are administered.

Verbal Scale:

1. Test of General information.
2. Test of General comprehension.
3. Test of Arithmetic reasoning.
4. Test of distinction between similarities.
5. Test of Digit span.
6. Test of vocabulary

Performance Scale:

7. Digit symbol test.
8. Picture completion test.
9. Block Design test.
10. Picture arrangement test.
11. Object assembly test.

The scores on these sub-tests are added to get an idea of an individual's intelligence.

Group Verbal Intelligence Tests

The tests, which necessitate the use of language and are applied to a group of individuals at a time, come under this category. Some of the earlier tests belonging to this category are:

- (i) Army Alpha Test (developed in World War)
- (ii) Army General Classification Test (developed in second World War)

Today we have a large number of group verbal tests. In India too, attempts have been made to construct such tests. Some of the popular tests of this nature are—

1. C.I.E. verbal Group Test of Intelligence (Hindi) constructed by Prof. Uday Shankar.
2. The Group Test of General Mental Ability (*Samuhik Mansik Yogyata Pariksha*) constructed by Dr. J.S. Jalota (Hindi).
3. Group test of Intelligence, prepared by Bureau of Psychology, Allahabad (Hindi).
4. Prayag Mehta's Group Intelligence Test (*Samuhik Budhi Pariksha*, Hindi). This test has been published by Mansayan, Delhi.
5. General Mental Abilities Test prepared by Dr. P.S. Hundal of Punjab University (Panjabi).
6. Group verbal intelligence test prepared by Dr. P. Gopala Pillai of the Kerala University (Malayalam).
7. *Samuhic Budhi Pariksha* (Hindi), prepared by Sh. P.L. Shrimali, Vidya Bhavan G.S. Teacher College, Udaipur.
8. *Samuhic Budhi Ki Jaanch* (Hindi), prepared by Shri M.S. Mohsin, Educational and Vocational Guidance Bureau, Patna, Bihar.

The Group Non-Verbal Intelligence Tests

These tests do not necessitate the use of language and are applicable to a group of individuals at a given time.

The difference between performance test (used for an individual) and non-verbal tests (used for a group) is in the degree as far as their non-verbal nature is concerned. The performance tests require the manipulation of concrete objects or materials supplied in the test by the subject. Responses are purely motor in character and seldom require the use of paper and pencil by the testee, (except in cases like Maze Test etc.) whereas the test material used for group testing, is provided in booklet and requires the use of pencil by the testee.

Still in these tests, material does not contain words or numerical figures. It contains pictures, diagrams and geometrical figures etc. printed in a booklet. The subject is required to do such activities so as to fill in some empty spaces, draw some simple figures to point out similarities and dissimilarities etc. So, although the subject uses paper and pencil, he does not need to know words or numerical figures. What he has to do is explained clearly by the examiner usually through clear demonstrations so as to make the least possible use of language.

The examples of such type of tests are:

- (i) **Army Beta Test.** It was developed during World War I, in U.S.A. for testing the intelligence of those soldiers who were either illiterate or were not used to English language.
- (ii) **Chicago Non-verbal Test.** This non-verbal test has proved most useful for young children aged between 12 and 13 years.

(iii) **Raven's Progressive matrices Test.** This test was developed in the U.K. It is a very popular non-verbal group test of intelligence. The test has been designed to evaluate the subjects ability—

(a) to see relationship between geometric figures or designs.

(b) to perceive the structure of the design in order to select appropriate part for the competition of each pattern.

(iv) **C.I.E. Non-Verbal Group Test of Intelligence.** Originally prepared by J.W. Jenkins, the test is printed by C.I.E. for adaptation into Hindi medium schools. The test contains such terms as instructed in Fig. 22.5.

नीचे प्रत्येक पंक्ति में बाईं ओर तीन आकार दिये गये हैं जो एक जैसे हैं दाईं ओर 5 आकार दिये हैं। इनमें से वह आकार ढूँढो जो बाईं ओर दिए हुए तीन आकारों में से सबसे अधिक मिलता-जुलता हो उसके नीचे रेखा खींच दो।

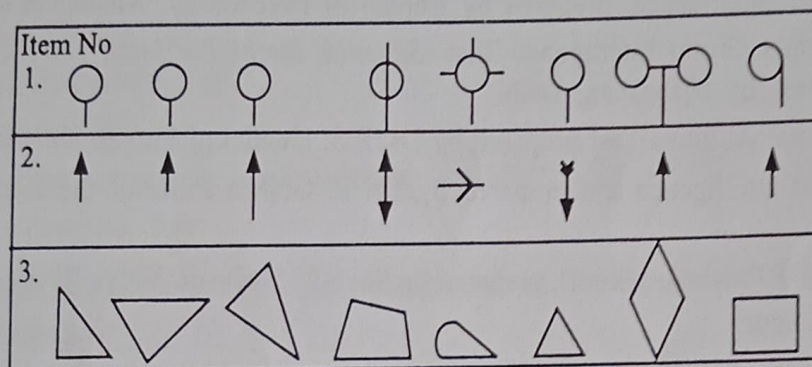


Fig. 22.5 An item from C.I.E. non-verbal group test of intelligence.

Individual and group tests have their advantages as well as disadvantages. We can compare them on the following lines:

<i>Individual Tests</i>	<i>Group Tests</i>
1. With these tests, only one individual is tested at a time. They cannot be administered to a group and this makes them costly in terms of time, labour and money.	1. These tests have two-fold advantage. In addition to their applicability in testing a group of individual at a time, they can also be administered to the individuals separately. Testing of so many individuals at a time gives them the advantage of saving time, money and labour.
2. Individual tests have the unique advantage of being used for children as well as adults.	2. Group tests cannot be given to young children below 9 to 10 years of age.
3. As the examiner has a close contact with the subject, he can take into account all personal and emotional factors and like-wise have all those additional pieces of information which may prove useful for the interpretation of an individual's test scores.	3. The examiner does not have a desirable contact with the subject. He cannot detect and rectify influence of such factors as ill health, mood, poor social background or practice and coaching that might have been given to a subject for boosting his score. What the examiner gets at all is the numerical score and nothing of additional information as obtained in individual tests.
4. Individual tests are not as objective and standardized as group tests. Their administration require well-trained and competent examiners.	4. Group tests are more objective and standardized in comparison to individual tests. The manuals and instruction provided with these tests make their administration, scoring and interpretation so easy that a need of such trained personnel is seldom felt.

VERBAL TESTS VS NON-VERBAL AND PERFORMANCE TESTS

What led to the construction of non-verbal and performance test when verbal tests were there for testing the intelligence, is a relevant question to be asked. Verbal tests, as already said, laid emphasis on linguistic ability. They were loaded with verbal material words and numericals. Hence those with linguistic superiority were always on the advantageous side in comparison to those having language weakness. To do away with such flaws, non-verbal and performance tests were put to use. In brief, the advantage of these tests over verbal tests are as under:

1. Performance tests are useful for those who have language handicap due to one or more of the following reasons:
 - (i) They may belong to the foreign language speaking groups.
 - (ii) They may be illiterates, not knowing how to read and write.
 - (iii) They may have difficulties in reading, writing and listening due to defects in their sense organs (deaf, dumb etc.)
 - (iv) They may be younger children who are not yet able to read and write well.
 - (v) They may be mentally retarded or mentally deficient children and therefore, very slow in grasping and responding to the verbal items.
 - (vi) They may belong to unprivileged class or strata of the society and hence may have had limited education opportunities.
2. Verbal test belonging to one region contains the material which has a direct relationship with the language or culture of that region or country. Non-verbal and performance tests are more or less language and culture-free and hence can be used for cross-cultural and linguistic study of intelligence.
3. They can prove useful in the efforts to determine aptitude and promise in shop work, mechanical jobs and so on.

LIMITATIONS OF NON-VERBAL AND PERFORMANCE TESTS

1. They may not be able to predict scholastic success in schools as do the verbal tests simply because school work itself is predominantly verbal.
2. They, specially the performance tests, are very costly and pose difficulty in being transported from one place to another.
3. They are more susceptible to practice-effects and chance successes are more frequent than in the case of verbal tests. Therefore, they are less reliable than verbal tests.
4. These tests are limited in their range of mental functioning tested since they do not require much use of the ability to make abstractions and deal with concepts. They are thus not able to differentiate among above-average individuals.

Thus these are the merits and limitations of the tests. In fact, the testing of mental ability is a comprehensive task and cannot be solely left either to the verbal or performance tests. For taking a reliable view of a person's intellectual ability, following things should be kept in mind:

- (i) Performance test should be taken as a supplement to verbal tests and vice versa.
- (ii) No single test or tests are suitable for this purpose. There should be an attack from many angles.

How to Test the Intelligence with an Intelligence Test?

So far, we have discussed the problem of measuring intelligence theoretically. To deal with such a practical problem is in fact a difficult task. Below we shall illustrate the process with the help of a group verbal test. We take the Group General Mental ability test constructed by Dr. S. Jalota for this purpose.

THE TEST

This is a verbal group test of mental ability for Hindi knowing school-age children. The test material is divided in four parts:

- (a) **Test Booklet.** In the test booklet the direction for attempting the items of the test are written. There are 100 questions (on each page 20) in this test which require verbal ability for answering. Some specimen questions are given below:

- (1) तट का अर्थ (1) गंगा (2) किनारा (3) बांध (4) पर
(2) 19, 17, 15, 13, 11, 9 इन संख्याओं के क्रम के अनुसार आगे की एक संख्या उत्तर पत्र पर लिखो।

All these questions are to be answered in 20 minutes.

- (b) **Answer Sheet.** These are not re-usable. They are supplied to test the intelligence of the students of a group.
(c) Scoring key for evaluating the answers.
(d) Test manual (for direction and table of conversion)

PROCEDURE

The group under examination is made to sit comfortably. They are provided with answer sheets and test booklets. The task is completed in the following steps—

- (i) They are instructed not to write anything on the test booklet.
- (ii) On their respective answer sheets, they have to write a brief introduction about themselves like name, class, school, father's name, date of birth and age in years, months and days.
- (iii) Again, they are directed to read the instructions on the beginning of the test booklet carefully. The examiner also tries to explain to them.
- (iv) Now they are asked to answer the questions. Students are supervised properly so as to check the cases of cheating etc. They are supposed to finish their work within 20 minutes.
- (v) After collecting the answersheets, the scoring is done with the help of an answer key. The total raw score of each testee is thus calculated.
- (vi) With the help of table provided in the manual, the raw scores of these individuals are converted into their mental ages.
- (vii) Chronological ages are known with the help of the date of birth supplied by the subjects.
- (viii) Finally, by dividing the mental ages with their chronological ages and multiplying the quotient with 100, the I.Q. of the subjects can be known.

How Good can Intelligence be Measured?

Measurement of intelligence is not possible in the same way as we measure a piece of cloth or the temperature of our body. Why is it not possible can be understood through the following discussion:

1. **Nature of the thing we want to measure:** Intelligence is not a thing. It is only an idea, an abstraction. Therefore, its measurement is not possible like the measurement of a piece of cloth, wood or land etc.