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• Introduction :-

Definition - In order to understand the meaning of the term intelligence, it is essential that the views points of different experts be carefully examined. Today psychologists have made numerous attempts to define and measure intelligence.

Intelligence is the capacity to acquire and apply knowledge in day to day life. Werchler (1944) defined it as, "the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment." One of the salient features of this definition is that intelligence is displayed by the behaviour of the individual as a goal and that intelligent behaviour is goal directed and helps in making effective adjustment in the given environment. Stoddard (1943) defined intelligence as "the ability to undertake activities that are characterised by 1. difficulty, 2. complexity, 3. abstractness, 4. economy, 5. adaptiveness to goal, 6. social value, 7. the emergence of originals and to maintain such activities under conditions that demand a concentration of energy and resistance to emotional forces." Meisser et. al (1996) defined intelligence as "intelligence is a general ability and contains the capacity to reason, plan, solve problems, think abstractly, understand and complex ideas, learn fast and learn from experiences. It does not include rote learning of specific skills."

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school (reading, writing), it does not refer to skilled dealing with intelligence tests. It is a broad and deep capacity that refers to insight in and understanding of affairs in the everyday life. It helps to decide what has to be done and it distinguished from creativity, character, personality and any other traits." Intelligence thus can be said to have the following characteristics:-

- 1) It is a power or capacity of a human being.
- 2) It is the ability of adaptation and adjusting to a new situation.
- 3) It is the ability of abstract thinking as well as the capacity to learn past experiences.
- 4) It is allround mental efficiency.

Types - Thorndike has classified intelligence in three categories

1) Concrete Intelligence - It refers to intelligence in relation to concrete materials. It is the ability of an individual to comprehend actual situation and react to them adequately. It is also known as mechanical intelligence. This kind of intelligence is measured by performance test in which individual has to deal with concrete material.

2) Abstract Intelligence - It is the ability of an individual to respond towards numbers, formulas, diagrams, letters, etc. It is required in the

ordinary academic subjects in school.

3) Social intelligence: It refers to the ability of an individual to react to social situations in daily life. It is the ability of an individual to understand others and to search in a way that the aim desired should be attained. High level of social intelligence is possessed by those who are able to adjust in society.

Cattell and Horn (1978) distinguished two types of intelligence, that is —

1) Fluid intelligence: It is considered to be the mental capacity of an individual which is required for learning and problem solving. It is dependent on neurological development and is respectively free from the influences of education and culture.

2) Crystallized intelligence: It involves once acquired form of general information consisting of knowledge and skills essential for performing different tasks in one's day to day life. It is not a function of one's neurological development and therefore is specially learnt depending on education and culture.

Theories — The theories can be grouped under two categories mainly —

A. Factor Theories —

1) Spearman's two factor theory: According to Spearman (1923) each intellectual activity

involves a general factor 'g' which it shares with all intellectual activities and a specific factor 's' which belongs to it alone. Thus, he suggested that general intelligence is a sort of general mental energy running through all the different tasks. In addition to this general factor there are specific capabilities which give an individual the ability to deal with specific problems. However the factor 'g' is present in all specific activities.

2) Group factor theory: It was proposed by L.L. Thurstone. For factors not common to all intellectual abilities but common to certain activities comprising a group the term group factor was suggested. There are a no. of groups of mental abilities and each of these groups has its own primary factor. Thurstone and his associates have identified 9 such factors. They are as follows:

- Verbal factor (V), • Spatial factor (S), • Numerical factor (N),
- Memory factor (M), • Word fluency factor (W), • Inductive reasoning (RI), • Deductive reasoning (RD), • Perceptual factor (P), • Problem solving ability factor (PS).

3) Vernon's hierarchical theory: The British psychologist P.F. Vernon (1950) suggested a hierarchical structure for the organization of intelligence. According to him the mind is a kind of hierarchy in which 'g' is the most prominent

Intelligence is a mental ability that is an overall factor measured through intelligence test. Under it there are two major group factors termed as Verbal and KM, representing two main kinds of mental abilities. While Verbal is concerned with the verbal, numerical, educational abilities. KM is connected with practical, mechanical, spatial and physical abilities. These 2 major factors can be divided into minor group factors and these minor factors are further subdivided into various specific factors related with specific mental abilities.

↳ Guilford's theory of structure of intellect: Guilford (1967) proposed that every mental process or intellectual ability can be described in terms of 3 different dimensions. That is operations (the act of thinking), contents (the terms in which we think) and products (the ideas we come up with). Each of these dimensions may be further subdivided into some specific factors or elements which are as follows—

Operations	Contents	Products
Evaluation (E)	Figural factor (F)	Units (U)
Convergent thinking (C)	Symbolic (S)	Classes (C)
Divergent thinking (D)	Semantic (M)	Relations (R)
Memory (M)	Behavioural (B)	Systems (S)
Cognition (C)		Transformation (T)
		Implications (I)

B. Cognitive Theories —

1) Cattell and Horn's theory of intelligence: Cattell and Horn distinguished b/w 2 types of intelligence

• Fluid intelligence - It refers to the ability of an individual which is required for learning and problem solving. It is dependent on neurological development and is respectively free from the influences of education and culture.

• Crystallized intelligence - It involves once acquired form of general information consisting of knowledge and skills essential for performing different tasks in one's day to day life. It is not a function of one's neurological development and therefore is specially learn depending on education and culture.

2) Jensen's theory of mental functioning: According to this theory (Jensen 1969) the functioning

of one's mind depend upon the type and degree of intelligence one's processes. Jensen describes one's intelligence as composed of 2 types of abilities, namely associative abilities, conceptual abilities.

Associative abilities includes one's ability to remember reproduce identify discriminate, synthesize, associate, assimilate, transfer and apply etc. Conceptual abilities on the other hand involve one's ability to carry out higher order of thinking, reasoning, analyzing and the capacity of problem solving.

3) Sternberg's information processing theory of intelligence: Sternberg

(1985) identified the following step one processes information. • Encode

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ing, • Inferring, • Mapping, • Application, • Justification, • Response.
 Considering the way human beings process information in executing a mental task. Sternberg lay down a triarchic structure for his theory of intelligence based on three sub-theories, namely component sub-theory, experimental sub-theory and contextual sub-theory.

4) Gardner's theory of multiple intelligence: Gardner asserted that human intelligence or cognitive competence can be better describe as a set of individual's multiple no of domains in a particular cultural settings. He concluded that there are 7 independent types of intelligence that grow and develop independently in different people depending upon their hereditary characteristics and environmental experience. • Linguistic intelligence, • Logical mathematical intelligence, • Spatial intelligence, • Musical intelligence, • Bodily kinesthetic intelligence, • Intrapersonal intelligence, • Interpersonal intelligence.

Intelligence Test — On the basis of administration intelligence test can be divided into 2 categories —

1) Individual test: It is one which can be administer to one person at a time. Ex:- Terman-Merrill Intelligence Test.

2) Group test: It is one which can be administer more than one person at a time. Ex:- Army Beta Test.

On the basis of the nature of items used in intelligence test may be on 2 types -

1) Verbal test: It is one in which the instruction and item are reproduced usually through the written language. Ex:- Army Alpha Test.

2) Performance test: It is one where language is used in only to impart instruction and items are manipulative in nature. The testee is required to answer the manipulating the given test material. Ex:- Koh's Block Design Test.

In addition to verbal and performance test there is another important class of intelligence test known as non-verbal test / non-language test / the culture free test. It is one where no language is used at all either in instruction or in construction of items. Usually the instruction is given through gestures, blackboard instruction, charts and the items are neither verbal nor manipulative types. The test items are usually of figured relation type where the testee is to discover, without the actual manipulation of objects, the relationship b/w various figures or designs. It can be administered to persons belonging to different cultures. Hence, it is also known as culture free / culture fair test. Ex:- Raven's Progressive Matrices Test.

Intelligence can be assessed through Age and Point scale. In age scale items are grouped by age level. Arrangement of items is noway concerned to their content. At any age level there may be different tasks related to different aspects of

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of the content. For example, at a particular age level one task may be related to perceptual speed, another task to memory and still another task to concentration and language skills. At another age level one task may be scattered throughout the scale. Beside in age scale the subject's don't receive a specific amount of credit or points for each task completed. On the other hand point scales are those in which credits or points are assigned to each items. Here the subject's receive the specific amount of credit or point for each items found. Binet scales are examples of age scale whereas an wechsler scales are examples of point scales.

S. S. Chughan
2.5.19

• General Problem :- On intelligence.

• Specific Problem :- To assess the abstract intelligence of the subject by using Terman-Merrill Intelligence Scale.

• Basic Concept :- According to Alfred Binet (1905), "Intelligence is the completeness of understanding, inventiveness, persistence in a given task and critical judgement." In other words Binet's conception of intelligence emphasizes on 3 characteristics of the thought process.

- 1) Its tendency to take and maintain a definite direction.
- 2) The capacity to make adaptation for the purpose of attaining a desired end.
- 3) The power of auto-criticism.

Historical development of intelligence testing can be classified into 3 distinct periods —

1) Pre Binet Period, 2) Binet Period, 3) Post Binet Period.

The weaknesses of Pre Binet Period were —

- 1) Intelligence was identified as the acuity of senses.
- 2) Complex functions were not measurable.
- 3) Tests were too simple and limited to measure intelligence.
- 4) Mind mental abilities could not be measure with the help of physical sensory test.

Binet introduced the intelligence test in 1905 with the

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assistance of Theodore Simon, this test is known as Binet-Simon Test. Binet proposed the concept of mental age related to intelligence. It looks at how a specific individual at a specific age performs intellectually compared to average intellectual performance for that actual age measure in time from birth. The physical age of the child is compared to the intellectual performance of the child. If a child can pass the test suitable for 9 years old, his mental age will be 9 whatever the chronological age may be. Chronological age refers to the actual amount of time a person has been alive. Several revisions of Binet-Simon scale have been proposed which are as follows:

<u>Year</u>	<u>Test / Author</u>	<u>Comment</u>
April 1905	Development of Binet-Simon Test announced at a conference in Paris.	-
June 1905	Binet-Simon Intelligence Test introduced.	Simple 30 item test.
1908 revision of Binet scale.	Binet and Simon	Introduced the mental age concept.
1911 revision of Binet scale.	Binet and Simon	Expanded to include adult.
1916 Stanford revision of Binet-Simon scale	Stanford-Binet first edition by Terman	Introduced the I.Q. concept.

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1937 Stanford Binet 2 nd edition.	Stanford Binet 2 nd edition by Terman-Merrill.	1 st use of parallel forms (K and M)
1960 Stanford Binet 3 rd edition.	Stanford Binet 3 rd edition by Terman-Merrill.	Modern item analysis methods used.
1972 Stanford Binet 3 rd edition.	Stanford Binet 3 rd edition by Terman-Merrill.	SB-3 restandardized on 2100 persons.
1986 SB-4 th edition	4 th edition by Thorndike Hage and Sattler	complete restructuring into 15 subtests.
2003 SB-5 th edition	SB-5 th edition by Roth	5 factors on intelligence inclusion of verbal and nonverbal domains and includes fluid reasoning.

2nd Stanford edition appear in 1937 known as Terman-Merrill revision. It has the following features:

- 1) It consisted of 2 equivalent forms K and M.
- 2) 1937 tests were less verbal at the lower levels and the earlier emphasis on the rote memory at the upper level was corrected.
- 3) The no. of items in Binet scale of 1916 was 54 while in 1937 revision each form has 120 test items.
- 4) The limit of mental growth in both Stanford revision and Terman-Merrill revision is 16 years. The age level after 14 years is called average adult level as equivalent to a mental age of 15. There are 3 more test in order of difficulty is known as superior adult 1, 2, 3.

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altogether - there are tests for 20 levels. The 1937 scale extends downward to the level of age 2.

6) The levels below age 5 and above age 14 have been more carefully and validly standardized.

7) Scoring standards and instruction for administering the test are improved.

8) From age 2 to age 5 the test provides groups of test items at $\frac{1}{2}$ years intervals.

9) Groups of tests were provided at age 11 and age 13 that were absent in the 1916 scale.

10) Although the 1937 scale is predominantly verbal in character, it does provide more performance and other non-verbal materials at the earlier age-level especially through age 4.

11) Whereas the maximum mental age attainable on the 1916 Stanford-Binet was 19 years 6 months, the maximum on the 1937 revision is 22 years 10 months.

12) 6 tests for each 6 months from 2 years to 5 years that is each test is calculated to be 1 month in age.

From 6 years to 14 years there are 6 tests for each year, that is the value of each test is 2 months. This is because in case of children the rate of growth is very rapid. So the value of each test is 1 month. In case of average adult level there are 8 tests, each test valued 2 months. In superior adult levels there are 6 test in each level. Each test is valued 4 months, 5 and 6 months respectively in the 3 levels.

The ratio b/w mental and chronological age and mental age is called the intelligent quotient or I.Q.

$$I.Q. = \frac{MA \text{ (in months)}}{CA \text{ (in months)}} \times 100$$

For the data the yearly gain becomes relatively small by the age of 15 but little tendency is there to improve there after. Chronological age beyond this point has therefore being disregarded in computing the I.Q. However, in keeping with the fact that age improvement occurs gradually rather than abruptly, we begin at 13 years to disregard increasing fraction of successive chronological age increments. From 13 to 16 we cumulatively drop one out of every three additional months of C.A and all of it after 16. The C.A of the subject who is b/w the ages of 13 and 16 is counted as 13 + $\frac{2}{3}$ of the additional months he has lived. This means that a true C.A of 14 is of 14 yrs as counted as 13 years 8 months thus a C.A of 16 yrs as 15 years which is the highest divisor used in the computation of an I.Q.

The standardization group of 1937 included individuals of 18 yrs but it didn't include an adult population. Therefore the test items at the several adult levels rest upon theoretical consideration readily mention rather than upon actual competencies of adult performance. Perhaps due to the methods used in standardizing the scale at the superior adult level it has been frequently observed inadequacy of college students who has a group would be ranked above average. The inadequacy of the scale is especially marked when administer to very superior students for it is not difficult

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enough at the higher levels of adulthood.

The aim of the present testing is to assess the abstract intelligence of the subject by using Terman-Merrill Intelligence Scale.

• Preliminaries: 1) Name of the testee: Armita Mukherjee

2) Age of the testee: 19 years 3) Sex of the testee: Female

4) Educational Qualification:

5) Condition: cooperative and steady.

6) Date of the testing: 05/02/19

7) Time of the testing: 7:30 am - 9:30 am

• Materials required: - Terman-Merrill Intelligence Scale (M form-booklet), manual, stopwatch, stationaries, screen.

• Description of the test: - Terman-Merrill Intelligence scale consist of two equivalent forms 'X' and 'M' and was greatly expanded and standardized on the sample of US population. Each form contains 120 items with the age levels of 2, 3, 3.5, 4, 4.5, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 yrs, average adult, superior adult-1, 2, and 3 levels. From the age 2 to 5 the scale provides a group of items at 1/2 year interval. Though predominantly verbal in nature, it provides more performance and non-verbal materials at the earlier levels especially till the age of 4 yrs. For every year age level there are 6 items except at the age level of average adult in which 8 items have

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been provided.

Standard method of administration: - The testee's C.A is to be recorded. The test is to be started at an age level of 2 yrs younger than the real C.A of the testee. If the testee is an adult one, the test should be started at an age level of 14 yrs. If the testee fails to perform any of the items of that age level, the lower age levels are to be tried out till the age level is reached where the testee can perform all the items. This age level is the testee's basal age. The testee is then given the items of higher age levels which are to be continued till the end of the superior adult 3 age level. The test will be discontinued in that age level where the testee will not be able to answer any of the items correctly. After the basal age is determined, correctly answered items are given a score each in terms of month. These scores are taken and added to the basal age to find out the testee's mental age. In case of adult testee corrected chronological test is to be found. The corrected C.A of the testee who is b/w the ages of 13 and 16 yrs is counted as $13\frac{2}{3}$ of the additional months he/she has lived. This means that a true C.A of 14 yrs is counted as 13 yrs 8 months; a true C.A of 15 as 14 yrs 4 months and a true C.A of 16 yrs as 15 yrs which is the highest divisor used in the computation of an I.Q.

In Binet scale three requirements must be satisfied:

The standard procedures must be followed:-

Control of conditions - The procedure for giving this test has

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been carefully standardized for each test situation and should be followed without deviation.

• **Avoidance of giving help** - It is never permissible to repeat the question after an unsatisfactory response is given. However, since the test administrator may be that the testee is capable of answering correctly.

• **Order of presenting the test** - The tests of each year group should be given in the order in which they appear in the manual and the record booklet.

(ii) The child's best efforts must be enlisted by the establishment and maintenance of adequate rapport.

(iii) The responses must be correctly scored.

▣ **Avoidance of halo effect** :- Each response must be judged independently with its own merits without being influenced by success or failures of other responses.

▣ **Scoring not purely mechanical** :- Scoring of Binet tests can never be made as objective as the stencil scoring. The remedy is to learn to score each test as nearly as the possible way it was scored in the process of standardizing it. Considerable practice as well as careful study of the instruction is necessary in order to acquire a ready skill.

• **Procedure** :- The subject was made to sit comfortably and rapport was established with her. The test was started at the age of 14 yrs as the testee was an adult.

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one. The items were asked as per the specific instruction given in the booklet for each item. The testee was asked to respond correctly to the questions. There was no time limit imposed on her except some of the cases where it was instructed. If testee was allowed to proceed all the item in level of 14 yrs. The responses of the testee were recorded verbally. As the testee could answer all the items in the age level 14 yrs, this age was chosen as her basal age. After giving some rest to the testee the item of average adult level were presented. Then she was presented with the items of age levels superior adult 1, 2 and 3 also. No ceiling age could be found as the testee was able to answer few items of superior adult 3. After completing the test the responses of the testee were score according to the standard scoring pattern and the I.Q. was determined.

• Instructions: - "Please sit comfortably and be very attentive. I shall give you different sets of questions. Answer each question properly after understanding it clearly. Each question will have different instructions. If you face any difficulty in understanding any question please report to me immediately."

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Scoring Standard :-

<u>Age level</u>	<u>Credit (in months for each item passed)</u>
Upto 5 years	1
From 6 years to average adult	2
Superior Adult 1	4
Superior Adult 2	5
Superior Adult 3	6

Data :-

Year XIV

<u>Item no. and name</u>	<u>Subject's response</u>	<u>Plus(+) or minus(-) achieved</u>	<u>Pass(✓) or fail(x)</u>
1. Reasoning	8 से 2 तक के नंबर सहज ही लिखे गए	+	✓
2. Picture Ab-	बिना किसी सहायता के चित्रों को पहचाना	+	✓
ordities III	कम से कम 3 अक्षरों में लिखे,		
3. Orientation:	a) पहचाना, b) पहचाना	+	
Direction I	c) पहचाना, d) पहचाना	+	
	e) पहचाना	+	✓
	d) पहचाना	+	
	e) पहचाना	+	
4. Abstract	a) एक छोटा चित्र, बड़ा चित्र में कौन से	+	
Words III	बोलना शुरू,		
	b) एक + पहचान, कौन से पहचान - पहचान	+	✓
	एक छोटा चित्र कौन से चित्र में कौन से		
	c) कौन से चित्र कौन से चित्र में कौन से	+	
	कौन से चित्र		

General Problem: On Personality

Specific Problem: To assess the personality pattern of an adult individual by using the Personality Factor Questionnaire (Form A) developed by Cattell and his associates.

Basic Concept: Personality may be hard to define, but we know it when we see it. We all make personality judgements about the people we know. The term "Personality" refers to the total functions of an individual who interacts with his environment. Such a definition automatically includes all traits as the main themes of the personality. When psychologists define personality, they tend to refer to qualities within a person, characteristics of a person's behaviour, or both. In a now-famous definition, psychologist Gordon Allport (1937) mentioned both inner qualities and behaviour, but he emphasized the inner qualities: "Personality is the dynamic organisation within the individual of those psychophysical systems that determine his unique adjustments to his environment." Psychologist Walter Mischel (1976) mentioned both inner processes and behaviour but emphasized behaviour in his definition. Personality, he wrote, consists of "the distinctive patterns of behaviour (including thoughts and emotions) that characterise each individual's adaptation to the situations of his or her life." No single definition of personality is acceptable to all psychologists. However, most agree that

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Personality includes the behaviour patterns a person shows across situations or the psychological characteristics of the person that lead to those behaviour patterns.

Raymond Cattell's Factor Analytic Trait Theory: The essential ideas of factor analysis was introduced by Spearman, 1904.

He suggests that two factors contribute to our performance -

① A General factor (for eg. - verbal fluency, general intelligence or educational level) ② A specific factor (for eg. - visual memory, specific information etc.). The method of factor analysis was developed as means of determining the existence of general factors and aiding in their identification. Spearman's techniques for isolating single factors was revised by Thurstone's introduction of 'Multiple Factor Analysis'.

The factor theorist typically begins the study of behaviour with the large number of scores of a large number of subjects. Given these surface indices, the investigators then applied the technique of factor analysis to discover what the underlying factors that determine variation in the surface variable. The outcome of factor analysis not only isolates the fundamental factors, but also provides an estimate of the extent to which this measure is contributed to each of the factors. This estimate is referred to as the factor loading or saturation of the measure and is simply an indication of how much of the variation is to be contributed to each of the factors.

From another point of view, factors can be distinguished as: ① Orthogonal factor: The factors extracted are uncorrelated with one another (in a geometrical sense, at right angles to one another, or orthogonal)

② Oblique factor: Factors that are co-related. According to Cattell, oblique factors are more important because they create true causal influences on personality as they are inter-related. The use of oblique factor has an additional implication. If factors are correlated with one another, it is possible to reapply the same analytic factors to the correlation among the factors yielding so called second order factors.

In Cattell's view, there are 3 major sources of data about personality which are as follows: ① L-data: It is the actual record of the person's behaviour in society, such as school records. ② Q-data: It is the self-rating data. It involves the person's own statements about his/her behaviour. ③ T-data: It involves creation of special situation in which the person's behaviour may be objectively scored.

Cattell provides a very general definition of personality. According to him, personality is that which permits a prediction of what a person will do in a given situation. The goal of psychological research in personality is, thus, to establish laws about what different people will do in all kinds of social and general environmental situations.

Cattell views personality as a complex and differentiated structure of traits with its motivation largely dependent upon a subset of these, the so-called dynamic traits. For him, a trait is a 'mental structure'

and inference that is made from observed behaviour to account for regularity in this behaviour. Central to Cattell's point of view is the distinction between surface traits and source traits. Surface traits are those which represent clusters of ~~manifestations~~ or overt variables that seem to go together and source traits are those which represent underlying variables that enter into the determination of multiple surface manifestations. Thus, if we find a number of behavioural events that seem to go together, we may prefer to consider them as one variable. It is labelled as surface trait. Source traits on the other hand are identified only by means of factor analysis which permits the investigator to estimate the variables or factors that are the basis of this surface behaviour. It is evident that Cattell considers source traits more important than surface traits. Surface traits are produced by the interaction of source traits and generally can be expected to be less stable than factors. Source traits may be divided into those that reflect heredity and those derived from environmental factors. The traits that result from the operation of environmental conditions are called environment-moulded traits and those that reflect hereditary factors are called constitutional traits. Traits may also be divided in terms of modality through which they are expressed. If they are concerned with setting the individual into action towards some goal, they are called dynamic traits. If they are concerned with the effectiveness with which the individual reaches the goal, they are called ability traits. or they may be concerned largely with constitutional aspects of

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response such as speed, energy or emotional reactivity in which they are referred to as temperamental traits.

Burt (1941) suggested that there are 4 types of factors:

- ① General/Universal factors: That contribute to performance on all measures.
- ② Group factors: That play a role in more than one but not in all measures.
- ③ Specific/Singular factors: That contribute to only one of the measures.
- ④ Accidental/Error factor: That appear on a single administration of a single measure and to be attributed to faulty measurement or lack of experimental control.

The aim of the present testing is to assess the personality pattern of an adult individual by using the Personality Factor Questionnaire (Form A) developed by Cattell and his associates.

Preliminaries:

Name of the testee: Kanchan Gupta

Age of the testee: 22 years

Sex of the testee: Female

Educational qualification of the testee: Undergraduate (3rd year)

Condition of the testee: Ready for the present testing

Date of testing: 22/01/20

Time of testing: 8:00 - 8:30 am.

Materials required: ① 16 PF questionnaire (Form A) [2 booklets]

② Answer sheet ③ 16 PF profile ④ Stencils

⑤ Norm ⑥ Stationaries

Description of the test: The Sixteen personality factor (16 PF) questionnaire is an objectively scorable test devised by basic research in psychology to give the most complete of personality possible in a brief time. The test was designed for use with individuals aged 16 and above. Forms A, B, C and D are most appropriate for individuals whose educational level is roughly equivalent to that of the normal high school student. Form E is designed for individuals with marked educational or reading deficits.

The 16PF can be scored by hand or computer, and various types of answer sheet are available for this reason.

The personality factors measured by the 16 PF are not just unique to the test but instead test within the context of the general theory of personality. The first commercial publication of the test was in 1949. Since this time, 5 major revisions of item and many additional improvements have been incorporated into the 16 PF.

These 16 dimensions or scales are essentially independent. Any item in the test contributes to the score on one and only one factor, so that no dependencies were introduced at the level of scale construction. Moreover, the experimentally obtained correlation among the 16 scales are quite small, so that each scale provides some new piece of information about the person being test. In addition to the 16 primary factors, the test can be used as a measure of atleast 5 secondary dimensions which

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are broader traits (scorable from the component primary factor).

These 16 factors are A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃ and Q₄. Four second order factors are Q₁, Q₂, Q₃, Q₄. Regarding the primary and secondary factors, if the testee's scores are low, then he/she possesses different characteristics whereas high scores indicate different characteristics in the same scale. The description of the characteristics according to the testee's stem scores are follows:-

16 Personality Factors

First Order factors:-

Variables	Factors	Low stem Score (1-3)	High stem Score (8-10)
1	A	Detached, Aloof, cool, reserved, impersonal, formal	Outgoing, warm, kind, easy going, participating, likes people
2	B	Concrete thinking, less intelligent	Abstract thinking, more intelligent, bright.
3	C	Affected by feelings, easily annoyed, emotionally less stable	Emotionally stable, matured, faced reality, calm
4	E	Submissive, humble, mild, easily led, accomodating.	Dominant, assertive, aggressive, Stubborn, competitive, bossy
5	F	Sober, restrained, prudent, taciturn, serious	Enthusiastic, spontaneous, expressive, cheerful, heedless
6	G	Expedient, disregards rules, self indulgent	Conscientious, conforming, moralistic, staid, rule bound
7	H	Shy, threat sensitive, timid,	Bold, venturesome, uninhibited,

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		hesitant, intimidated	can take stress
8	I	Tough minded, self reliant, rough, reliable, no-nonsense	Tender-minded, sensitive, overprotected, intuitive, refined
9	L	Trusting, accepting condition, easy to get on with.	Suspicious, hard to fast, distrustful, skeptical
10	M	Practical, concerned with 'down to earth' issues, steady	Imaginative, absent-minded, absorbed in thought, impractical
11	N	Forthright, unpretentious, open, genuine, artless	Shrewd, polished, socially aware, diplomatic, calculating
12	O	Self-assured, secure, feels free of guilt, untroubled, self-satisfied.	Apprehensive, self blaming, guilt prone, insecure, worrying
13	Q ₁	Conservative, respecting traditional ideas	Experimenting, liberal, critical, open to change
14	Q ₂	Group oriented, a 'joiner' and sound follower, listens to others	Self sufficient, resourceful, prefers own decisions.
15	Q ₃	Undisciplined, self conflict, lax, careless of social rules	Following self image, socially precise, compulsive.
16	Q ₄	Relaxed, tranquil, composed, has low drive, unfrustrated	Tense, frustrated, overwrought, has high drive

4 Second order factors.:

Factors	Dimensions	Low Score Direction	High Score direction
Q ₁	Extraversion	Introversion	Extroversion
Q ₂	Anxiety	Low anxiety	High anxiety
Q ₃	Tough foise	Emotional sensitivity	Tough foise
Q ₄	Independence	Subduedness	Independence

There are 187 items in 16 PF test. Each item has 3 alternative responses - A, B and C. The testee has to pick the independent response in the separate answersheet.

Procedure: Rapport was established with the testee. Two 16 PF booklets, one pencil, one eraser and one answer sheet were required. One booklet was kept with the test administrator for demonstration. Other things were given to the testee. Though 16 PF is a self administrating test and instructions are written on the cover page of the booklet, the administrator read out the instructions and the four examples, and the testee read them silently alongside. The testee was asked to give responses in the separate answer sheet. Though there was no time limit, the testee was asked not to delay and to give immediate answers.

When the responses were given, the raw scores were calculated for each item and were added up for each factor. Then the sten scores were found out from the raw scores of each factor. The sten scores were then put up in the 16 PF profile and interpretation was reported.

Instructions: " Please be comfortable and listen to the following instructions. I'm going to give you a booklet and an answer sheet, a pencil and an eraser. Write your name and other required information in the appropriate places of the answersheet.

There are instructions printed on the cover page of the booklet and I will read the instructions for you as you will read them silently with me. There are 187 items with 3 alternatives in each. You will choose any one alternative in the answersheet. Don't make any mark of on the booklet. Please don't delay and give immediate answers. You will give only one answer for each item. If you face any difficulty, please inform me."

Scoring procedure: Each answer scores 0, 1, or 2 points except the factor B (intelligence) which scores either 0 (incorrect) or 1 (correct). The score on each item contributes to only one factor total. The answer appears as pencil marks in the given answersheet. Two cardboard stencils are used, one covers the factors A, C, E, H, L, N, Q₁ and Q₃ and the other covers B, F, G, I, M, O, Q₂ and Q₄. Simply, the stencil has to be put over the answersheet and the marks visible through the holes for factor, either 2 or 1 is indicated by the printed number adjacent to the hole. The sum of these scores for one factor has to be entered in the space ^{beside} that particular factor. Before using the stencils, the administrator should check the answersheet so that there would be no unscorable marking on responses.

The standardisation table converts raw scores to stem scores. Stem scores are distributed over ten equal intervals. Standard

score points from 1 to 10 with the population average fixed at Sten 5.5. Sten 5 and 6 extends respectively a half Standard deviation below and above the mean, constituting solid centre of the population, while other outer limits of Mens 1 to 10 are 2.5 SD above and below the mean, Sten 5 and 6 are average, 4 and 7 are slightly deviant and 1 and 10 extreme.

STEN Score:-

- * 5 and 6 - Average
- * 4 and 7 - Slightly deviant
- * 1 and 10 - Extreme

STEN	Description of levels
1	Extremely low
2	Grossly low
3	Moderately low
4	Slightly low
5	Average
6	Average
7	Slightly high
8	Moderately high
9	Grossly high
10	Extremely high.