DEVELOPMENT OF GROUP VERBAL INTELLIGENCE TEST IN URDU FOR HIGH SCHOOL STUDENTS

BY

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EXTERNAL EXAMINER

DEDICATED TO

All those who might have excelled or blocked in their performance during this venture

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INTRODUCTION

DEFINITION:

The literature of psychology contains numerous definitions of intelligence because intelligence is an abstraction conceptualized differently by different psychologists. However, it seems fairly safe to say that intelligence is usually associated with these traits: the ability to (1) learn quickly (2) adapt to new situations, (3) use abstract reasoning, (4) understand both verbal and mathematical concepts and (5) perform tasks in which a relationship must be grasped (Cited in Bruno, 1986).

In the years since Binet's early work, many new tests of intelligence have been developed, and much research on the nature of intelligence has taken place. Intelligence has been viewed by educators as the ability to deduce the relationships, and by computer scientists as the facility to process the informations (Wechsler, 1975).Many observers have decried the use of the term intelligence, with its connotation that general mental ability is innate, and some have proposed to replace it with general scholastic ability or general education ability. These terms are indicative of the fact that so called intelligence tests are primarily measures of the ability to succeed in school work.

A number of definitions have been evolved by psychologists according to their own concepts of the term intelligence. Being dissatisfied by the number of definitions and their interpretation, Boring(1950) defined Intelligence as what intelligence test tests. Burt(1944) defined intelligence as innate general cognitive ability.

FREEMAN'S CLASSIFICATION:

(1) Adjustment or adaptation ability. The definitions of this category lay emphasis on the adjustment ability of an individual to his environment. The individual is thought intelligent in proportion to his ability to adjust to new situations and problems of life. The person who is intelligent has no difficulty in the adjustment. He adjusts in an effective way and can vary his behaviour according to the situation. A person who is less intelligent is rigid and has less responses to make in the process of social interaction.

(2) Ability to learn. The definitions of this category emphasize the importance of an individual's ability to learn. Learning ability is an index of one's intelligence.

(3) Ability to carry on abstract thinking. This category of definitions lays more emphasis on the effective use of concepts and symbols in dealing with situations, especially, presenting a problem to be solved through the use of verbal and numerical symbols. Terman(1916), defining intelligence, says that an individual is intelligent in proportion as he is able to carry on abstract thinking.

Different categories of definitions are not exclusive of each other but are interdependent. The division has been made for the convenience of understanding. It should be understood that all categories of definitions are inclusive and interdependent on each other.

Two Comprehensive Definitions:

(1) Wechsler defines intelligence as the aggregate or global capacity of the individual to act purposefully, to think

rationally and to deal effectively with his environment (Cited in Freeman, 1965, p. 151).

(2) Stoddard offers the following definition: Intelligence is the ability to undertake activities that are characterized by (i) difficulty, (ii) complexity, (iii) abstraction (iv) economy, (v) adaptiveness to a goal, (vi) social value and (vii) the emergence of originals, and to maintain such activities under conditions that demand a concentration of energy and a resistance to emotional forces(Cited in Freeman, 1965, p.152).

THEORIES OF INTELLIGENCE:

Intelligence is merely a label for a hypothetical mental process or set of behaviours that are called intelligent. There is a tendency to reify an abstract concept like intelligence by acting as if it were a neurological entity. At least for the time being, no area of the brain or chemical substance that can be defined as the place or material of intelligence has been identified. In one sense, the notion of intelligence is merely a convenient fiction to help psychologists predict and understand behaviour. Thus, theories of intelligence are actually theories of intelligent behaviour. Such behaviour is a composite of many different abilities, as well as other personality variables, that vary from person to person and from one period of life to another.

It is understandable how a complex, inexact concept such as intelligence would be difficult to define precisely. Binet himself preferred to emphasize judgement in his definition, whereas others have referred to intelligence as the ability to think abstractly, the ability to learn, or the ability to adapt to one's environment. Each of these definitions has been criticized for one reason or another. Adaptability is obviously necessary for survival, but it is perhaps too broad as a synonym for intelligence. On the other

hand, Terman's definition of intelligence as the ability to do abstract thinking appears to be too narrow; abstract-thinking ability is an important aspect of intelligence but certainly not the only one. Finally, the popular conception of intelligence as the ability to learn is inadequate if intelligence tests are accepted as measures of intelligence. Scores on these tests are not very highly correlated with the rate or speed of learning new tasks, although they are more closely related to the level or amount of learning of which an individual is capable.

Early Factor Theories

Spearman's two-factor theory and Thorndike's multifactor theory:

The statistical technique of factor analysis was first developed by the British psychologist-statistician Charles Spearman in response to a suggestion made by Karl Pearson. As his research on the method proceeded, Spearman (1927) formulated a two-factor theory of intelligence, which he felt could explain the pattern of correlations among the group of cognitive tests that he analyzed. In its simplest form, the theory states that performance on any cognitive task depends on a general factor (g) plus one or more specific factors (S1, S2, S3, ...SN) unique to the particular task. Two tests that have been recommended as measures of Spearman's g factor are the Raven Progressive matrices and the Culture-Fair Test.

Spearman has not been alone in his belief in the explanatory power of a general intelligence factor. Binet and Terman made its existence an assumption of their work, and there is evidence that performance on the Stanford-Binet and similar tests can be explained largely in terms of g (McNemarr, 1942). It has been suggested by certain psychological statisticians that intelligence be defined as the first principal axis (factor) extracted from matrices of correlations among cognitive tests (Lohnes, 1973). The

first factor typically dominates all the other factors obtained from factor analyses of ability tests. Also, it is this common core of general cognitive ability that is primarily responsible for the reliability or stability of scores on most cognitive tests (Thorndike, 1975).

Criticisms of the two-factor theory have not been lacking, and many alternative theories have been proposed. The pioneer American psychologist E. L. Thorndike, for example, formulated a theory and devised a test-the CAVD (the letters CAVD stand for completions, arithmetic, vocabulary, and understanding directions and discourse) as an expression of his viewpoint that intelligence is a composite of many different abilities interconnecting in the brain. One proposal made by Thorndike for three kinds of intelligence-social, concrete, and abstract-was probably the first multifactor theory. This theory, however, was not based on the results of factor analysis of ability tests. It was Thurstone and his coworkers who made the most serious assault on Spearman's two-factor theory.

Thurstone's primary mental abilities:

One of the most famous names in psychological and education measurement is that L. L. Thurstone, a man who made many methodological and substantive contributions to the field. As a result of applying his centroid method of factoring and oblique rotation to the correlations among many different cognitive measures, Thurstone extracted seven important group factors. These primary mental abilities, as he perhaps unfortunately labelled them, are V (verbal meaning), N (number facility), R (inductive reasoning), P (perceptual speed), S (spatial relations), M (memory), and W (verbal fluency). Most cognitive tests represent complex combinations of these factors, so Thurstone and his associates constructed a series of tests, the Primary Mental Abilities Tests, to serve as relatively pure measures of each factor.

Thurstone's multidimensional conception of mental abilities established a frame of reference for future factor-analytic research on intelligence in the United States, although C. Burt, G. H. Thompson, and other British psychologists continued to emphasize the importance of a general intelligence factor. Perhaps the most prominent multifactor theorist on the contemporary American scene is J. P. Guilford, whereas in Great Britain Philip Vernon's hierarchical theory has been especially influential. R. B. Cattell, a British immigrant to the United States, stands somewhere between a general factor theorist and a multifactor theorist in his orientation.

Guilford's structure-of-intellect model:

Holding something of a record for the number of cognitive factors proposed is J. P. Guilford's model of the structure of intellect (Guilford, 1967). Guilford proposed that performance on any cognitive task can best be understood by analyzing it into the kind of mental operation or process performed, the type of content or test material on which the mental operation or process performed, , and the resulting product of performing a particular operation on a certain type of test content. Since in Guilford's model there are five possible kinds of operations (cognition, memory, divergent thinking, convergent thinking, and evaluation), four types of content (figural, symbolic, semantic, and behavioral), and six products (units, classes, relations, systems, transformations, and implications), it implies the existence of 5x4x6=120 possible factors comprising the structure of intellect.Guilford and his students then set themselves the task of determining how many of these"logical factors" actually exist (they have reported finding over 80) and constructing a measure or test of each factor.

Vernon's hierarchical theory:

An alternative to Guilford's multifactor theory is the tree shaped model proposed by the British psychologist Philip Vernon (Vernon,1960). A general cognitive factor (G) is at the highest level, with two major group factors-verbal_educational(V:ED) and the practical_mechanical_spatial(K:M)- at the next level. The V:ED and K:M factors are further broken down into a number of minor factors. For example, V:ED comprises abilities such as verbal fluency, numerical ability and perhaps creativity. Some of the minor factors under K:M are mechanical knowledge, psychomotor ability, and spatial ability. Finally, at the lowest level of the hierarchy are specific factors peculiar to certain tests.

In this hierarchical model of intelligence, the higher the factor is on the tree, the broader it is or the wider the range of behaviours it encompasses. Consequently, Vernon's theory retains the general intelligence factor of Spearman while relegating Thurstone's primary mental abilities and Guilford's structure of intellect factors to a subordinate status under G. Integrated models of the sort represented by Vernon's hierarchy offer a plausible way of combining the various findings and interpretations of factor analytic research into a single theory.

Cattell's theory of fluid and crystallized intelligence:

Vernon distinguishes between intelligence A, which is that part of overall intelligence due to heredity, and intelligence B, that portion due to environment. This distinction is related to R.B.Cattell(1963) theory that general intelligence is composed of two factors- fluid intelligence(gf) and crystallized intelligence(gc). Cattell who employed oblique rotations in his factor analysis, views these two factors as distinct but correlated. Although both types of intelligences are concerned with the ability to perceive the relations, fluid intelligence is

general to many different fields, whereas crystallized intelligence is specific fields such as school learning. Fluid ability is used more in tasks requiring adaptation to new environment;crystallized ability, in tasks where habits have become fixed. Cattell found that a person's fluid intelligence, as measured by culture-fair tests reaches a peak around the age of 14 or 15. In contrast, crystallized ability, which is the result of applying fluid intelligence to school experiences, goes on developing until the age of 25 or 30. According to his theory, an injury to the brain may reduce fluid ability, which is not fully developed in the child, while leaving crystallized ability unaffected. When the brain is injured, crystallized ability appears to retain the "shape" that fluid ability and experience have given to it.

FACTORS OF ABILITY

Regarding the question of the relative generality or specificity of human abilities; it is suggested that neither extreme point of view is correct and that middle ground must be adopted. Arguing for the generality of abolition in the fact that correlations between tests of abilities are almost always positive even small in some cases. It would be rare to find one type of human ability that correlated negatively with another. In addition to the tendency of all tests of ability to correlate positively with one another, these are defined clustering of tests. For example, all tests involving the ability to understand words, such as tests of reading comprehensive and vocabulary, tend to have correlations with one another, averaging 60 or more.
Similarly, all tests involving numerical computations, such as addition, substraction, multiplication, and find square roots, tend to correlate highly with one another and then form another cluster, or factor.

While planning for any intelligence test, following factors were considered important.

(a) Verbal factors:

The most important factors relating to school work concern the abilities to understand, to use, and to deal with written and spoken language. There are many possible verbal factors that can be found by exhaustively analyzing many different types of verbal tests. However, only two of these seem to be very important. They are verbal comprehension and verbal fluency.

Verbal Comprehension:

The most important verbal factor that concerns the ability to understand written and spoken language is verbal comprehension.Verbal comprehension represents most of what we refer to as "reading skill". Although the factor extends for beyond sheer vocabulary, a vocabulary test provides a good measure of verbal comprehension.

Typical item:

1. Which one of the following word means most nearly the same as salutation?

   a.Offering
   b.Greeting
   c.Discussion
   d.Appeasement

Verbal Fluency:

Verbal fluency concerns the ability to produce words and sentences rapidly. It can be thought of as the rate of production aspect of verbal ability, in contrast to verbal comprehension, which concerns the depth of understanding of verbal material.

Typical item:

1. Write as many names of the foods as you can is the next two minute.

Verbal comprehension comes in to play when rather complex words, sentences and paragraphs are being dealt with. Verbal fluency comes in to play when the verbal material is relatively simple and when fluidity of expression is at issue. These two type of abilities are some what correlated. Correlations of about 40 or 50 are found in between them.

(b) **Reasoning Factors:**

Reasoning is a complex domain in which the abilities involved tend to blend in different ways in different tests, making it hard to separate the reasoning factors from one another and to find good measures of any of them. The most clearly determined factors are discussed below.

General Reasoning:

The most commonly found factor of reasoning is concerned with the ability to invent solutions to problems. Arithmetical reasoning problem (Numerical reasoning items) are most characteristic of the factor.

Typical items:

If a machine produces bolts at the rate of two each fifteen minutes, how many bolts does the machine produce in three hour?

Even though such simple algebraic problems involve numbers, the main ability being measured is not that of numerical computation. In order to solve the problem the subject must invent a solution, grasp same principle by which each can be solved. The general reasoning factor also appears in items concerning serial completion, in which the subject is required to supply the next

entry in a patterned series of letters or digits. Two examples are as follows.

(1) z z y y x x w ---
(2) 2 1 3 2 4 3 5 4 6 5 ---

There is an element of discovery in all test that measure the factor of general reasoning, the discovery of same principle whereby a correct solution is obtained.

Deduction:

The deduction factor is concerned with the drawing of conclusions, as in logical syllogisms. In this type of reasoning there is nothing in particular to be discovered or invented, the ability being concerned with evaluating the implication of an argument. Deduction factor is mainly concerned with those items pertaining to logical syllogism

Typical item;

John is younger than Fred. Bill is older than Fred. Therefore Bill is---- than John.

Seeing relationships:

A third factor of reasoning involves the ability to see the relationship between two things or ideas to use the relationship to find other things or ideas. The factor is best represented by verbal analogies and design analogies.

Typical item:

Ship is to sail as automobile is to
a.Ship
b.Seat

c.Motor
d.Wind
e.Drive

Some items centring reasoning abilities represent a blend of the factors of seeing relationships and the factor of general reasoning. This is the case, for example, with the series completion item.

NATURE OF INTELLIGENCE

MEANING OF AN IQ:

For the general public, the IQ is not identified with a particular type of score on a particular test, but is often a shorthand designation for intelligence. So prevalent has this usage become, that it cannot be merely ignored or deplored as a popular misconception. To be sure, when considering the numerical value of a given IQ, we should always specify the test from which it was derived. Different intelligence tests that yield an IQ do in fact differ in content and in other ways that affect the interpretation of their scores. There is a need to reexamine the general connotations of the construct "intelligence," as symbolized by the IQ. It might be added that the prevalent conception of intelligence has been shaped to a considerable degree by the characteristics of the Stanford-Binet scale, which for many years provided the only instrument for the intensive measurement of intelligence and which was often used as a criterion for validating new tests.

First, intelligence should be regarded as a descriptive rather than an explanatory concept. An IQ is an expression of an individual's ability level at a given point in time, in relation to his age norms. No intelligence test can indicate the reasons for his performance. To attribute inadequate performance on a test or in everyday-life activities to "inadequate intelligence" is a

tautology and in no way advances our understanding of the individual's handicap in the individual's history.

Intelligence tests, as well as any other kind of tests, should be used not to label an individual but to help in understanding him. To bring a person to his maximum functioning level we need to start where he is at the time; we need to assess his strengths and weaknesses and plan accordingly. If a reading test indicates that a child is retarded in reading, we do not label him as a nonreader and stop; nor do we give him a nonverbal test to conceal his handicap. Instead we concentrate on teaching him to read.

An important goal of contemporary testing moreover, is to contribute to self-understanding and personal development. The information provided by tests is being used increasingly to assist individuals in educational and vocational planning and in making decisions about their own lives. The attention being given to effective ways of communicating test results to the individual attests to the growing recognition of this application of testing.

A second major point to bear in mind is that intelligence is not a single, unitary ability, but a composite of several functions. The terms is commonly used to cover that combination of abilities required for survival and advancement within a particular culture. It follows that the specific abilities included in this composite, as well as their relative weights, will vary with time and place. In different cultures and at different historical periods within the same culture, the qualifications for successful achievement will differ. The changing composition of intelligence can also be recognized within the life of the individual, from infancy to adulthood. An individual's relative ability will tend to increase with age in those functions whose value is emphasized by his culture or subculture; and his relative ability will tend to decrease in those functions whose value is deemphasized (Levinson, 1959, 1961).

Typical intelligence tests designed for use in our culture with school-age children or adults, measure largely verbal abilities; to a lesser degree, they also cover abilities to deal with numerical and other abstract symbols. These are the abilities that predominate in school learning. Most intelligence tests can therefore be regarded as measures of scholastic aptitude. The IQ is both a reflection of prior educational achievement and a predictor of subsequent educational performance. Because the functions taught in the educational system are of basic importance in our culture, the IQ is also an effective predictor of performance in many occupations and other activities of adult life.

On the other hand, there are many other important functions that intelligence tests have never undertaken to measure. Mechanical, motor, musical, and artistic aptitudes are obvious examples. Motivational, emotional, and attitudinal variables are important determiners of achievement in all areas. Current creativity research is identifying both cognitive and personality variables that are associated with creative productivity. All this implies, of course, that both individual and institutional decisions should be based on a much relevant data as can reasonably be gathered. To base decisions on tests alone, and especially on one or two tests alone, is clearly a misuse of tests. Decisions must be made by persons. Tests represent one source of data utilized in making decisions; they are not themselves decision-making instruments.

NATURE OF ADULT INTELLIGENCE:

Within the life span, testing has been oriented chiefly toward the school child and college student. At these levels, the test constructor can draw on the large common pool of experiences that have been organized into academic curricula. Most intelligence tests measure how well the individual has acquired the intellectual skills taught in our schools; and they can in turn predict how well

he is prepared for the next level in the educational hierarchy. Tests for adults, including the Wechsler scales, draw largely on this identifiable common fund of experience.

As the individual grows older and his own formal educational experiences recede further into the past, this fund of common experience may become increasingly less appropriate to assess his intellectual functioning. Adult occupations are more diversified than childhood schooling. The cumulative experiences of adulthood may thus stimulate a differential development of abilities in different persons.

Because intelligence tests are closely linked to academic abilities, it is not surprising to find that longitudinal studies of adults show larger age increments in score among those individuals who have continued the education longer (D.P. Campbell, 1965; Harnqvist, 1968; Husen, 1951; Lorge, 1945; Owens, 1953). Similarly, persons whose occupations are more "academic" in content, calling into play verbal and numerical abilities, are likely to maintain their performance level or show improvement in intelligence test scores over the years, while those engaged in occupations emphasizing mechanical activities or interpersonal relations may show a loss, Some suggestive data in support of this hypothesis are reported by Williams (1960); who compared the performance of 100 persons, ranging in age from 65 to over 90, on a series of verbal and non-verbal tests. Rather striking correspondences were found between the individual's occupation and his relative performance on the two types of tasks. Longitudinal investigations of adults have also found suggestive relationships between total IQ changes and certain biographical inventory items (Charles & James, 1964; Owens, 1966).

Each time and place fosters the development of skills appropriate to its characteristic demands. Within the life span.

these demands differ for the infant, the schoolchild, the adult in different occupations, and the retired people. An interesting demonstration of the implications of this fact for intelligence testing was provided by Demming and Pressey (1957). These investigators began with a task analysis of typical adult functions, conducted through informal surveys of reading matter and of reported daily activities and problems. On this basis, they prepared preliminary forms of some 20 tests "indigenous" to the older years. The tests emphasized practical information, judgement, and social perception. Results with three of these test, administered together with standard verbal and nonverbal tests to samples of different ages, showed that the older persons excelled the younger on the new tests while the reverse relationship held for the traditional tests. All these types of research suggest that whether intelligence test scores rise or decline with increasing age in adulthood, depends largely on what experiences the individual undergoes during those years and on the relationship between these experiences and the functions covered by the tests.

INTELLIGENCE - TEST SCORES AND GROUP DIFFERENCES:

From the time of their introduction during the early part of this century until the present, intelligence tests have been used extensively in research on individual and group differences(Tyler, 1974). To a large extent this aggregation of students have been unsystematic, and too often it has been a reflection of convenient correlational methods rather than sound research design.

Sex:

Occasionally an investigator finds a difference between males and females in general intelligence, but it is usually insignificant. The results of research do indicate, however, that females tend to be superior to males in rote memory, vocabulary, and verbal fluency (Wechsler, 1958). Males, on the other hand, are

superior to females in spatial ability, problem solving, and mechanical aptitude. It is recognized that these findings are,, at least to a degree, a function of the differences in the ways in which girls and boys have been treated in our society. Girls have been expected to do better in linguistic areas, and boys on problem-solving tasks.

Urban-rural environment:

One environmental variable associated with the factors of occupational membership and social class is urban vs. rural residence. The relationship of this variable to intelligence is indicated by studies conducted some years ago. For example, McNemar (1942) found significantly lower average Stanford-Binet IQs for children from rural areas than for those from cities. Although it still exists, this urban-rural difference in mental ability is not as pronounced today as it was a generation ago. Today's children are exposed to a greater range of environmental stimuli than their parents and grandparents. In fact, studies show that both television and radio can produce improvements in children's vocabularies and in their level of knowledge.

Climate:

Geographical variables such as climate can also have some effect on measured intelligence. The low level of mental activity is said to be typical of tropical variable of climate affects intelligence, it probably does so by decreasing motivation to perform or by reducing the level of activity to that which is absolutely necessary. In addition, diet is associated with climate, and the relationship between climate and performance may be due to diet rather than to climate. The incidence of malnutrition is rather high in many tropical countries.

Social class:

One of the most consistent findings concerning intellectual differences is that relating IQ to socioeconomic level. Higher average IQs for children in higher social classes has been the rule in these studies, and the distinction holds on both culture-fair and conventional intelligence tests (Knief & Strroud, 1959). Whether these social-class differences are caused primarily by heredity or by environment is debatable, but it is generally maintained that a favourable home environment can have a measurable effect on mental ability (Hunt, 1961; Skodak & Skeels, 1949).

HERITABILITY AND MODIFIABILITY:

Specifically, a heritability index shows the proportional contribution of genetic or hereditary factors to the total variance of a particular trait in a given population under existing conditions. For example, the statement that the heritability of Stanford-Binet IQ among urban American high school students is .70 would mean that 70 percent of the variance found in these scores is attributable to hereditary differences and 30 percent is attributable to environment.

Heritability indexes have been computed by various formulas (Jensen, 1969; Loehlin, Lindzey, & Spuhler, 1975), but their basic data are measures of familial resemblance in the trait under consideration. A frequent procedure is to utilize intelligence's test correlations of monozygotic (identical) and dizygotic (fraternal) twins. Correlations between monozygotic twins reared together and between monozygotic twins reared apart in foster homes have also been used.

Apart from questionable data, heritability indexes have other intrinsic limitations (Anastasi, 1971; Hebb, 1970). Jensen (1969), clearly lists these limitations among others. First, the concept of

heritability is applicable to populations, not to individuals. For example, in trying to establish the etiology of a particular child's mental retardation, the heritability index would be of no help.

Second, heritability indexes refer to the population on which they were found at the time. Any change in either hereditary or environmental conditions would alter the heritability index. For instance, an increase in inbreeding, as on an isolated island, would reduce the variance, attributable to heredity and hence lower the heritability index; increasing environmental homogeneity, on the other hand, would reduce the variance attributable to environment and hence raise the heritability index. Furthermore, a heritability index computed with one population is not applicable to an analysis of the differences in test performance between two populations, such as different ethnic groups.

Third, heritability does not indicate the degree of modifiability of a trait. Even if the heritability index of a trait in a given population is 100 percent, it does not follow that the contribution of environment to that trait is unimportant. Regardless of the magnitude of heritability indexes found for IQ'S in various populations, one empirical fact is well established: the IQ is not fixed and unchanging; and it is amenable to modification by environmental interventions. Rises and drops in IQ may also result from both fortutous environmental changes occurring in a child's life and planned environmental interventions (Anastasi, 1958a), major changes in family structure, sharp rises or drops in family income level, adaptation into a foster home, or participation in a preschool program may produce conspicuous increases or decreases in IQ.

There is some suggestive evidence that correlations with subsequent intelligence test score or academic achievement can be substantially raised when environmental variables are included

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There is some suggestive evidence that correlations with subsequent intelligence test score or academic achievement can be substantially raised when environmental variables are included

along with initial test scores as predictors (Bloom, 1960). An individual's intelligence at any one point in time is the end product of a vast and complex sequence of interactions between hereditary and environmental factors. At any stage in this causal chain, there is opportunity for interaction with new factors; and because each interaction in turn determines the direction of subsequent interactions, there is an ever widening network of possible outcomes. The connection between the genes an individual inherits and any of his behavioral characteristics is thus highly indirect (Anastasi, 1958b, 1973; Hebb, 1953).

INTELLIGENCE AND PERSONALITY:

Although it is customary and convenient to classify test into separate categories, it should be recognized that all such distinctions are superficial. In interpreting test scores, personality and aptitudes cannot be kept apart. An individual's performance on an aptitude test, as well as his performance in school, on the job, or in any other context, is influenced by his achievement drive, his persistence, his value system, his freedom from handicapping emotional problems, and other characteristics traditionally classified under the heading of "Personality."

Even more important is the cumulative effect of personality characteristics on the direction and extent of the individual's intellectual development. Investigations on groups ranging from preschool children to college students have been surveyed by Dreger (1968). Although some of the research on young children utilized a longitudinal approach, data from older subjects were gathered almost exclusively through concurrent correlations of personality test scores with intelligence test scores and indices of academic achievement. The data assembled by Dreger indicate the importance of considering appropriate personality variables as an aid understanding an individual's intelligence test performance and in predicting his academic achievement.

It would thus seem that prediction of a child's subsequent intellectual development could be improved by combining information about his emotional and motivational characteristics with his scores on ability tests. A word should be added, however, regarding the assessment of "motivation." In the practical evaluation of schoolchildren, college students, job applicants, and other categories of persons, psychologists are often asked for a measure of the individual's "motivation."

The relation between personality and intellect is reciprocal. Not only do personality characteristics affect intellectual development, but intellectual level also affects personality development. Suggestive data in support of this relation are provided in a study by plant and Minium (1967). Drawing upon the data gathered in five available longitudinal investigations of college-bound young adults, the authors selected the upper and lower 25 percent of each sample in terms of intelligence test scores. These contrasted groups were then compared on a series of personality tests that had been administered to one or more of the samples. The personality tests included measures of attitudes, values, motivation, and interpersonal and other noncognitive traits. The results of this analysis revealed a strong tendency for the high-aptitude groups to undergo substantially more "Psychologically positive" personality changes than did the low-aptitude groups.

At a more basic theoretical level, K.J. Hayes (1962) has proposed a broadly oriented hypothesis concerning the relationship of drives and intellect. Regarding intelligence as a collection of learned abilities, Hayes maintains that the individual's motivational make up influences the kind and amount of learning that occurs. Specifically, it is the strength of the "experience-producing drives" that affects intellectual development. These drives are illustrated by exploratory and manipulatory activities, curiosity, play, the babbling of infants, and other intrinsically

motivated behaviour. Citing chiefly research on animal behaviour, Hayes argues that these experience-producing drives are genetically determined and represent the only hereditary basis of individual differences in intelligence. It might be added that the hereditary or environmental basis of the experience-producing drives need not alter the conceptualization of their role in intellectual development. These two parts of the theory may be considered independently.

GROUP ADMINISTRATED TESTS OF INTELLIGENCE:

During the early part of this century. Lewis Terman regularly taught a course on the Stanford-Binet Intelligence Scale at Stanford University. It was in a section of this course that a student of his, Arthur Otis, reportedly conceived the notion of adapting certain of the Stanford-Binet tasks to paper-and-pencil format. Shortly thereafter, many of Otis's adopted tasks and others were combined as the first group intelligence, the Army Alpha. The Army Alpha and the companion nonlanguage test for illiterates, the Army Beta, were administered to nearly two million U.S.Army recruits during and after World War 1 for the purposes of military selection and classification. After the war, Otis and other psychologists published their own group tests of intelligence.

While individual tests such as the Stanford-Binet and the Wechsler scales find their principal application in the clinic, group tests are used primarily in the educational system, civil services, industry and the military service. Mass testing began during World War I with the development of the Army Alpha and Army Beta for use in the United States Army. The former was a verbal test designed for general screening and placement purposes. The later was non language test for use with men who could not properly be tested with the Alpha owing to foreign language background or illiteracy. The pattern established by these tests was closely

followed in the subsequent development of a large number of group tests for civilian application.

Revision of the civilian form of both original Army tests are still in use as Alpha Examination. Modified Form 9(Alpha 9) and as Revised Beta Examination. In the armed services, the Armed Forces Qualification Test (AFQT) is administered as a preliminary screening instrument in USA. AFQT provides a single score based on an equal number of vocabulary, arithmetic, spatial relations and mechanical ability items.

2. Group Tests Verses Individual Tests:

Group tests are designed primarily as instrument for mass testing. In comparison with individual tests, they have both advantages and disadvantages. On the positive side, group tests can be administered simultaneously to as many persons as can be fitted comfortably into the available space and reached through a microphone. Large scale testing programme were made possible for the development of group testing technique. By using only printed items and simple responses that can be recorded on a test booklet or answer sheet, the need for a one-to-one relationship between examiner and examinee was eliminated. A second way in which group testing facilitated mass testing was by greatly simplifying the examiner's role. In contrast to the extensive training and experience required to administer the Stanford-Binet for example, most group tests require only the ability to read simple instructions to the examinees and to keep accurate time. Some preliminary training sessions are desirable, ofcourse, since inexperienced examiners are likely to deviate from the standardized procedure in way that affect the test result because the examiner's role is minimized, however, group testing can provide more uniform conditions than does individual testing. The use of tape records and film in test administration after further opportunities for

standardizing procedure and eliminating examiner's variance in large-scale testing.

Scoring in more objective in group testing and can be done conveniently. Most group tests can also be scored by computers through several available test scoring services. Moreover, whether hand-scored or machine scored group tests usually provide separate answer sheets and reusable test booklets. Since in these tests, all responses are written on the answer sheet, the test booklets can be used indefinitely until they were over, thereby effecting considerable economy. Answer sheets also take up less room than booklets and hence can be more conveniently field for large numbers of examinees.

From another angle, group tests characteristically provide better established norms then do individual tests. Because of the relative ease and rapidity of gathering data with group tests, it is customary to test very large, representative samples in the standardization process.

Group tests necessarily differ from individual tests in form and arrangements of items. Although open ended questions calling for free responses could be used, today the typical group test employs multiple choice items for uniformity and objectivity of scoring. Group tests characteristically group items of similar content into separately timed sub tests. Within each subtest, items are usually arranged in increasing order of difficulty. This arrangement ensures that each examinee has an opportunity to try each type of item.(such as vocabulary, arithmetics spatial etc.) and to complete the easier items of each type before trying the more difficult one in which he might otherwise waste time.

Although group tests have several desirable features and since as a indispensable function in present day testing, they have some limitations. Here the examinee has much less opportunity to

establish rapport, obtain cooperation and maintain the interest of the examinees. Any temporary condition of the examinee such as illness, fatigue, worry or anxiety, that may interfere with test performance is less readily detached in group than in individual testing. In general, person unaccustomed to testing may be somewhat more handicapped on group tests than on individual tests. There is also some evidence suggesting that emotionally disturbed children may perform better on individual than on group tests (Bower, 1969; Willis, 1970). From another angle, group tests have been attacked because of the restrictions imposed on the examinee's responses. Criticisms have been directed particularly against multiple choice items and against such standard item types as analysis, similarities and classification (Hoffman; 1962, Latane, 1966). One contention is that some items may penalize a brilliant and original thinker who sees unusual implication in the answers but it is rare.It is undoubtedly true that group tests provide little or no opportunity for direct observations of the examinee's behaviour or for identifying the causes of typical performance

HISTORICAL BACKGROUND OF MULTILEVEL GROUP INTELLIGENCE TESTS:

The rational underlying the construction of a multilevel intelligence test is to provide a series of the test for the purpose of comparing intellectual growth over several years. The Stanford-Binet and Wechsler tests are individually administered tests. More extensively used than these are the group administered tests such as the Otis-Lenon, Kuhlmann-anderson, Lorge-Thorndike, Hennon-Nelson, and California Test of Mental Maturity.

Otis Tests:

The Otis-Lennon Mental Ability Tests (Otis and Lennon; The Psychological Corporation, 1967) are a revision of the earlier tests in the Otis series, The Otis Self Administering Tests of Mental Ability and The Otis Quick-Scoring Mental Ability Test. Like

its predecessors, the Otis-Lennon is composed of a variety of items to measure general mental ability. The six levels of the tests extend from Primary1 (last half of the Kindergarten) through advanced grades (10-12).Working time on the test varies from 30 to 45 minutes, depending on the level. The norms, based on the national sample of 200,000 pupils in all 50 states, are expressed in mental ages, deviation IQs, and percentile ranks and stanine ranks by age and grades.

Kuhlmann Tests:

The Kuhlmann-Anderson Tests, Seven edition (Kuhlmann and anderson;Scholastic Testing Service and the Psychological Corporation, 1960-1963) and the Kuhlmann-Finch Scholastic Aptitude Tests(Finch and Kuhlmann; American Guidance Service, 1953-1956) are both modern adaptation of intelligence tests devised by Fredrick Kuhlmann many years ago. The seven levels of Kuhlmann-Anderson extend from Kindergarten through grade 12, and the eighth levels of Kuhlmann-Finch from grade 1 through 12.The kuhlmann-Anderson tests are somewhat longer(50-60 minutes) than Kuhlmann-Finch(30 minutes), and at the junior and senior high levels the former tests yield separate Verbal and Quantitative scores as well as Total scores. The Kuhlmann-Finch is purported to be culturally fair, being more nonverbal in content than the Kuhlmann- Anderson, Scores on both test batteries can be expressed as deviation IQs.

Cognitive Abilities Test (CAT):

This series of tests, published Houghton Mifflin Company (by R. L. Thorndike & E. P. Hagen, 1971), is a successor to the and Primary II (grades 2-3) with two forms for each level. The four subtests at each level oral vocabulary, relational concepts, multi mental ("on that doesn't belong with the others"), and quantitative concepts - take 12-16 minutes each and are administered in four separate sessions. Norms on the Primary Battery were computed by

relating the scores made by a group of third- and fourth- grade children to the corresponding percentile ranks and stanines as well as grade percentiles and grade stanines, were determined on 2,500 Kindergartners and 5,000 pupils per grade in grades 1-4 of 47 communities.

The Multi- Level Edition of the CAT is designed for grades 3-12 and consists of three parallel batteries - Verbal, Quantitative, and Nonverbal - at eight different grade levels. The Verbal Battery contains vocabulary, sentence completion, verbal classification, and verbal analogies subtests, The Quantitative Battery, which includes subtests of quantitative relations, number series, and equation building, assesses the ability to work with number and other quantitative symbols. The Nonverbal Battery, comprised of spatial, geometric, and figural patterns, includes subtests of figure classification, figure analogies, and figure synthesis, Norms on the Multi- Level Edition, based on a nation wide sample stratified according to type of community, are expressed as standard age scores, grade percentile ranks, and grade stanines.

Henmon- Nelson tests:

The Henmon- Nelson Test of Mental Ability, 1973 Revision (by M. J. Nelson, T. A. Lamki & J. L. French; Houghlton Mifflin), cover four grade levels: grades 3-6, 6 -9 and 9 - 12 (Form 1) and Kindergarten through grade 2 (Primary Battery). An older college - level edition of the tests is also available. Each of the three levels of Form 1 consists of 90 items arranged in spiral - omnibus format including items on scrambled words, verbal analogies, verbal classification, verbal inference, number series, arithmetic reasoning, figure analogies, and following directions. Testing time for Form 1 is 30 minutes and the norms, based on a random sample of 35,000 pupils tested in 1972, are expressed as deviation IQs, stanines, and percentile ranks by grade.

The Primary Battery of the Henmon - Nelson tests is untimed, but usually takes 25-30 minutes. It is comprised of three subtests: a Listening Test of 30 general information items a Picture Vocabulary Test of 35 items, and a Size and Number Test of 23 items. The Primary Battery was standardized on 5,000 pupils, and scores are expressed as deviation IQs, stanines, and percentile ranks by grade.

Short Form Test of Academic Aptitude (by E. T. Sullivan, W. W. Clark & E. W. Tiegs; CBT/McGraw - Hill, 1970):

A successor to the well known California short Form Test of Mental Maturity, the Short form Test of Academic Aptitude (SFTAA) is composed of four subtests (Vocabulary, Analogies, Sequences, and Memory) at five grade levels (1.5 -12). In addition to scores on the four subtests and composite measures of language and nonlanguage aptitudes the test can be scored for general academic aptitude. Since this test was standardized on the same norm group at the California Achievement Tests, the SFTAA can be used to determine achievement expectancies at successive elementary and high school grade levels.

Other multilevel intelligence tests. A particularly noteworthy multilevel series of general ability tests is the School and College Ability Tests, Series II (SCAT), published by Addison - Wesdley Testing Service (1966). SCAT has levels (13 fall - 14 spring, 9 spring - 12 fall, and 3 spring - fall), with two or three equivalent forms at each level. The 50 verbal analogies items and 50 quantitative comparison items of which SCAT is composed yield three scores: Verbal, Mathematical, and Total. The scores are expressed as percentile ranks, percentile bands and stanines.

Another multilevel set of test for measuring the abilities required in school work is the Analysis of Learning Potential (ALP) (by W. M. Durost et al.; The Psychological Corporation, 1970). ALP consists of five batteries: Primary (garde 1), Primary II (grades

2-3), Elementary (grades 4-6), Advanced 1 (grades 7-9), and Advanced II

USES OF INTELLIGENCE TESTS:

(1) For measuring general learning readiness:

We know that intelligence tests are correlated with school achievement so intelligence acts can be used to indicate the level of capacity at which the pupil has arrived. Numerous investigations have been made to discover the relationship between intelligence tests and school marks at different levels of schooling. All researches have proved, beyond doubt, that intelligence tests can be used to measure the readiness for learning at different levels.

(2) For indicating the extent of differences of IQ among the children of same chronological age:

There are great differences in IQ of the pupils of same age. These differences indicate the need for providing teaching materials at use the tests for educational guidance, i.e., we can advise students to select subjects keeping into consideration their intellectual abilities.

(3) Defining more accurately the degree of mental retardation or defect:

Since the development of intelligence tests, we have been using intelligence tests to define more accurately the levels of feeblemindedness. Using the intelligence tests we may define the level of feeblemindedness. It is intelligence test that can aid us in knowing just which children will probably remain in the special class.

(4) For identifying gifted children:

Since 1921, when Terman used both individual and group tests of intelligence to identify the gifted, intelligence tests

have been used for this purpose. Tests of intelligence have given us an accurate definition of brightness in terms of IQ. Teacher's judgement has been found inaccurate in identifying gifted children as reported by Terman, Whipple and Coy in their separate studies of gifted children.

(5) For educational guidance:

The essence of educational guidance resides in providing for all children materials for instruction both interesting in content and suitable to their level of intellectual development. When we contemplate the magnitude of individual differences, psychological testing can be very useful in ensuring that children's educational progress is in accord with their abilities and can be helpful in discovering those children who need vocational guidance. Vocational guidance means finding the right man for the job. Tests can be used to provide vocational guidance at different age levels in various vocations. At present in our country vocational guidance is not adequately provided. It is unfortunate that we have not yet developed a system of sound vocational guidance services. We need to develop intelligence tests, interests and aptitude tests suiting to the needs of our country. The vocational guidance programme will have considerable social consequences in our country which is developing socially, economically and technologically. For making decisions about going to college, intelligence tests can be used to predict the subsequent success of a high school or inter college students. Teachers can use intelligence tests to make decision for individual students regarding their success in college or university.

(6) For study of mental growth:

Mental abilities develop in a sequential order from birth onward.We can use intelligence tests for studying mental growth and direction of individual and group curve. Intelligence tests have made it clear that the mental

development of children is a steady consistent process from one year to the next. Use of intelligence test in consecutive measurement has thrown the old idea that there are periods of rapid mental growth at the time of adolescence followed by periods of slow growth, mental growth continues until at least 18 years of age.

(7) For homogeneous grouping:

Teachers, in the past, have experienced great difficulties inherent in attempting to teach pupils or students who are widely different in their capacities to learn. In average classroom, bright and dull children are the losers. To remedy the problems of traditional classroom, homogeneous grouping of students has been suggested and tried out in many schools of western countries with encouraging results with the help of intelligence tests.

(8) Use in research:

Intelligence tests are used for conducting research in different areas of human abilities.

LIMITATIONS OF INTELLIGENCE TESTS:

An intelligence test permits a person to show what he can do at a certain time with a certain carefully selected, but small, set taken from all the possible items which test intelligence. No one should suppose that this small set can tell as much about him as if 100 times as many items were available. Nonetheless, it tells a great deal and inordinate increase in length of tests, suffer the usual consequences of the law of diminishing return. Similarly we know that one person may be more fatigued than another when we take the test, possibly reducing his scores. They tell us what a person can do right now, handicapped or favoured as he may be by his inherited characteristics, his home and school background, better sensory-motor or bodily States. They do not tell us how he would have done if tested 10 years ago or if tested ten years hence, with

or without ideal conditions during those ten years Consequently, it is always possible to second-guess such a test and conclude that it does not tell what we really want to know.

Jensen reports that he has often had cause to believe that the first intelligence tests given to certain children underestimate their IQ after 2 to 4 days of getting acquainted with such children. He typically found that a retest on a different form of the same test yielded an IQ of 8 to 10 points higher. Children may be so frightened in a testing situation with a tester they do not know and when confronted with tasks that are completely novel that they do no exhibit nearly the intellectual capacity one would expect from other evidence about them particularly with young children, it would be important to spend much more time-building rapport for testing than few minutes that are some time employed before formal testing begins.

One of the major defects of present day testing, is that, it is unable to get below the surface of the mind. It measures what a child knows rather than how far he can go in the pursuit and discovery of ideas. It has almost no bearing on originality, on the mobilization of many ideas toward a single concept or on the ability to devote his attention over a period of time to a single line of thought. A smattering of knowledge in many fields will lead to a score equal to that of the child who could do marvellously well along certain lines, but whose accredited performance is cut-off far below his mental levels. For example, a child with a 30,000 words vocabulary can scarcely get more mental credit than a child with 10,000 words vocabulary, although the differences in mental accomplishment are tremendous.

Chapter 2

Purpose of the Study:

The present study was aimed at achieving the following goals:

1. Construction of a Group Verbal Intelligence Test in Urdu for high secondary school children (GVITU) which can later be utilized for research and other practical purposes.

2. Establishing the validity of this test.

3. Determining the reliability of the test.

4. Developing local norms by the grade 10.

METHODOLOGY:

Methodology of the construction of GVITU was as follows:

1. Planning and preparation of item pool.
2. Pre- Try-out Study.
3. First Try-out Study.
4. Second Try-out Study.

Planning and preparation of the GVITU:

The GVITU comprises of two subtests

1.Vocabulary Test.
2.Numerical Reasoning Test.

Items of GVITU are based upon various terms, concepts and formulae, introduced and elaborated in text books prescribed for classes 6 to 10. While constructing the test items, an attempt was made to give representation to each and every chapter in these

books. For this purpose,every fifth page of every Urdu text books was taken for selecting one word from every fifth line. These items were written accordingly.The initial item pool, generated was consisted of 250 items for Vocabulary Test from Urdu text books, and 70 items for Numerical Reasoning Test. For establishing the format of items of Numerical Reasoning Test, help was also taken from Differential Aptitude Test(DAT).

In the construction of items, main emphasis was laid upon perceptual clarity, comprehension and application and not just mere reproduction of factual knowledge. Basic assumption behind these attempts was that if the subjects really understood the concepts, they could solve the problem, no matter is what are way it was presented.

Initial Editing and arrangement of the Items:

Once the items were ready in their initial form, they were presented to four psychologists involved in research of psychological measurement for their expert opinion and advice. In the light of their view, and grading, items were arranged from easiest to the most difficult.

The items were arranged in a manner, proceeding from the easiest to the most difficult. The items from class 6 were given in the beginning, where as those from class 10 text book were given at the end of the test. It was decided to construct multiple-choice item, so that a wider range of content area could be covered and also because multiple-choice items usually prove to be more appropriate for presenting concepts. It was expected that this would assure the objective nature of GVITU, both in administration as well as in scoring.The subtests used in the try-out for the purpose of item analysis comprised of 60 items for vocabulary and 45 items for numerical reasoning test respectively. The test was prepared in Urdu, keeping in view the fact that majority of

Pakistani students is being educated through an Urdu medium of instruction.

Distracters Of The Items:

For finding the distracers of the items of the two subtests of GVITU, 60 items of Vocabulary Test and 45 items of Numerical Reasoning Test were taken to 60 students of F.G.Schools, 30 for male and 30 for female, ranging from 8th to 10th classes. Students were instructed to give the meanings of each item of Vocabulary Test, while they were instructed to give the answer to each item of Numerical Ability Test.

From the responses of the students on the items of the two subtests, four best and plausible responses were selected as the distracters for each item of the two subtests.

PRE-TRY-OUT:

Before the actual try-out was conducted, a pre-try-out of GVITU was undertaken. The purpose of the pre-try-out was to find out:

i. Any problem in understanding and following the instructions.
ii. Understandability and readability of the format of the test.
iii. Comments on the type and format of the test items.
iv. The total time taken for the two subtests.

The test was administered to a group of sixty students, ten each from classes 8 to 10 of male and female. The students were given instructions for taking test and were introduced to the purpose of the study. The results of this administration revealed that the students did not have any of the above mentioned problems and difficulties. Therefore no modification was required and it was decided to prepare the same plan for the actual administration.It

was observed that on the average the students could complete Vocabulary Test in 35 minutes and numerical reasoning test in 30 minutes.

FIRST TRY-OUT:

Once the format and the individual items were finalized in the first stage, the first try out was carried out.

Objective of the try-out:

The try-out of GVITU was carried out to serve the following purposes.

1. Item analysis of the GVITU with reference to estimating its item characteristics:-
(a) Difficulty level.
(b) Discrimination power.

2. Revision of GVITU in the light of the above mentioned information.

Procedure:

The Sample:

The GVITU was administered to a sample of 100 students of F.G. Institutions for each subtest. Out of 100, 50 were male and 50 were female and out of each 50, 25 were from 10th class and 25 were from 11th class.The institutions selected for the first try-out are given in appendix-1(A), while sampling plan is given in Table-1:

Table-1

SUBTEST	CLASS 10		CLASS 11		
	MALE	FEMALE	MALE	FEMALE	TOTAL
VOCABULARY	25	25	25	25	50
NUMERICAL REASONING	25	25	25	25	50
TOTAL	50	50	50	50	200

An effort was made to get the students of average performance. For this purpose, help was taken from their academic record lists. Random sampling procedure was used for the selection of students. The purpose of selecting the subjects according to their academic achievement was to have a balanced and more equally distributed group. This did not affect the test administration any way, since subjects were not aware of this categorization

Test Administration:

The subtests of GVITU were group administered to four groups of twenty five students each for each subtest, making the total of 200. Each of the group was administered the subtests separately during their school hours. Efforts were made to reduce test anxiety by presenting the test as a research instrument rather than a school examination. At the beginning of each session, after the instruction were clearly read out to the subjects, which were already printed on the cover page of each subtest, they were told that for answering the test items they just had to bring in their minds, general concepts of vocabulary and arithmetic respectively, studied at school. They were encouraged to raise the questions, if any, regarding the nature of the test, prior to distributing the test. Their questions were answered to their satisfaction. They were asked to respond to all the questions.

SCORING AND ANALYSIS OF THE DATA:

Plan for computerized analysis of GVITU was prepared and all data were fed to the computer at the National Institute of Psychology, Islamabad.

Item Analysis:

Item analysis was kept as a major objective of the present study, considering the role it could play in future revision, and for developing a new and fine version of the test. For an item analysis of GVITU, two indices were calculated.

a)	Facility index	Percentages of responses to correct choices were calculated for this purpose.
b)	Discrimination Power	To see if the test discriminated between high and low achievers on GVITU, 27 with highest score and 27 students with the lowest score were chosen.

RESULTS AND DISCUSSIONS OF THE FIRST TRY-OUT:

The various indices obtained through item analysis have been presented in Appendix-2 for Vocabulary Test and in Appendix-3 for Numerical Reasoning Test , describing the :

a) Facility level.
b) Discrimination Power.

a) Facility level:

There was not a single item which was not responded correctly by any one, while there were two items which were responded correctly by every one. They were, item number 18 for Vocabulary Test and item number 1 for Numerical Reasoning Test and seemed to

be the easiest one respectively with a 100% facility level. On the other hand items number 32 for Vocabulary test and item number 15 for Numerical Reasoning Test appeared to be the most difficult since they carried a facility level of 22.222% and 20.370% respectively.

Keeping in view the facility levels, the new order of item was developed. According to the new arrangement, items with the highest facility level came in the beginning. The new arrangement suggested that item number 18 should be the first one, and the item number 32 should come at the end of Vocabulary Test, While item number 1 should be the first one and item number 15 should come at the end of Numerical Reasoning Test. When more than one items shared the same facility level, they were arranged according to their discrimination indices.

b) Discrimination Power.

In order to find out the discrimination power of the items of the two subtests, the data of 27% of students obtaining the highest score and that of 27% of students obtaining the lowest score on both of the subtests were compared in the computer. The appendix-2 and appendix-3 shows that the discriminatory power of the item number 18 in Vocabulary Test and item numbers 1 and 2 in Numerical Reasoning test is zero. This means that these items could not discriminate between good and poor performer on GVITU. This can lead to the conclusion that both high and low achievers did equally well or bad on these items. Keeping in view the discrimination index, it was decided that items with minimum discrimination power of 0.25 must be selected and others be dropped out.

The comprehensive Appendixes 2 and 3 were used for identifying good, acceptable and poor items. 25 items each with high discrimination power were considered to be " Good items " and were selected for second try out from both the subtests respectively.

SECOND TRY-OUT:

Once the new and fine version of the test was completed in the first try-out, the second try-out was carried out.

Objectives of the second try-out:

The second try-out of GVITU was carried out to serve the following purposes.

1.Item analysis of the GVITU with reference to estimating its:-
(a)difficulty level.
(b)Discrimination power.

Procedure:

The Sample:

The GVITU was administered to a sample of 100 students of F.G.Schools,for each subtest. Out of 100, 50 were male and 50 were female and out of each 50, 25 were from 10th class and 25 were from 11th class.

The institutions selected for the second try-out are given in Appendix-1 B, while sampling plan is given in Table-2:

Table-2:

SUBTEST	CLASS 10		CLASS 11		
	MALE	FEMALE	MALE	EMALE	TOTAL
VOCABULARY	25	25	25	25	50
NUMERICAL REASONING	25	25	25	25	50
TOTAL	50	50	50	50	200

An effort was made to get the students of average performance. For this purpose, help was taken from their academic record lists. Random sampling procedure was used for the selection of students. The purpose of selecting the subjects according to their academic achievement was to have a balanced and more equally distributed group. This did not affect the test administration any way, since subjects were not aware of this categorization.

Test Administration:

The subtests of GVITU were group administered to four groups of twenty five students each for each subtest, making the total of 200. Each of the group was administered the subtests separately during their school hours. At the beginning of each session, after the instructions were clearly read out to the subjects, they were told that for answering the test items they just had to bring their minds, general concepts of vocabulary and arithmetic respectively, studied at school. They were encouraged to raise the questions, if any, regarding the nature of the test, prior to distributing the test. Their questions were answered to their satisfaction. They were asked to respond to all the questions.

Analysis of the data:

Plan for computerized analysis of GVITU was prepared and all data were fed to the computer at the National Institute of

Psychology, Islamabad. Since the aim of the present study was, beside developing an intelligence test, to determine its various psychometric characteristics, the data were analyzed at different levels.

Item Analysis:

Item analysis was kept as a major objective of the present study, considering the role it could play in future revision, and for developing new version of the test. For an item analysis of GVITU, two indices were calculated.

RESULTS AND DISCUSSIONS OF THE SECOND TRY OUT:

The various indices obtained through item analysis, for Vocabulary Test and Numerical Reasoning Test, have been presented in appendix-4 and appendix-5 respectively, describing their :

a) Difficulty level.
b) Discrimination Power.

a) Facility level:

There was not a single item which was not responded correctly and incorrectly by every one. Keeping in view the difficulty levels, the new order of items was thought of. According to the new arrangement, items with the highest facility level came in the beginning. The new arrangement suggested that item number 25 should be the first one, and the item number 7 should come at the end of Vocabulary Test, While item number 25 should be the first one and item number 2 should come at the end of Numerical Reasoning Test. When more than one items shared the same difficulty level, they were arranged according to their discrimination powers.

b) Discrimination Power.

In order to find out the discrimination power of the items of the two subtests, the data of 27% of students obtaining the highest score and that of 27% of students obtaining the lowest score on both of the subtests were compared in the computer. Keeping in view the discrimination power, it was decided that items with minimum discrimination power of 0.25 must be selected and others be dropped out. Hence for Vocabulary Test, items number 10,16,4,3,9,8,6,18,5,5,2,1,17,22,20,21,12,11,14,24,15 and 19 were selected, while items number 13, 23 and 25 were dropped for final version. Similarly for Numerical Reasoning Test, items number 1 to 24 were selected, while item number 25 was dropped for making final version. So these selected good items were then used to establish the validity and determining the reliability of GVITU.

VALIDITY

Procedure:

For determining the validity index for GVITU,an other study was conducted. Once the test items,and the format of the test were given the final shape, after item analysis, it was once again taken to the field for finding the evidence of validity.

Sample:

The sample selected for administration of GVITU for information of school marks consisted of 100 students, divided into four groups of 25 students each, belonging to the schools which are mentioned in appendix-1 B. These students were promoted to the present grades in the beginning of April,1992, while the administration took place on 15 October,1992. Sample was selected randomly in such a way that it contained high, as well as average, and poor achievers.

ADMINISTRATION.

1- GVITU:

GVITU was group administered to students. The students were allowed 30 minutes for doing the test. The whole administration was completed in one day.

2- SCHOOL MARKS:

In obtaining school marks of their last examination passed, no test administration was involved. The marks secured by the students in their last examination passed,which was their annual examination held about six months ago, were obtained from the class teachers. These marks were given out of a total of 850.

RESULTS AND DISCUSSION:

Once the scoring was completed and the data tabulated, Pearson product moment correlation was calculated to see the relationship between the two variables i.e, sutest and school marks.

Subjects's score on school marks was correlated with their score on GVITU. As a result correlation coefficient was calculated for both of subtests of GVITU and marks in last examination, which are given in Table-3.

Table-3

	1	2	3
SCHOOL MARKS	-	.54**	.48**
VOCABULARY TEST			
NUMERICAL REASONING TEST			

p< .001 1-tailed signific.

Having a look at the tables one can easily see the results go along the assumption with which the validity study was started. These results suggest that there is a significant positive correlation (p< .001)between school marks and vocabulary test. Similarly there is a good positive correlation between school marks and Numerical Reasoning test. The size of the coefficient can be further increased by taking current examination's results of the subjects. Although both sets of scores seem to be going in the same direction, it can not be concluded that any one who does good on a traditional school examination, does equally good on GVITU. For this, one may infer that school achievement has nothing much to do with the understanding of the text knowledge; rather one can say that school achievement is not dependant upon just intelligence.

RELIABILITY ESTIMATE OF GVITU.

Reliability is one major index of efficiency of any measurement.The extent to which one can be dependant upon a test, is very much determined by the reliability of the test.
Considering the demands of the test, it was decided to adopt Kuder Richardson Formula(KR-20) for estimating reliability.The sample, the administration, and the scoring procedure was the same as the one used in the validity study.
The obtained estimate of reliability of GVITU is given in Table-4

Table-4

	CORRELATION COEFFICIENT.
VOCABULARY TEST.	.85
NUMERICAL REASONING TEST.	.82

LOCAL NORMS OF GVITU.

Nearly all standardized tests provide some form of within-group norms. With such norms, the individual's performance is evaluated in terms of the performance of the most nearly comparable standardization group, as when comparing a child's raw score with that of children of the same chronological age or in the same school grade.

PERCENTILES:

Percentile scores are expressed in terms of the percentage of persons in the standardization sample who fall below a given raw score and indicates the individual's relative position in the standardization sample. Percentile can be expressed in as ranks in a group of 100. The 50th percentile (P50) corresponds to the median. Percentile above 50 represents above average performance; those below 50 signify inferior performance.

Once the final version of the test was ready for future administration, a study was conducted for developing local norms of GVITU by grade.

METHODOLOGY.

The methodology of this study was the same as the one adopted in the try outs, except the fact that the sample size was larger this time.

Procedure:

The sample comprised of 360 class 10 students of Rawalpindi city. Sampling plan is as given in Table-5

Table-5

N= 360											
MALE= 180						FEMALE= 180					
F.G.SCHOOLS			PUNJAB SCHOOLS			F.G.SCHOOLS.			PUNJAB SCHOOLS		
1	2	3	4	5	6	7	8	9	10	11	12
30	30	30	30	30	30	30	30	30	30	30	30

Instrument:

The final version of GVITU, comprising of 46 multiple-choice items, splitted into two subtests(Vocabulary Test and Numerical Reasoning Test), was used to develop local norms of grade 10.

ADMINISTRATION AND SCORING:

The test was administered to twelve groups comprising thirty students each of class 10. Total administration was completed within a week. On the average each group finished the test in 30 minutes.The students marked their responses on the question

papers.The whole data was scored through computer, with the help of key prepared for this purpose.The maximum attainable score on the Vocabulary test was 22 whereas the minimum possible score was zero. The highest score obtained by the students on the test was 22 while the lowest score was 4. The maximum attainable score on the Numerical ability test was 24 whereas the minimum possible score was zero. The highest score obtained by the students on the test was 23 while the lowest score was 2.22. The maximum attainable score on the total test was 46 whereas the minimum possible score was zero. The highest score obtained by the students on the total test was 43 while the lowest score was 8.22.

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APPENDIX-1

A- Institutions For First Try-out.

1. F.G. High School Abbottabad.
2. F.G. Girls High School Abbottabad.
3. Army Burnhall College
4. F.G. College for Women Rawalpindi.

B- Institutions For Second Try-out.

1. F.G. High School Adamjee road, Rawalpindi.
2. F.G. SirSyed Girls High School Rawalpindi.
3. F.G.SirSyed College, Rawalpindi.
4. F.G. College for Women Rawalpindi.

C- Institutions For Percentile Norms.

1. Faizulislam High School Rawalpindi.
2. Christian High School Rawalpindi.
3. Islamia High School No3 Rawalpindi.
4. F G Secondary School-1 M H Rawalpindi.
5. F G Secondary School Adamjee Road Rawalpindi.
6. F G Secondary School-2 M H Rawalpindi.
7. Govt Girls High School Westridge Rawalpindi.
8. Govt Muslim Girles High School Rawalpindi.
9. Govt Girles High School No-2 Rawalpindi.
10. F G High School Kashmir Road Rawalpindi.
11. F G High School Tariq abad Rawalpindi.
12. F G High School Daryaabad Rawalpindi.

APPENDIX-2

INDICES OF DIFFICULTY AND DISCRIMINATION OF VOCABULARY TEST

Variables	Correct Responses of High Group	Correct Responses of Low Group	Index of Difficulty	Index of Discrimination
1	12	7	35.18519	.185189
2	19	9	51.851	.370
3	27	14	75.925	.481
4	18	11	53.703	.259
5	16	4	37.037	.444
6	13	8	38.888	.185
7	26	24	92.592	.074
8	26	14	74.074	.444
9	27	10	68.518	.629
10	26	15	75.924	.407
11	27	25	96.296	.074
12	16	10	48.148	.222
13	21	8	53.703	.481
14	8	6	25.925	.074
15	25	15	74.074	.370
16	25	13	70.370	.444
17	27	16	79.629	.407
18	27	27	100.00	0
19	27	26	98.148	.037

20	27	24	94.444	.111
21	13	5	33.333	.298
22	22	10	59.259	.444
23	24	10	62.962	.518
24	22	18	74.074	.148
25	27	19	85.185	.296
26	27	20	87.037	.259
27	27	16	79.629	.407
28	25	19	81.481	.222
29	27	24	94.444	.111
30	19	14	61.111	.185
31	26	10	66.666	.592
32	7	5	22.222	.074
33	14	6	37.037	.296
34	26	16	77.777	.370
35	26	13	72.222	.481
36	12	5	31.481	.259
37	6	8	25.925	-.074
38	18	1	35.185	.629
39	26	13	72.222	.481
40	23	7	55.555	.592
41	21	9	55.555	.444
42	26	11	68.518	.555

43	12	9	38.888	.111
44	27	17	81.481	.370
45	20	7	50.000	.481
46	27	19	85.185	.296
47	20	17	68.518	.111
48	10	7	31.481	.111
49	21	11	59.259	.370
50	23	10	61.111	.481
51	27	18	83.333	.333
52	27	11	70.370	.592
53	27	21	88.888	.222
54	24	6	55.555	.666
55	17	6	42.592	.407
56	23	18	75.925	.185
57	8	5	24.074	.111
58	26	16	77.777	.370
59	18	10	51.851	.296
60	22	13	64.814	.333

A P P E N D I X - 3

INDICES OF DIFFICULTY AND DISCRIMINATION OF NUMERICAL REASONING TEST

VARIABLES	CORRECT SCORES IN HIGH GROUP	CORRECT SCORES IN LOW GROUP	INDEX OF DIFFICULTY	INDEX OF DISCRIMINAT --ION
1	27	27	100	0
2	26	26	96.296	0
3	27	22	90.740	.185
4	22	19	75.925	.111
5	26	24	92.592	.074
6	23	21	81.481	.074
7	23	10	61.111	.481
8	26	13	72.222	.481
9	27	9	66.666	.666
10	27	18	83.333	.333
12	26	10	66.666	.592
15	8	3	20.370	.185
17	27	24	94.444	.111
18	17	4	38.888	.481
19	27	23	92.592	.148
20	23	2	46.296	.777
21	20	7	50	.481
22	22	9	57.407	.481

23	24	6	55.555	.666
24	21	2	42.592	.703
25	23	12	64.814	.407
26	25	14	72.222	.407
27	24	9	61.111	.555
28	27	9	66.666	.666
29	23	17	74.074	.222
30	27	20	87.037	.259
31	19	2	38.888	.629
32	25	11	66.666	.518
33	23	14	68.518	.333
34	26	22	88.888	.148
35	26	14	74.074	.444
36	27	15	77.777	.4443
38	26	16	77.777	.370
39	27	20	87.037	.259
40	25	12	68.518	.481
41	26	19	83.333	.259
42	15	3	33.333	.444
43	19	8	50	.407
44	24	4	51.851	.740
45	26	11	68.518	.555

APPENDIX-4

INDICESOF DIFFICULTIESAND DISCRIMINATIONSOF VOCABULARY TEST.

No.	Correct Responsesof High Group	Correct Responsesof Low Group	Indexof Difficulty	Indexof Discriminatio n
1.	20	6	48.148	.518
2.	22	7	53.703	.555
3.	22	3	46.296	.703
4.	26	4	55.555	.814
5.	21	6	50	.555
6.	24	8	59.259	.592
7.	19	4	42.592	.555
8.	23	7	55.555	.592
9.	25	7	59.259	.666
10	27	3	55.555	.888
11.	26	16	77.777	.370
12.	26	16	77.777	.370
13.	26	20	85.185	.222
14.	27	18	83.333	.333
15.	25	17	77.777	.296
16.	27	4	57.407	.851
17.	27	14	75.925	.481
18.	27	11	70.370	.592

19.	25	17	77.777	.296
20.	26	13	72.222	.481
21.	27	14	75.925	.481
22.	27	14	75.925	.481
23.	27	24	94.444	.111
24.	27	19	85.185	.296
25.	27	24	94.444	.111

APPENDIX-5

INDICESOF DIFFICULTIESAND DISCRIMINATIONSOF NUMERICAL REASONING TEST.

No.	Correct Responsesof High Group	Correct Responsesof Low Group	Indexof Difficulty	Indexof Discriminatio n
1.	26	11	68.518	.555
2.	14	5	35.185	.333
3.	14	5	35.185	.333
4.	22	13	64.814	.333
5.	22	7	53.703	.555
6.	26	19	83.333	.259
7.	20	3	42.592	.629
8.	20	2	40.740	.666
9.	26	5	57.407	.777
10.	22	10	59.259	.444
11.	26	11	68.518	.555
12.	27	7	62.962	.740
13.	27	9	66.666	.666
14.	27	8	64.814	.703
15.	26	11	68.518	.555
16.	26	12	70.370	.518
17.	24	10	62.962	.518

18.	24	14	70.370	.370
19.	20	12	70.370	.518
20.	25	14	72.222	.407
21.	27	16	79.629	.407
22.	22	12	62.962	.370
23.	26	19	83.333	.259
24.	18	9	50	.333
25.	27	21	88.888	.222

نام:_____ عمر:_____ جماعت:_____

اسکول:_____ تاریخ:_____

ہدایات برائے حصہ اوّل

الفاظ کے معانی:

عزیز طلباء آپ سب کو ایک عدد سوالنامہ دیا جا رہا ہے، جس میں الفاظ کے معانی بتانا ہیں۔ ہر لفظ دائیں طرف سے شروع ہو گا اور اس کے سامنے اس کے چار ممکنہ جوابات ا، ب، ج، د دیئے گئے ہیں۔ آپ کے خیال میں جو معنی درست ہوں یا درست سے قریب ترین ہوں، اس کے ساتھ دیئے ہوئے، ا، ب، ج، د پر ✓ کا نشان لگائیں۔ یاد رکھیں کہ صرف ایک ہی جواب پر ✓ لگائیں۔ اگر آپ محسوس کریں کہ آپ نے غلط جواب پر ✓ لگایا ہے تو اس کو کاٹ دیں اور جو نیا جواب ہو، اسے دوبارہ ✓ لگا دیں۔ ایک مرتبہ پھر یاد کر لیں کہ صرف اور صرف ایک ہی جواب پر ✓ لگائیں۔ شکریہ!

نمبر شمار	الفاظ	ا	ب	ج	د
1۔	مَندُوب	نمائندہ	رعب	مذہب	دیوانہ
2۔	دفعتاً	دبانا	حقیقت میں	دور کرنا	یکایک
3۔	مَصارِف	مشورے	تعارف	مشغُول	اِخراجات
4۔	جلوہ	طاقت	نمائش	جلال	حِفاظت
5۔	اِشتیاق	کوشش	فخر	فرق	آرزو
6۔	گھڑیال	گھڑی ٹھیک کرنے والا	گھڑی رکھنے کی جگہ	پیتل کا گھنٹہ	مُشکل وقت
7۔	مُضائقہ	اِہتمام	دِلچسپ	حَرج	ذائقہ دار
8۔	تضاد	حادثہ	تقاضا	نُقصان	مُخالف
9۔	نَاقص	غیر ضروری	قبضہ کرنا	برائی کرنا	غیر خالص
10۔	دُکھڑا	دَرد بھرا قِصّہ	دُکھنے والی جگہ	دُکھ کی جمع	دُکھی شخص

ہدایات برائے حصّہ دوئم

عددی استدلال:

عزیز طلباء اس حصہ میں آپ کو چند سوالات کے جوابات دیئے ہیں۔ یہ سوالات حساب کے بنیادی اصولوں پر مبنی ہیں۔ ہر سوال دائیں طرف سے شروع ہو گا اور اس کے سامنے اس کے چار ممکنہ جوابات ا، ب، ج، د دیئے گئے ہیں۔ آپ کے خیال میں جو جواب درست ہو، صرف اس پر ✓ کا نشان لگائیں۔

نمبر شمار	سوالات	ا	ب	ج	د
-1	اگلا جوڑا مکمل کریں: (?,70),(50,40),(20,10)	60	70	80	90
-2	اگلا جوڑا بتائیں: (??),(8,6),(6,4),(4,2),(0,0)	(9,8)	(6,6)	(8,8)	(10,8)
-3	اگر ANIMAL مساوی ہو 123456 کے تو LAMINA مساوی ہو گا، کس کے؟	123564	132564	542136	654321
-4	حل بتائیں: ? = -2(4)(-2)	-16	-8	16	8
-5	اگلا عدد بتائیں: ? , C , 4 , B , 6 , A , 8	D	1	2	3
-6	اگلا عدد بتائیں: ? , 8 , 6 , 8 , 4 , 8 , 2	9	8	7	6
-7	؟ کی جگہ عدد بتائیں: 25 20 5 40 34 6 80 70 ?	8	9	10	20
-8	اگلا جوڑا بتائیں: (??),(E5),(C3),(A1)	(G6)	(G7)	(H6)	(H7)
-9	اگر CHAIR مساوی ہو 53794 کے، تو RICHA مساوی ہو گا، کس کے؟	49357	49753	49573	49537
-10	حل بتائیں: 2سال 8 ماہ 20 دن + 3سال 3 ماہ 10 دن	5 5 سال ماہ	11 5 سال ماہ	9 سال	6 سال
-11	حل کریں: ? = 2 - 2 + 2 X 2÷2	2	1	0	4
-12	حل بتائیں: $? = \frac{3^4}{4^3} \times \frac{4^3}{3^4}$	0	1	3	4
-13	اگر TABLE مساوی ہو 42035 کے، تو TABLET مساوی ہو گا، کس کے؟	42053	42035	420354	420435
-14	؟ کی جگہ عدد بتائیں: $\frac{11}{5} = \frac{77}{?}$	30	32	35	40

-15	حل بتائیں : 3فٹ 8 انچ + 2فٹ 4 انچ	4,1 فٹ انچ	5 فٹ	10, 5 فٹ انچ	6 فٹ
-16	اگر ایک ڈرائیور اسّی کلومیٹر فی گھنٹہ کی رفتار سے بس چلائے تو چالیس کلو میٹر کا فاصلہ وہ کتنے وقت میں طے کرے گا ؟	25 منٹ	30 منٹ	35 منٹ	40 منٹ
-17	حل بتائیں: ? = .25 X .25	.250	.O625	.625	.00625
-18	حل بتائیں: $? = \frac{1}{2} + \frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	1	0
-19	بتائیں کہ 15 کس کا 75% ہوگا ؟	75	70	20	25
-20	اگلا جوڑا مکمل کریں (?,9),(42,6),(21,3)	84	48	63	36
-21	بتائیں کہ 24 کا 25% کیا ہوگا؟	4	6	25	12
-22	اگلا عدد بتائیں: ? , 4 , 12 , 60 , 420	360	0	1	.5
-23	اگلا عدد بتائیں: ? , 3 , 4 , 2 , 5 , 1 , 6	1	2	3	4
-24	جذر بتائیں: $? = \sqrt{.09}$	.03	.3	.30	.9