CHAPTER III

REVIEW OF THE RELATED LITERATURE

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CHAPTER III
REVIEW OF THE RELATED LITERATURE

Introduction

It would be in the fitness of things to have a bird's eye-view of the history of the mental testing along with some details about the tests of reading readiness. This would provide a historical background of mental testing as a whole, and would also make it clear for the investigator to foresee the limitations and scope of the study and locate his own problem in the whole area of investigation. It also helps in selecting the proper tools, sample and treatment of data. Moreover, it helps to precise the conclusions of the investigation and to avoid ambiguities. It enables the researcher to find out related problems for further study.

Consequently, it has been attempted to review the related literature akin to the present study.

The present study has two major objectives. Its first objective is to develop a test to measure general ability. The second one is to take up an investigation into the role of general ability in relation to reading readiness of the pre-primary school children. Thus, keeping in view the nature of the present work, the review of the related literature has been undertaken in two parts:
1. Review of the work done in Mental Testing

Measurement of general mental abilities remained prevalent ever since the dawn of history. Hence, an attempt has been made to review the related literature on general mental ability under two broad divisions: like (i) The Pre-Scientific Stage, and (ii) The Scientific Stage.

3.1 The Pre-Scientific Stage

In 1772, Lavater wrote his essay on Physiognomy, 'Destined to make man known and loved', in which he stressed upon an examination of facial features and expressions to judge the disposition and capacities of the mind. But, in 1809, Sir Charles Bell, in his book "Anatomy of Expressions" discarded Lavater's theory.

In 1807, F.U. Call advocated phrenology as an index of the capacity of the mind but this method, too, was found futile. Casare Lombroso advocated that the visible deformations of the body, particularly of the head, had direct connections with the mind. His doctrine was dealt with a blow on the publication of 'Head Growth in Students' in 1886, by Sir Francis Galton. In 1906, Karl Pearson, too, gave a convincing proof against the physical methods of inferring the mind.
In France, during the first half of the nineteenth century, some work was done in more accurate differentiation among individuals with regard to mental abilities. Jean Esquirol (1772-1840) made explicit the distinction between mental deficiency and mental illness. He also distinguished among the several levels of mental deficiency. Esquirol correctly discerned the fact "that development and use of language is one of the most useful and valid psychological criteria for differentiating levels of mental deficiency."1

This observation was considered the major aspect of mental ability by numerous psychologists among whom the late Lewis M. Terman, the principal author of the standard version, is especially noteworthy.

Galton was the first person to conceive and put into practice the idea of measuring intelligence by sensory discrimination.

"Galton was influenced by traditional associationism of philosophical origin and by the physiological psychology of Alexander Bain...

\[\ldots\] The former source of theory led to an emphasis upon measurement of sensory functions, and the latter led to an emphasis upon measurement of motor qualities."2

In 1879, Wilhelm Wundt along with Fechner established the first psychological laboratory at Leipzig and gave an experimental turn to psychology. James McKeen Cattell of Columbia who was first among the students of Wundt, established a laboratory in Pennsylvania in 1883. He did a pioneer work in U.S.A. in instituting a series of mental measurements, some of which were based on memory and simple judgement along with those of sensory discrimination and motor movement. It was he who suggested the term 'mental test' which was to become a trade mark for the whole measurement movement.

This development met an early debacle by Wissler's crucial work on test scores of Columbia students reported in 1901. From this study, it was discovered that, while measuring 'pure' characteristics, the new tests seemed to have no relation to significant human behaviour. Again, the outcome of sharp study at Cornell University, could not help at all to revive a 'budding young test movement that had hardly got off the ground'.

Jastrow prepared tests involving touch, vision, memory and reaction time. Boas made tests for physical measurement of children and obtained teacher's estimates. Gilbert gave tests measuring height, weight, lung capacity, sensation,

memory, suggestibility, etc. Kraepelin and Ochrn, in Germany, developed tests to measure perception, memory, association and motor function. Muensterberg developed more complex and varied tests, introducing speed factor, based on loud reading, and naming colours, plants, minerals, cloth, food, parts of the body and geometrical figures.

In India too, a variety of puzzles and conundrums were set before the scholars and officers in the courts of Hindu Kings and 'darbars' of Muslim Kings expecting instant solutions from them. The person giving immediate answer was regarded as intelligent.

Thus, the early movements in measurement of mental ability could be traced out, but the experiments were not perfectly scientific. The objectivity in testing was, still to emerge, still however, the outline of the pre-scientific stage provides a background to compare the early efforts of psychological testing with scientifically developed testing.

3.2 The Scientific Stage

The cry for intelligence was acutely clamant in the first decade of the twentieth century. The prevailing situation of that time was rightly remarked by Ballard:

"While the teacher tried to cultivate intelligence and the psychologists tried to measure intelligence, nobody
A scientific study of the general ability began in the twentieth century, on the work of a French psychologist, Alfred Binet. A history of mental testing is in large part a history of the Binet's Test, its antecedents and its descendants. He was a pinnacle among mental testers. He was concerned with obtaining insight into real behaviour and did not restrict himself to 'pure' measures. He tried many and varied approaches including recall of digits, size of cranium, hand writing analysis and palmistry.

"The results, however, led to a growing conviction that the direct even though crude, measurement of complex intellectual functions was the best solution."5

In 1904, the Minister of Public Instruction Commissioned Alfred Binet and Theodore Simon, a medical doctor, to find a procedure for determining how to segregate the slow learner in the schools of Paris. The first Binet-Simon Scale was published in a Paris Journal L'Ann'ee Psychologique, in 1908.


Binet and Simon stated that:

"The objective of the first Binet scale was then a discrimination between normal and mentally deficient children by a more direct method, to supplement or to replace the less certain physical, social and educational signs of retardation."  

This scale of 30 tests arranged in order of difficulty tentatively served its purpose and enabled the testers to separate the subnormal children from the normal ones in a more objective manner than had been possible before.

In the light of suggestions offered by several psychologists, Binet and Simon, in 1908, again reconstructed a new scale, which consisted 59 items. These French pioneers did set a pattern of standardization after individual examination of 203 Paris school children between ages of 3 and 13 years by 1908 scale. This new scale was helpful in classifying the individuals according to their ability and the concept of 'mental age' was employed for the first time. "This discovery, simple as it now appears to us, may be likened to the invention of the first rolling wheel which has enabled us at the present time to construct the most smoothly moving motor cars."

The 1911 scale which included 54 tests extending from 3 to 15 years with 5 tests at the adult level. A few test items were dropped, and a few others were transferred to suitable age groups. The method of scoring was also modified.

"Binet, the synthesizer and the originator, provided the original major impetus to study of individual differences by means of standardized tests. Since 1911, revisions and adaptations of his scale have been made in a number of countries." 8

Goddard (1911), Kahlmann (1912, 1922 and 1939), Yarkes, Herring (1922) and Terman (1916) in U.S.A., Cyril Burt (1928) in England, Bobertag in Germany, Ferrari in Italy, Decroly and Degand in Belgium, all engaged themselves in further application and revision of the scale.

In 1937, Terman and Merrill brought out a new revision of Binet Scale, having two equivalent forms L. & M, each of which contained 120 tests as compared with the 90 tests in the first revision. It extended downward to the level of age two and upward through three levels of superior adult known as superior adult I, II and III.

As Brown states, "When making a decision regarding the desirability or revising an existing test, a test

constructor must consider the advantages of a revision e.g. eliminations of obsolete materials, utilization of new techniques of test construction etc., and then weigh these against the disadvantages of such a revision e.g. the time and cost of the revision, and the rendering irrelevant of much of the normative, validity, and experimental data about the test.  

In 1960, revision of Stanford Binet Scale more effective items have been retained and rearranged and deviation IQ has been introduced.

Cronbach says,

"The latest revision of (1960) combines the best tests of the 1937 revision into a single form L-M and improves and uptodates the scoring system. In all parts of the world, there have been other versions, taken directly from the Binet test as one of the Terman revisions."

There are two main limitations of Binet's tests:

1. Being verbal tests, they cannot be administered to the illiterate, deaf and mute, and

2. Being individual tests, they consume a great deal of time.


To minimize these limitations, two types of tests have been developed. They are:

1. **Performance Tests**, and
2. **Group Tests**.

### 3.3 Performance Scales or Tests

According to Mehrens and Lehmann,

"A test is called a performance test if the tasks involved demand a manipulation of objects (e.g., making geometrical configurations with blocks) rather than oral or written response."\(^{11}\)

This type of test is most helpful in assessing the level of intellectual functioning for people who have language disabilities, deafness, blindness etc., and also very fruitfully used in clinical psychology to detect feeble-minded children.

A few performance tests have been included in the Stanford-Binet Scale and in the Wechsler Scale. Common examples of performance tests are Mankin Test, Koh's Block Design, Form-board tests, Porges Maze Test, Cube Imitation Test, Substitution Test, Picture Completion, Draw a Man Test, Knox cube Test and so on.

"General mental ability of inferior and younger children are better measured by the performance tests than older and superior children."

Some of the widely used performance tests are described below:

i. The Pintner - Paterson Scale of Performance Tests (1917). It was revised in 1937. There are 15 sub-tests and are applicable to the age group between 4 and 16. It is a point scale. In most of the test items speed is regarded as an important factor. Percentile scores have been calculated for each level.

ii. Arthur Point Scale of Performance Tests. (1930, revised ed. 1947). It can be applied individually. It is suitable for ages from 4 1/2 years to superior adults. There are 10 sub-tests in this scale. She adapted a few sub-tests and restandardized them. She introduced the Porteus Mazes, the Koh’s Block Design test, various forms boards and block counting tests. It is very popular in the elementary schools. It is a point scale.

iii. Cornell-Coxe Performance Ability Scale. There are 6 sub-tests and one "optional substitute for the third" sub-test.

iv. Pintner General Ability Test: (Non language series).

v. Draw-a-Man Test of Goodenough. This is a new type test and has been found to be very useful by many. In this test the subject is asked to draw a picture of a boy or of a girl on a piece of paper with a pencil from his imagination. Clinical psychologists may use this test in order to get some idea about the emotional troubles of their patients.

vi. Alexander's Pass Along Test: Concrete intelligence of a subject can be determined by this test. A few rectangular blocks coloured red and blue, nine test cards and three trays of different sizes are there in this test. Definite time limits and scoring for preparing each test card are pre-determined.

Wechsler Scales

The Stanford Binet Scale has certain drawbacks as a measure of adult intelligence. In the scale, the items developed for children have been inappropriate for adults. Then, the use of mental age concept is of a questionable utility with adults and, thirdly, the available normative data were collected on children and not on adults. Therefore, in 1939, David Wechsler, a psychologist of Bellevue Hospital in New York, developed an individual intelligence test strictly for adults.
In first presenting this scale, Wechsler pointed out that previously available intelligence tests had been designed primarily for school children and had been adopted for adult use by adding more difficult items of the same kinds. The content of such tests was often of little interest to adults. Many test items, written with special reference to the daily activities of the school children, clearly lack full validity for most of the adult subjects. As Wechsler expressed it,

"Asking the ordinary housewife to furnish you with a rhyme to words, 'day', 'cat' and 'mill' or an ex-army sergeant to give you a sentence with words, 'boy', 'river', 'ball' is not particularly apt to evoke either interest or respect." 13

It was to meet these various objections that the original Wechsler-Bellevue Scale Form - 1 was developed. In 1947, he added a second form, Form 1 completely revised and restandardized, was published by the Psychological Corporation in 1955 as Wechsler Adult Intelligence Scale (WAIS). "This scale was designed to test the intelligence of adults from 16 to 75 years, a correction for "deterioration" being applied to scores of examinees at the upper end of the age range. There are 11 sub-tests of the WAIS - six verbal and

five performance tests - comprising different type of tasks. Within each sub-test, the items are arranged in order of increasing difficulty it takes approximately one hour to administer."  

The Wechsler Intelligence Scale for Children (WISC) - a downward extension of the Wechsler-Bellevue Scale Form-I - was published in 1949. It is designed for ages 6-16 years. In 1967, the third member of the Wechsler family of tests, the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) was published for the ages 4 and 6 1/2 years. For all the tests, Wechsler has computed Deviation IQs having a mean of 100 and a standard deviation of 15.

3.4 Group Tests of General Ability

Group tests are preferred to individual tests because of their practicability, acceptability, availability of trained personnel, economy of time and money. Now-a-days teachers, parents and other members of the society accept group tests of intelligence as valid psychological tests. In various fields, such as in the army, navy, research, industry and commerce, group tests are very generously applied.

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Group tests can be verbal, non-verbal, or mixed type. They were first used by the committee under Yerks in U.S.A. during the first world war to classify the recruits. Then Otis, Thorndike, Pyle and Pinter started mental testing in group. Two types of tests were prepared by the army psychologists known as The Army Alpha (verbal) and The Army Beta (non-verbal) tests.

After the first world war, the use of group tests became common for other purposes. A few details about the noteworthy group tests are as follows:

i. **Army Alpha Examination** (1916-1939): It can be used in secondary schools and it can also be administered to adults.

ii. **Army General Classification Test (AGCT)** (1945): It was developed during the world war II. The items of the test were based on vocabulary, arithmetic, reasoning and the arrangement of block counting.

iii. **Otis - Lenon Mental Ability Test:** (1967): It is composed of a variety of items to measure general mental ability. The six levels of tests extended from primary I through Advanced Grade 10-12.

v. **Cognitive Abilities Test**: This series of tests, published by Houghton Mifflin Company (by R.L. Thorndike and E.P. Hagen, 1971), is a successor to the Lorge Thorndike Intelligence tests. It consists of primary Battery, for kindergarten through grade 3 and Multi-level Edition for grade 3-12. The four sub-tests at each level - oral, vocabulary, rational concepts, multimental and quantitative concepts - take 12-16 minutes each.

vi. **Henmon-Nelson Tests**: The Henmon-Nelson tests of Mental Ability, 1973 Revision (by M.J. Nelson, T.A. Lamke and J.L. French; Houghton Muffin) cover four grade levels; grade 3-6, 6-9, 9-12 and kindergarten through grade 2.

vii. **Progressive Metrices** (1938, 1947, 1951): They were prepared by J.C. Raven and H.K. Lewis. They are non-verbal tests for age group 5½-11.

viii. **Pinter General Ability Test** (1931, 1941): The test includes separate language and non-language items. They can be used for grade 4 to 9.

ix. **Terman - McNemor Test of Mental Ability** (1940-1949): It is a verbal test, testing reasoning and information. It can be used for grades 7 to 12.

x. **Primary Mental Abilities Test** (1963): It is meant for grades K.G. to 12. It consists of items measuring
verbal meaning, spatial ability, perceptual ability, number ability and reasoning ability.

**SRA Tests of General Ability (TOGA) (1960):** The tests have been developed by J.C. Flanagan for grades K.G. to 12. It eliminates school learned skills. The tests consist of two sub-tests viz., information and reasoning. All the test items are in pictorial form.

### 3.5 Infant and Pre-school Tests

As one of the main objectives of the present study is to construct a general ability test for pre-primary school children, it is particularly necessary to review such type of literature.

"The youngest age at which it has been proved feasible to employ group tests is kindergarten and the first grade level." 15

At pre-school ages, individual testing is required in order to establish and maintain rapport as well as to administer the oral and performance type of items suitable for such children. All tests designed for infants (0-1½ years) and pre-schoolers (1½-5 years) require individual administration. Testing can be difficult because of their short

attention span and susceptibility to fatigue. Young children frequently lack motivation to pursue the test tasks. Preschool testing is a more highly interpersonal process.

A few details about the infant and pre-school tests are as follows:

i. **Gesell Developmental Schedule** (Gesell and Amatruda, 1947): These schedules are employed in assessing the level of behaviour development in four areas viz., Motor behaviour, Adaptive behaviour, Language behaviour and Personal-Social behaviour.

ii. **The Oseretsky Tests of Motor Proficiency** (1923): They were originally published in Russia and were subsequently translated into several languages and used in a number of European countries. The age range covered by the original tool was from 4 to 16 years. It covers all major types of motor behaviour, from postural reactions and gross bodily movements to finger coordination and control of facial muscles.

iii. **Lincoln-Oseretsky Motor Development Scale** (1955) covering only ages 6 to 14, having 36 items.

iv. **Cattell Infant Intelligence Scale**: This scale was developed as a downward extension of the 1937 Stanford-Binet, Form-L.
v. Bayley Infant Scales of Development (1968): It is a revision of California First-Year Mental Scale.

vi. Merrill-Palmer Scale of Mental Tests (1931): It covers age-group from 18 months to 6 years.

vii. Columbia Mental Maturity Scale (1953): Covers the age-range 3 to 12. Each item consists of three or more drawings printed on a large card.

viii. Draw-a-Man Test: Good enough developed it in 1928 for the children between 1 and 10 years.

ix. Point-Scale of Performance Tests (1925, 1947): The tests are meant for ages 4½ years to adult.

x. Valentine Intelligence Tests for Children (1945, 1953): The test is meant for the children of ages 1½ to 15, it is a British scale combining items from well-tried sources and a superior test for the children of pre-school ages.

3.6 Review of Some of the useful General Ability Tests (Abroad)

(A) Otis-Lennon Mental Ability Test

This test is in two forms J & K for two levels, viz., Primary I (K.G.) and Primary II. The whole test takes
approximately 25 to 35 minutes and is administered in two sessions.

There are 23 classification items (pictorial, geometrical) in part I, and 32 items in part II. The items are designed to measure verbal concepts, quantitative reasoning, general information and ability to follow directions. Alternative form reliability is 0.87 and split-half reliability is 0.90.

(B) Lorge-Thorndike Intelligence Tests

The tests are meant for the children studying in K.G. to the students studying in Standard XII. They have five levels: K-1, 2-3, 4-6, 7-9, 10-12. Each level is in two forms with five verbal and three non-verbal test items. The verbal tests include vocabulary, sentence, completion, arithmetic reasoning, verbal classification and verbal analogies.

In the second level, test-items include figure-classification, number series, and figure analogies. The time consumption is 35 minutes for the verbal test and 27 minutes for the non-verbal test. The scores are expressed as deviation I.Qs. Age Norms and Percentile Norms are provided.

Test-retest reliability co-efficient for verbal battery is .93 and for non-verbal battery is 0.85, odd-even reliabilities are .95 for verbal and 0.92 for non-verbal battery and correlation between the two batteries is .74.
Cattell Culture-Free Test and Culture-Fair Test

1. Cattell Culture-Free Test\textsuperscript{16} measures mental ability free from verbal materials and from 'acquired skills of most performance test'. It has six parts: classification, pool reflection, completion, horizontal sequence, vertical sequence and rhythms or circles.

The split-half 'r' is .88 and correlation of each part-score with the total score varies from 0.35 to 0.82.

2. Cattell Culture-Fair Test\textsuperscript{17} is available in three levels: (i) for ages 4 to 8 and mentally retarded adults, (ii) for age range 8 to 13 and average adults, and (iii) for standards X to XII students and superior adults. All the levels have 8 test items. The four sub-tests have culture-free items: series, classification, matrices and conditions.

The split-half and test-retest 'r' are .70 and .50 respectively.

\textbf{References}


(D) **Pinter General Ability Tests**

The battery of general ability tests has been designed for kindergarten children, Grade 2, 2-4 and 4-9.

Pinter-Cunningh Primary (K-2) consists of 7 sub-tests: common observation, perception of aesthetic difference, identification of associated objects, discrimination of size, perception to make whole, picture completion and copying design.

Co-efficient of correlation between the alternative form A and B vary from .83 to .94. Grade 4-9 tests consist of verbal and non-verbal test items. Each type requires about 45 minutes for administration. There is a significant relationship between verbal and non-verbal tests.

(E) **Flanagan's Tests of General Ability (TOGA)**

TOGA is a non-verbal pictorial measure of intelligence designed to be independent of reading, arithmetic and other scholastic tasks.

It has several levels K-2, 2-4, 4-6, 6-9, 9-12. Flanagan's test has two parts: viz., (i) reasoning type test items and (ii) information type test items.

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The split-half reliability co-efficients vary from .80 to .90. Correlations between Part I and II range from 0.25 to .67 for different levels with a median value .43.

3.7 Development of General Ability Tests in India

Herbert Rice was the first man to translate Binet Scale in Hindi in 1922. In 1927, Maury adopted verbal group tests in Hindi, English and Urdu. Jha adopted Mental Tests in Hindi in 1934. Kamat adopted the Stanford-Binet Tests in Marathi and Kannada in 1934. After independence several tests of general ability have been developed in India by Bora, Ahuja, Yadav, Pathak, Oak, Pramlata, Sharma, Durai, Rao and others. The tests developed particularly in Gujarat for Gujarati speaking children have been shown separately in the pages to follow.

3.8 Development of General Ability Tests in Gujarat

Testing movement in Gujarat State also needs a special mention. Gujarat is one of the states in India, which came into existence as a separate state, with its own major dialect, Gujarati, which has remained as a common thread through all the districts of this big state. So any test, whether it is verbal or non-verbal test, has not remained restricted to any particular district, but has become a test for the state. In Gujarat, the movement in mental
testing took momentum after independence. The tests developed in Gujarat State have been listed in the table 3.1 to follow:

Table 3.1
TESTS DEVELOPED IN GUJARAT STATE

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Test</th>
<th>Investigator</th>
<th>Verbal/Non-verbal or Mixed</th>
<th>Std. or Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group Test of Intelligence</td>
<td>K.G. Desai</td>
<td>Verbal</td>
<td>12 to 18 yrs.</td>
</tr>
<tr>
<td>2</td>
<td>Group Test of Intelligence</td>
<td>Desai &amp; Bhatt</td>
<td>&quot;</td>
<td>12 to 18 yrs.</td>
</tr>
<tr>
<td>3</td>
<td>Non language test of Intelligence</td>
<td>D.S. Bhavsar</td>
<td>Non-verbal</td>
<td>12 to 18 yrs.</td>
</tr>
<tr>
<td>4</td>
<td>Group test of Intelligence</td>
<td>C.L. Bhatt</td>
<td>Mixed</td>
<td>V to VII Std.</td>
</tr>
<tr>
<td>5</td>
<td>Non-verbal group test of Intelligence</td>
<td>G.B. Shah</td>
<td>Non-verbal</td>
<td>7 to 13 yrs.</td>
</tr>
<tr>
<td>6</td>
<td>Group test of Intelligence</td>
<td>Lele and others</td>
<td>Verbal</td>
<td>11 to 16 yrs.</td>
</tr>
<tr>
<td>7</td>
<td>Non-verbal Group Test of Intelligence</td>
<td>M.M. Patel</td>
<td>Non-verbal</td>
<td>14 to 16 yrs.</td>
</tr>
<tr>
<td>8</td>
<td>Verbal group test of Intelligence</td>
<td>Jayaben Patel</td>
<td>Verbal</td>
<td>13 to 16 yrs.</td>
</tr>
<tr>
<td>9</td>
<td>Group Test of Intelligence</td>
<td>J.M. Patel</td>
<td>Mixed</td>
<td>13-16 yrs.</td>
</tr>
<tr>
<td>10</td>
<td>Draw a man test</td>
<td>Premila Phathak</td>
<td>Pictorial - Above 6 yrs.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>General Ability Test</td>
<td>M.T. Patel</td>
<td>Non-verbal</td>
<td>VIII-X stds.</td>
</tr>
<tr>
<td>12</td>
<td>General Ability Test</td>
<td>J.Z. Patel</td>
<td>&quot;</td>
<td>V-VII Stds.</td>
</tr>
<tr>
<td>13</td>
<td>General Ability Test</td>
<td>P.P. Patel</td>
<td>&quot;</td>
<td>XI-XII stds.</td>
</tr>
<tr>
<td>14</td>
<td>General Ability Test</td>
<td>R.M. Patel</td>
<td>&quot;</td>
<td>II-IV stds.</td>
</tr>
<tr>
<td>17</td>
<td>Adoption of WISC scale</td>
<td>M.C. Bhatt</td>
<td>Mixed</td>
<td>5-11 yrs.</td>
</tr>
</tbody>
</table>
3.9 **Review of the Non-Verbal General Ability Tests in Gujarat**

The present test being non-verbal in nature, the investigator has attempted to peep into the existing non-verbal group tests of intelligence developed in Gujarat State, presented as follows:

**(A) Non-Verbal Group Test of Intelligence with special reference to the Gujarat State (for the children of Age-Group 7-13) by G.B. Shah in 1964:** The test consists of seven sub-tests. Similarity, classification, Analogy, **\text{b}** *Asurdity*, Progressive series, Substitution code and Picture. The entire test includes 162 items. It is a speed test requiring about 45 minutes for administration. Reliability coefficient range is .92 to .961.

**(B) Performance Tests of Intelligence for Students of Standard II to XI in Gujarat State by L.K. Patel:** It is a performance scale for the school going population in the age range 6+ to 15+ in Gujarat. Different types of performance tests were selected. The final form of the test was given to 400 students, forty in each age group. Intelligence quotients on the present tests were compared with the IQ's on Desai Bhatt group test, Bhatt group tests, Bhavsar non-verbal
group tests, Shah's non-verbal group tests and adaptation of Wechsler scale for children in Gujarat.

(C) General Ability Test for classes V, VI and VII by J.Z. Patel: The test is meant for the pupils of standards V through VII. The test includes two sub-tests: Information and Reasoning. The test items were constructed on the concept defined by Flanagan. It contains 76 items with two practice items in each of the sub-tests. The time-limit for the entire test is 42 minutes. The final form of the test was administered to 6551 pupils of classes V, VI and VII of the schools of Gujarat State.

(D) General Ability Test for classes VIII through X by M.T. Patel: The objective of the study was to construct a non-verbal group test of general ability. The test items measured information and reasoning. The test was meant for measuring individual differences of school going children in general ability. The sample consisted of 6659 pupils of classes VIII, IX and X selected from various districts of Gujarat State. The test items are in pictorial form. The reliability co-efficient of the test ranged from .83 to .97. The factorial study indicated that there was one common factor in the sub-tests.
(E) General Ability Test for classes XI and XII by Pallavi P. Patel: The test is meant for measuring general mental ability of the students of higher secondary schools of Gujarat State. It is a non-verbal group test standardised on a sample of 5763 students. The reliability co-efficient of the test range from .71 to .86.

(F) General Ability Test for the pupils of standard II, III and IV by R.M. Patel: The main objective of the study was to prepare a non-verbal group test of general ability for classes II, through IV of the schools in Gujarat State. The sample consisted of 4502 pupils. The reliability co-efficients range from .84 to .96. The validity indices vary from .57 to .70. The results of the studies of general ability as a predictor of academic achievement of the pupils of classes II, III and IV have been also reported.

(G) Adaptation of the Stanford-Binet Intelligence Scale (1960 revision) for Gujarati population by J.H. Shah: The purpose of the study was to provide an up-to-date adaptation of the third revision of Stanford-Binet Scale (Form L-M) for Gujarati population. A stratified sample taking into consideration age, sex, socio-economic status and occupational division of the
parents as variables was drawn. Ten boys and ten girls in each age group ranging from two plus to eighteen plus having half year intervals from two through five years age levels were selected. The reliability coefficients by different methods is range from .76 to .98. Validity indices by different methods range between .48 to .79. A few additional studies such as sex differences, occupational differences, sibling resemblance and twin resemblance were reported.

3.10 The Case for the Present Test

The need of mental testing is being felt more and more with gradual expansion of education. Looking to the development of tests in advanced countries, work done in India seems to be less. Especially in Gujarat, there is no series of tests available to measure general ability of the children from K.G. to higher secondary classes. Here is an humble attempt by the investigator to provide the missing link by constructing and standardizing a test for the children of pre-primary school and standard first. He feels that it would be an addition to the already existing tests meant for testing the general ability of children.
In the light of the review of the tests available in India and abroad, it was felt that the process of constructing the present test should be visualised in terms of: time limit, number of sub-tests and weightage to the environment aspect. In the words of Anastasi:

"A practical difficulty encountered with separate sub-tests is that less careful examiners may make timing errors. Such errors are more likely to occur with several short time limits than with a single time limit".\(^\text{19}\)

The essence of the above view is that the number of sub-tests should be less and several time-limits should be avoided.

Ebil, Neil and Beuer have the following views regarding the determination of individual's general mental ability.

"The belief that intelligence is completely dependent on genetic influence without appreciable change of environmental factors is now seldom held. The current trend is to give both heredity and environment some of the credit for performance of intelligence tests".\(^\text{20}\)

\(^{19}\) Anne Anastasi (1968), Op. cit., p. 245.

The popular tests of General Ability were found fit in the light of the details given above. J.C. Flanagan has rightly said:

"Items measuring information and reasoning were selected for inclusion in the Tests of General Ability for two reasons. First, it appeared that these two abilities are dominant in most of the definitions of general intelligence. Secondly, a review of the literature indicates that these two abilities usually provide best predictions of school success." 21

Thus, a test should include the most wanted elements. The purpose of including information items in the test is to determine the pupil's familiarity with the world around him which he experiences at home, in the school and community. The reasoning part is culture-free and it tests a pupil's power of abstract reasoning. Abstract reasoning is similar to genetic differences in general ability. These differences are inherited and affect an individual's performance for the whole life.

2. Review of the work done in Reading Readiness

The reviews done in the area consist of the review of the tests developed in foreign countries, in India and

the review of the researches done in the area of the correlates of reading readiness.

3.11 Review of the Reading Readiness Tests (Abroad)

A number of reading readiness tests are available in foreign countries to measure readiness of the child for reading. Some of the widely used tests are summarily stated as follows:

1. **Lee-Clerk Reading Readiness Test (1931)**: This is a group test. It can be administered to ten to fifteen children at a time. It measures the ability to note similarities, the child's vocabulary and concepts and the ability to match the letters with letters and words with words. The test is useful for kindergarten and first grade children. It has a reliability coefficient of 0.97.

2. **Reading Readiness Test, David F. Vetaw, and Peggy Lou Moses, (1957)**: The test is meant for the kindergarten and first grade children. It contains 92 items distributed among 10 logically sequenced sub-tests. A split-half reliability coefficient of .92 is reported.
3. **Analysis of Reading Skill in Reading and Mathematics, Navy C. Rodrigues (1972)**: This is a short test for Spanish speaking children beginning formal schooling. It consists of three brief uncomplicated tests, each containing two pages of five items, viz., visual perception of letters, letter identification and mathematics. The test may be administered individually or to a group of up to fifteen children. Reliability coefficient by Split-half and K.R.-20 are .928 and .912 respectively.

4. **Gates Reading Readiness Tests (1939)**: This test consists of an eight pages booklet which contains all the materials to be put in the hands of the pupils. The test consists of five sub-tests viz., Picture directions, Word matching, Word-card matching, Rhymins, Reading letters and numbers.

5. **The Metropolitan Reading Readiness Tests by Hildreth and Griffitne (1950)**: This is a battery of non-verbal group test of reading readiness. The test items are well constructed and are quite interesting to kindergarten children. It consists of six sub-groups viz., word meaning, sentence meaning, information, matching, number and copying. This
test is used to find out whether a child is matured to undertake the study of reading. Time required is 60 minutes.

6. **Thackray Reading Readiness Profiles (1974)**: These are the first original British reading readiness tests. They are mainly designed for the use with reception class children. But they can also be used for the purpose of diagnosis with older non-readers. They have been standardized on over a sample of 6000 children in U.K. The profiles measure vocabulary, concept development, auditory discrimination, visual discrimination and general ability.

7. **Wood Cock Reading Mastery Tests by Richard Wood Cock**: The tests contain five sub-tests having two forms A and B. They are useful for children ranging from K.G. to grade 12 time limit is 20 to 30 minutes.

3.12 **Review of the Reading Readiness Tests in India**

In India, although attempts have been made to develop some psychological tests and achievement tests in certain school subjects, due attention has not so far been paid to the development of tests in reading readiness except that a few persons have attempted to construct achievement tests in this field on a small scale. So far as reading readiness
tests are concerned, only three of such tests have been constructed, one for Hindi speaking children by Rawat and the second for Gujarati speaking children by Umrajwala, and the third by Krishnamurti in Madras.

The descriptions of which are given below:

1. N.I.E. Reading Readiness Test, D.S. Rawat, (1964): This test is meant to ascertain whether a child is ready to start reading Hindi in the first grade in primary schools. It is also intended to discover the difficulties and weaknesses of the children with regard to skills necessary before the child can start reading. The test consists of the five sub-tests viz., Word Meaning Test, Sentence Meaning Test, Copying Test, Visual Perception Test, and Auditory Discrimination Test. The reliability coefficients of the sub-tests range from .80 to .90.

2. Reading Readiness Test : V.R. Umrajwala. This is an individual non-verbal paper-pencil test for the Gujarati speaking children, having age-range from 3 yrs. 6 months to 5 years 6 months. The test contains five sub-tests namely, Word Meaning, Visual discrimination, Sentence Meaning, Copying and

Auditory discrimination. The test requires 40 minutes to administering and ten more minutes would be required to explain the directions. Reliability coefficients of the test obtained by different methods are ranging between .80 and .95. The construct validity, concurrent validity and predictive validity of the test has been established. The concurrent validity of the test is .63.

3.13 Researches done in the area of correlates of Reading Readiness in India and Abroad

Such type of research has not been conducted to India in the area of Correlates of Reading Readiness. In U.S.A. and U.K. a lot of researches have been done on the factors related to reading readiness. A longitudinal study of Goppingen School Readiness Test found that the correlation with school marks in Arithmetic and German remained constant over a period of four years.

The study done by Hetzer and Tent using Binet test in an investigation with thirty-three children found a correlation of 0.74 between results obtained in the Weilburg School Reading Readiness Test and the Child's I.Q.23

Besides this, another similar study of Ye taw and Burdine (1957) reported correlation of .74 between IQ's and the raw point scores on their reading readiness test.

Morphett and Washburne\(^2^4\) studied the reading achievement of the first grade children in relation to their mental age. The study revealed that there was a sharp upward rise in achievement for the group from 6-0 to 6-5.

"Further more, certain pre-reading skills are closely related to general intellectual ability. Test of vocabulary and picture interpretation for example, are included in the Revised Stanford-Binet Scale at several levels as a part of a composite picture of intellectual maturity."\(^2^5\)

Lennon (1950)\(^2^6\) particularly emphasises the great difference in the correlations between reading ability and intelligence which occur at various grade levels. He found continuously increasing correlation from .34 for the second grade to .85 for the eighth grade. This finding is also confirmed by Manolakes and Sheldon (1955) and Bond and


\(^2^5\) Ibid., p. 39.

Tinker (1957), in their studies, that the level of intelligence determines the level of reading ability.

In more recent studies both by Malmquist (1969) in Sweden and Vormeland (1967) in Norway have reaffirmed the high correlation between general intelligence and reading ability. Malmquist (1970) concludes in his research that the relation was of such an order of magnitude that it definitely confirms the almost unanimous view expressed by previous investigators that intelligence is an important factor in the development of reading ability. 27

As in India, a matter of fact, a very few researches have been conducted on the reading ability and reading readiness. Not a single study tally with the present study, comprising an investigation into the role of general ability in relation to reading readiness of pre-primary school children with the help of his newly constructed and standardized tool.

Thus, this chapter has the details regarding the history of mental testing, different tests evolved in India and abroad and studies conducted in the areas of reading readiness.

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27. Ibid., p. 51.