Major characteristics of intelligence tests developed in India have been reported in the first part of this chapter. In the second part an attempt has been made to draw research implications for further work in intelligence testing.

Pareek (1965) has listed a large number of studies on the construction of intelligence tests in India. For review purposes, however, only those studies have been included here which have either been published in research journals or for which details regarding psychometric properties are available to researchers.

Perhaps Rice (1929) was the first person in India who attempted the standardization of the Binet-Simon Intelligence Scale for Indians. His adaptation commonly known as Hindustani Binet Performance point scale consists of 35 items (9 verbal and 26 non-verbal). The scale was standardized on 1,070 Urdu and Punjabi speaking school boys in the age range of 5-16 years. Point scale norms, mental age, and Hindustani Intelligence Quotient (HIQ) have been reported. The scale is reliable to the extent of 0.73 (N=332) by split half method and 0.83 (N=144) by retest method. Validity was established against school marks which ranged from -0.60 to +0.46 for different subjects and against teachers' estimates ranging from -0.83 to +0.36.

Kamat (1940) adapted the 1917-Standard-Binet tests in Marathi and Kannada. Norms were worked out on a sample of
1,074 boys and girls. Validity established against teachers' estimates was reported to be 0.50. This test was later on translated into Gujarati by Shukla (1948) and standardized on 1,247 Gujarati speaking children of Bombay area.

The Hindi adaptation of the Stanford-Binet Test of intelligence (L form) was attempted by the Allahabad Bureau of Psychology (1966) for the age range of 2 years to superior adults.

Terman-Merrill Individual Scale of Intelligence was adapted in Hindi by the Central Institute of Education (1966) for the age group 3 plus to 15 plus. The standardization sample consisted of 1250 children. The internal consistency of the scale was established by studying the item-total correlations which ranged from 0.30 to 0.89; median being 0.66. The score on the scale showed a tendency to increase with increase in the age. This was taken to be an evidence of the validity of the scale.

Besides Binet's model Koh's, Alexander's, Goddard's and Wechsler's are some of the other models of individual intelligence scaling which have attracted the attention of Indian research workers.

Local norms for the Koh's Block Design test were developed by Srivastava (1965) for Gorakhpur and Desai (1954) for Gujarat. For Alexander's Passalong test Kumariah (1955), Shah (1957) and Sareekh (1965) established local norms for Mysore, Rajasthan and Uttar Pradesh respectively.
Bhatia (1953) attempted a battery of performance tests incorporating the Koh's Block Design and Alexander's passalong tests. The standardization sample consisted of 642 school going boys and 512 illiterate boys in the age group 11-16 years. The reliability of the test was found to be 0.85 for literates (N=135) and 0.84 for illiterates (N=103). For literates the battery was validated against teachers' opinion which was found to be 0.70. For illiterates general opinion held in the village about the intelligence of the boy was taken to by the external criterion which correlated with test scores to the extent of 0.72. Separate norms for literates and illiterates have been reported.

Patel (1966) developed an abridged form of the Goddard's Form Board test by adapting it for Gujarati children in the age group of 6-10 years. The standardization sample consisted of 430 pupils. The retest reliability was found to be 0.66 and the validity against examination marks 0.52.

Mukerjee (1960) attempted a preliminary item analysis of the adapted version of Wechsler's Individual Scale of Children (WISC) for Gujarat children. Most of the items showed discrimination power of more than 0.20. The KR reliabilities for different sub-tests ranged from 0.60 to 0.80.

The only other reported study on WISC is that of Malin (1964). He abandoned the technique of standard scores of Wechsler and converted raw scores directly into IQs for interpreting the obtained raw scores. The retest reliability of his
adaptation of WISC was 0.92. The validity against school rankings was found to be 0.61 and against the Draw-a-man test 0.63.

For group tests of intelligence adaptations of Draw-a-man, NIIP, Raven's Progressive Matrices and Jenkin's Non-verbal test have been attempted by Indian researchers. Among these, Draw-a-man test model has been followed more often. Phatak (1956), Patel (1955), Shah (1957) and Shrimali (1966) adapted Goodenough's Draw-a-man scale for various age groups ranging from 4 plus to 15. Phatak standardized the scale for Gujarati children in the age group of 6-10 years and devised a new scoring technique. The retest reliability and validity against Kamat's test of intelligence were reported to be 0.82 and 0.51 respectively. Patel's adaptation covered the age group of 4-12 years. The retest reliability and validity against examination marks were found to be 0.64 and 0.51 respectively. Shah applied Draw-a-man scale on the city children of Gujarat in the age group of 6-10 years and also developed the age and grade norms based on a sample of 3,000 children. He found the retest reliability to be 0.89 and validity against teachers' ratings 0.62.

Shrimali's adaptation covers children of Mewar region in the age range of 6-15 years. His standardization sample consisted of 2,374 children. The retest reliability figures of 0.77 are based on a sub-sample of 70 only. Correlation with Menzel's general intelligence test based on a sub-sample of 229 was found to be 0.55.
Nafde (1961) and the Allahabad Bureau of Psychology (1966) worked on NIIP non-verbal group test of intelligence. Nafde's test was based on NIIP 70/23 and DAT abstract reasoning. Although the standardization sample consisted of 6,654 school and college students of science, arts, engineering and medicine, the psychometric properties were worked out on a sub-sample of merely 81 children. The split half and retest reliabilities were found to be 0.88 and 0.91 respectively. The validity against school marks for various sub-tests ranged from 0.35 to 0.54. The test has been reported to be unifactor one. Age norms for boys and girls of Bombay were also developed.

The adaptation of NIIP test by the Allahabad Bureau mainly involved the revision of norms for the classes VIII, X and XII. Standard score norms for these classes were also worked out.

Adaptations of Raven's Progressive Matrices test for Indian children were attempted by the Allahabad Bureau of Psychology (1966), Desai (1958) and Rath (1959). In the Allahabad study a sample of 1638 students was drawn from higher secondary schools of U.P. The adapted test demonstrated correlations to the extent of 0.60 with Pidgeon, 0.50 with NIIP 70/23 and 0.49 with Mohsin's VIT. Norms were also worked out for classes VIII, X and XII in the form of standard scores. Desai developed local norms for school children in Gujarat and Rath standardized this test for college students.

Jenkin's non-verbal group test of intelligence was adapted by the Central Institute of Education (1966) for the
ages 10 to 14 years. A sample of 3,315 children were used for standardization purposes. The split half reliabilities for various sub-tests ranged from 0.89 to 0.96 and by a retest varied from 0.83 to 0.94. The validity established against teachers' estimates ranged from 0.23 to 0.49 for different sub-tests. Against C.I.E group test of intelligence from 11 plus to 13 plus validity coefficients varied from 0.53 to 0.71. Age and grade norms in terms of standard scores were also reported.

Besides adaptations of foreign tests some research workers developed their own tests as well. Desai (1954) constructed a battery of tests in Gujarati for the ages 13 to 18 years corresponding to standards VII to XI. His standardization sample of 9,505 students was representative of the Gujarati speaking children of the erstwhile State of Bombay. Age-wise and grade-wise distributions of IQs were worked out. The retest reliability for a sub-sample of 400 was 0.77 and the split half 0.94. The correlation of IQ scores was 0.42 with examination marks, 0.53 with teachers' estimates and 0.82 with Shukla's (1948) adaptation of Stanford-Binet Scale.

Jalota (1953) developed a verbal group test of general mental ability in Hindi for the age range 12 to 16 years. The test was standardized on 1,341 students of grades VIII to XI of Banaras city. The KR reliability was found to be 0.94 and the validity against examination marks for various sub-tests ranged from 0.50 to 0.78. He also reported the centile norms and Mental Age conversion tables.
Khuddus (1957) attempted a verbal group test of intelligence in Telugu for 10-15 years children. His split half reliability of 0.97 and contingency coefficient with teachers' estimate of 0.63 are based on a sample of 270 only.

Lele and others (1966) developed a group test for children 11 to 16 years old. The test was standardized on a sample of 14,258. The retest reliability figures range from 0.65 to 0.88 for various ages. The validity against Desai's test, Progressive Matrices and teachers ratings calculated age wise vary from 0.30 to 0.80.

Mehta's (1962) group test of intelligence in Hindi for the children 12-14 years old was standardized on a sample of 1,800 children. The KR-21 reliability for various age groups ranged from 0.31 to 0.90. The validity of 0.44 was established against total school marks.

The verbal group test of intelligence developed by Mohsin (1966) is in Hindi for age group of 10-16 years standardized on sample of 1,270 children with split half reliability 0.95 and retest reliability 0.89. The test is correlated to the extent of 0.56 with examination marks, 0.54 with Menzil's general intelligence test, 0.63 with Terman's arithmetical reasoning test and 0.56 with Progressive Matrices test. Percentile norms and deviation IQs for the age group 14 and above have also been reported.

Satyanand's (1966) group test in Kannada language for 8-12 years children was standardized on 3,067 students. The reported split half reliability is 0.93 and by rational
equivalence 0.89. The validity against teachers' ratings is reported to be 0.62 and 0.73 against terminal examination. The mean scores on the test show a tendency to increase with age. Grade norms have also been worked out.

Sohan Lal (1948) and Rao and Dani (1966) constructed verbal group tests in Hindi for 11 years old and 13-21 years old respectively. For Sohan Lal's test split half reliability of 0.94 was based on a sample of 1419 eleven year old school children of U.P. For Rao and Dani's test the split half reliability is 0.94 and by retest it is 0.91. None of these have reported information on validity except the steady increase of mean score from one age to another in the case of Rao and Dani.

Mitra's (1959) test is the only reported non-verbal group test of reasoning ability standardized on a sample of 581 in the age range 15-35. The KR reliability for a sample of 581 was found to be 0.81 and by spearman-Brown formula 0.79 for a sample of 388 cases. The test is validated against Raven's Matrices, Revised Minnesota Paper Form Board, Desai's and Dave's tests and examination marks. Correlation coefficients range from 0.73 with Dave's test to 0.85 with Paper Form Board.

Some educational institutions and research establishments have also contributed in the field of cognitive test development in general and intelligence in particular.

The Central Institute of Education has developed a number of verbal group tests of intelligence separately for
11 plus through 16 plus. The split half and retest reliabilities of these tests vary from 0.73 to 0.97. The validity coefficients vary from 0.33 to 0.77 with respect to different tests. For each test separately standard score norms for boys and girls have been provided.

The Bureau of Psychological and Educational Research, Calcutta constructed a battery of verbal and non-verbal group tests for the use of guidance workers. The battery was standardized on a sample of 1,347. The split half reliability was reported to be 0.97 and the validity against the examination marks in Bengali and Mathematics varied from 0.17 to 0.65 with an average of 0.46.

The Directorate of Psychological Research of the Ministry of Defence developed a number of non-verbal and verbal (English) tests of Intelligence for adults for selection purposes. Full details of these are, however, not reported for reasons of secrecy.

The Allahabad Bureau of Psychology and the Guidance Bureau of Andhra Pradesh have also developed several verbal group tests of intelligence in Hindi and Telugu respectively for the age range 10-16 years. Details about reliability and validity of these tests have not been reported by these institutions.

Among the group tests of intelligence for adults besides Mitra's (1959) Series Completion Test other reported attempts for adults are that of Roy (1968) and Dhall (1966). Roy attempted an adaptation of sub-tests of Information and Comprehension of Wechsler's Adult Intelligence Scale (WAIS). His sample
consisted of 65 men from Delhi in the age group 16-25 years with minimum of schooling up to Primary stage. The analysis of variance reliabilities for Information and Comprehension sub-tests are 0.90 and 0.88 respectively. The two sub-tests were correlated with each other to the extent of 0.81. The validity coefficients against external criterion of scores on an adaptation of performance scale of WAIS were reported to be 0.31 and 0.46 for Information and Comprehension respectively.

Dhall adapted the sub-tests Similarities and Vocabulary of WAIS on a sample of 460 Delhi students of grade XI. Although WAIS is an individual test but Dhall adapted these sub-tests for group administration. He reported the split half reliabilities for similarities, Vocabulary and Combined tests to be 0.89, 0.82 and 0.83 and the validity coefficients calculated against examination marks were found to be 0.48 and 0.51 (corrected for attenuation) respectively.

II

It is evident from the above survey that some of the authors have taken great pains in developing the instruments whereas many others have left much to be desired in terms of psychometric properties of the tests. The major weakness which runs through most of the reported tests is the nature of sample used for standardization. Very few authors have cared to give details about the procedures adopted in selecting the sample and its characteristics.

Another conspicuous limitation in the reported studies is the faulty validation procedures. Frequently, teachers' ratings,
examination marks and or scores on other tests of intelligence have been used for validation purpose. Theoretically teachers' ratings sound alright for a more intelligent child is likely to do better in school than a less intelligent child and the teachers is perhaps the best person to evaluate child's intelligence. Research evidence, however, goes contrary to the expectation. In fact to counteract teachers' unreliable subjective estimates of pupil's cognitive behaviour Binet Simon tests came into existence. School examination marks as a criterion for validation can also be questioned on similar grounds. School marks are often based on essay type examinations with their obvious limitations of low reliability due to limited sampling of content and highly subjective and variable scoring on the part of examiners. Scores on another test of intelligence as a criterion for validation has its own limitations like the differences in the universe of behaviour covered by the other test, the measuring techniques adopted and different populations used for standardization.

Many tests have reported grade norms which made individual comparisons rather difficult. In any particular grade there are bound to be children of different ages and by having grade norms the likelihood of committing a mistake of comparing a child with other children who may not be of his age is increased.

Majority of the tests surveyed in the first part for the younger ages are group tests. Young children are distractable by nature and have not yet mastered sufficient reading skills.
For these children individual tests are preferable to group tests as the tester can often learn much more about an individual in the individualised situation than what the subject's global score would indicate on a group test. Moreover as stated earlier in an individual test situation the child has to know the correct answer before hand whereas in group test situation specially of multiple choice type he can very often arrive at correct answer on the basis of partial information only. Sometimes he may even mark this or that alternative and some of his markings may prove to be correct and for which he gets credit.

The above discussion thus reflects the need for valid and reliable measures which meet the requirements of different regional groups. This need is all the more intense for children's intelligence tests. Although attempts have been made to either adapt foreign tests or construct fresh tests for children, these attempts suffer from limitations like the ones discussed above. In the present study an attempt has been made to overcome these limitations as far as possible.
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