Chapter VII

SUMMARY

Introduction: In a democratic set-up like ours primary education is a must. It is, however, discouraging that even after 22 years of independence adequate educational facilities have not been provided even to children in the age group 6-14 years who are expected to take up the responsibility of nurturing the growing democracy. No doubt certain States like Kerala and some parts of Maharashtra have recorded remarkable increase in enrolment at the primary stage, but mere increase in number may not be sufficient. Specific educational programmes are needed to suit the requirements of pupils of different abilities. A pre-requisite to implement such programmes is the availability of effective instruments which may help in assessing the ability of the child and thereby aid in identifying bright from the retarded so that educational programmes can be geared to their respective needs. The present study is an attempt to provide an instrument for such purpose. It aims at developing a reasonably valid and reliable scale of intelligence for children in Hindi.

Nature of Scale: For developing the present scale individual form has been preferred to group from mainly because young children have not mastered sufficient reading skills and by nature they are more distractable. Moreover the tester can often learn much more from individual tests than what the mere subjects' score would indicate.
Age-range: Since the development of an intelligence scale, especially the individual one, needs tremendous time and resources, it was restricted to the limited age range of 8-12 years. This age range is significant because children at this stage are screened for scholarships instituted by different agencies and admissions in certain schools.

Tests: The constructed scale has the following tests:

1) Information
2) Comprehension
3) Arithmetic Problems
4) Similarities
5) Vocabulary

Through these tests it is intended to measure (a) ability to perceive logical relations, (b) ability for verbal, numerical and, in general, abstract reasoning, and (c) the extent of general verbal information and general range of one's ideas which are dependent on his ability to learn.

These are different aspects of intelligence and when put together should give a comprehensive measure of verbal intelligence.

Item-writing: For developing items for various tests specifications were laid down for behaviours to be covered under each test. Developed items were discussed with experts in the field of intelligence testing to ensure the content validity of the tests. A pre-tryout was also conducted on 5 children of markedly different abilities mainly to see the language aspect of items. In the light of the discussions
Try-out study: Try-out study was conducted on a sample of 210 children selected from Delhi schools. The stratification of the sample was done on the following variables:

1) Geographical location i.e. rural/urban
2) Sex
3) Types of schools
4) Parental occupation

Following the regular testing procedures all the five tests were administered to children individually and responses recorded verbatim on the response sheet designed for the purpose.

Scoring: For information, Arithmetic Problems and Vocabulary tests usual scoring model of 0 and 1 was adopted. In Comprehension and Similarities where credit was given for partially correct responses also the scoring model of 0, 1 and 2 was resorted to. Detailed guidelines for scoring were developed in consultation with experienced persons in the field of intelligence testing.

Item analysis: Total scores on each test separately were considered as internal criterion for finding out discrimination indices. After computing pass percentages in extreme groups for each item the value of the index was read off from the Flanagan's tables. For Comprehension and Similarities, however, where scoring is 0, 1 and 2 type, item-total correlations were also obtained to see whether the items discriminate at 0, 1, and 2 levels since 1 and 2 both were considered correct while computing indices on the basis of extreme groups. Discrimination
of at least 20 was considered as minimum for any item to be selected for final form. Scores on a non-verbal test of intelligence were taken as external criterion and discrimination indices for all items were obtained to provide additional evidence for their discrimination ability.

Difficulty indices for total age range and for each age level separately were computed for each item. Only those items which showed increasing trend in paws percentage with age were considered for selection. While selecting items for final form specifications laid down at the time of developing the items for various tests were kept in view to have better sample of behaviour.

Reliability: Reliability of tests in the scale was estimated by the Cronbach's general formula (\( \alpha \)) of which KR-20 is a special case when scoring is 0 or 1. The obtained values range from 0.8020 to 0.9312. An estimate of the reliability of the total scale was obtained by using Mosier's formula. It was found to be 0.9639. Standard error of measurement was also computed to know the probable extent of error in any score.

Validation: Tests in the constructed scale have been validated by following the construct-validity approach. Mean scores for the eight age groups show a consistent upward trend with age. This is true for all the five tests. When analysis of variance technique was applied it became evident that these
differences in mean scores could not be due to sampling fluctuations and might be attributed to the intellectual ability which tends to increase with age.

An attempt was made to study the extent of relationship between the constructed scale and the non-verbal test scores which were used as external Criterion for item analysis purpose. Each of the five tests as well as the total scale were correlated with the non-verbal test. The obtained correlation coefficients were highly significant and they ranged from 0.5130 to 0.6573.

Internal-Structure: The inter-test correlations at all the four age levels are positive and highly significant. It may thus be inferred that different tests in the scale tap similar mental functions. Correlations of various tests with total score on the scale are also significantly positive. Among individual tests the Vocabulary test correlates the highest with the score on the scale and this is true for all age levels.

Centroid method of Factor Analysis was applied and first two factors extracted for the three inter-test-correlation matrices for age levels of 8-9, 11-12 and for total age range 8-12. For all the three matrices first factor accounted for more than 70 percent of total variance. The contribution of second factor was found to be not significant.
Thus the scale appears to be unifactor one and this factor seems to run through the scale. It may be called general factor of mental ability.

Norms: The IQ norms have been developed for the present scale. For computing I.Q. norms the scores on different tests in the scale were transformed into standard scores with mean 10 and standard deviation 3. These transformed scores when added gave a composite score for each individual. The composite scores were further transformed into standard scores with mean 100 and standard deviation 15. And these transformed scores have been called IQs. These transformations were made separately for different age groups each of 6 months duration. The IQs here indicate individual's relative position in the age group to which he belongs at the time of testing.