

Tests and Measurement

A Trend Report

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Earlier reviews of psychological tests constructed in India (Menzel 1956, Harper 1960, Krishnan 1961, Jalota 1965, Mitra 1961, 68 and 72, and Mitra and Kuldip Kumar 1974) have reported on studies upto 1972 only. The present survey has brought to light additional investigations in test development.

There has been a marked trend in the number of studies in test construction during the past twenty-five years. Fortysix Ph.D.s have already been awarded on researches in test construction during the first six years of the seventies compared to fifty and nine during the sixties and fifties respectively. A somewhat similar trend can be seen in investigations conducted or financed by research institutions.

Compared to other fields of Psychology and Education, however, the number of studies in test development is not encouraging. A total of only 105 doctoral studies have so far been conducted and another 27 completed by institutions engaged in educational or psychological research in the country. A little less than half of these (42%) are on intelligence testing and the remaining on personality (27%), aptitude (20%) and creativity (7%).

Investigations completed during the four years (1973-76) show an interesting trend in testing. The number of intelligence tests has gone down considerably (from 49% of the studies upto 1972 to 33% of the studies reported during 1973-76). Creativity, which was hitherto an untouched area, has caught on (17% of studies of 1973-76 period fall in this category). Interest in personality, interest and aptitude testing has more or less been maintained.

Most of the studies included in the present review are adaptations of foreign instruments of measurement like Binet-Simon, WISC, WAIS, NIIP, DAT, Goodenough's Draw-a-Man Test, Bell's Adjustment Inventory, Kuder Personal Preference Record, Strong Vocational Interest Blank, Maslow's Security-Insecurity Test, Maudsley Personality Inventory.

The frequently used item-format in these studies has been either the yes/no or the true/false variety with few exceptions where the multiple-choice, the omnibus spiral type and the forced-choice formats have also been tried. Harper's and Flanagan's techniques of item analysis have been applied by almost all the test constructors. For reliability estimation, the mostly used procedures have been the split-half, the test-retest, and different forms of K-R formula. Recently, the methods of rational equivalence and analysis of variance, and procedures suggested by Mosier and Rulon have also been used for reliability purposes. For validation of measures, the external criteria used have been the examination marks, teachers' estimates of pupils' ability and scores on other tests. Some attempts have been made to apply Thomson's Inverse Matrix Method and Aitken's Method of Pivotal Condensation for obtaining validity estimates. Spearman's and Thurstone's techniques of factor analysis have been frequently used for studying the factor structure of tests.

An annotated account of doctoral level work as well as projects related to test construction is given in the following paragraphs and abstracts of these studies are given at the end of the chapter.

INTELLIGENCE TESTS :

The first Indian doctorate in test construction was awarded to Desai (1954) for developing a battery of group tests of intelligence in Gujarati for the age group 12 to 18 years studying in standards VII to XI of secondary schools. The battery was standardised on a representative sample of 4735 boys and 4770 girls from various classes of Gujarati medium schools. The reliability of the test on the sample of 400 with retest was 0.77 and split-half corrected by the Spearman-Brown formula was 0.94. Age and grade-wise distribution of IQs were worked out. The correlation of IQs with examination marks was 0.42, with teachers' estimate 0.53, and with Shukla's

adaptation of the Stanford-Binet Intelligence Scale was 0.82. A revision of this test was attempted by Bhatt and Desai (1969) to standardise it for urban and semi-urban areas of Gujarat State. The revised version was standardised on a stratified sample of 1106 boys and 897 girls of VIII to XI grades of schools in Gujarat. Age norms for boys and girls were worked out for urban population only. The reliability by split-half was 0.86 and by test-retest 0.84. The correlation coefficient with the original test was 0.77 and with other intelligence tests in Gujarati it varied from 0.65 to 0.69.

Other group tests of intelligence in Gujarati are by Bhatt (1962), Patel (1966), Patel (1970), Patel (1974) and Shah (1975). Bhatt designed his scale for Gujarati children of standards V to VII belonging to urban, semi-urban and rural cultures. The test was partly verbal and partly nonverbal and it was standardised on a sample of 5173 boys and 4649 girls drawn from fiftyeight schools representing urban, semi-urban and rural schools in Gujarat. The reliability of the test was computed by K-R, split-half, Guttman's and Rulon's formulae and it ranged from 0.91 to 0.98. The correlation of this test with the Desai's Group Test of Intelligence was 0.88, with Shukla's adaptation of the Stanford-Binet Intelligence Scale 0.82 and with the Joshi's Group Test of General Mental Ability 0.68.

The group test constructed by Patel (1966) contained verbal as well as figural items covering reasoning, perceptual, memory, numerical and spatial relations aspects of intelligence. The test was standardised on a sample of students in the age range thirteen to sixteen studying in grades VIII to XI of schools in Gujarat. The retest reliability of the test was 0.87 and the split-half 0.99. The validity coefficients with other tests of intelligence in Gujarati and examination marks ranged between 0.65 and 0.80. Another group test of intelligence in Gujarati by Patel (1970) consisted of only verbal items related to series, analogy, synthesis and classification functions. This test was standardised on 4471 students of 14+ to 16+ age randomly selected from seventy schools in Gujarat. The retest, split-half, K-R, and various other methods were applied to estimate the reliability of the test which varied between 0.82 and 0.97. The correlation coefficient of scores on this test with school marks was 0.54 and it ranged between 0.65 and 0.80 with other local verbal and nonverbal tests of intelligence. The grade expectancy and the mental age norms were computed and the IQ scores and percentile ranks for each age group were work-

ed out. Patel (1974) and Shah (1975) constructed tests of general ability for Gujarati speaking students. Patel's test was standardised on 6659 students of grades VIII through X drawn from various districts of Gujarat State. Shah's omnibus test covered the age range 13+ to 16+ and its sample of 8850 students for standardisation was drawn from the Gujarati speaking children of Greater Bombay. Besides Gujarati, group tests of intelligence have been constructed in Assamese, Bengali, English, Hindi, Marathi, Malayalam, Punjabi and Urdu.

Bora (1969) developed an omnibus type verbal group test of intelligence in Assamese for pupils of class VII to X of schools in Assam. The test items were based on foreign tests like the Otis Group Test of Intelligence, the Pressey Group Point, the Army Alpha Test, the Terman Group Test of Intelligence and the Thorndike Intelligence Examination. The test was standardised on 1193 girls and 2028 boys of eighteen schools of Greater Gauhati area. The retest reliability was 0.94 and the K-R (20) was 0.89. The split-half reliability coefficient varied from 0.91 to 0.96 for different classes. The correlation coefficient of scores on the test with the 'Hermon-Nelson Tests of Mental Ability grade 9-12, Form A, 1957' was 0.73.

Kapat (1960) constructed a group test of intelligence in Bengali for children of grades V and VI. The test included items on classification, analogy, series completion, synonym, antonym and practical judgment. The verbal part of the test had thirty-five items and the nonverbal part forty items. Standardisation of the test was done on 396 Bengali speaking children of five schools in Calcutta and its suburbs. The split-half reliability for various subtests ranged between 0.76 and 0.88. Validity coefficient was reported to vary from 0.32 to 0.70 for different subtests.

Another test of intelligence in Bengali for students of grade VIII was devised by Datta (1967) on the model of Holzinger-Crowder Uni-Factor Tests. The test was standardised on 420 class VIII students studying in twelve schools in Tripura. The internal consistency of various subtests ranged from 0.56 to 0.89. The validity coefficient by means of multiple group method was found to be 0.62 ($N=400$).

Ahuja (1966) and Ahuja (1969) constructed group tests of intelligence in English for Bombay children in age groups thirteen to seventeen and nine to thirteen respectively. The Ahuja (1966) test was standardised on 10132 children drawn from 53 schools on a stratified random basis. Age and grade

norms were worked out and deviation IQs were computed. The retest and split-half reliability coefficients were 0.84 and 0.97 respectively. Correlation with school marks was 0.53, with teachers' judgment 0.61 and with other tests of intelligence it varied from 0.55 to 0.80. The Ahuja (1969) scale was administered to 10373 students randomly selected from fiftythree English medium schools of Greater Bombay. Age norms and grade norms were worked out separately for boys and girls. The retest and split-half reliability coefficients were found to be 0.85 and 0.94 respectively. The validity coefficients against examination marks and teachers' judgments were 0.49 each, with Nafde's Nonverbal Test 0.56 and with Ahuja's Group Test of Intelligence (1966), it was 0.73.

Mehta (1958) revised his own test of intelligence and standardised it for Rajasihani school going children in the age range twelve to fourteen years. This test was in Hindi and its split-half reliability was 0.93 and the K-R 0.91. The correlation of test scores with school marks was 0.44.

Another group test of intelligence was developed by Joshi (1961) in Hindi for school and college going students. His test format was verbal omnibus spiral group point scale. The test was standardised on students of grades VIII to XII. The reliability ranged from 0.81 to 0.86 for different class levels and all the seven subtests were found to be highly saturated with 'g'. Singh (1971) developed a battery of tests to measure verbal, abstract and numerical reasoning abilities in students in the age range thirteen to twenty years. The battery was standardised on 4500 students. The split-half reliability for different tests varied from 0.82 to 0.94 and the retest reliability ranged between 0.70 and 0.80. The validity of the battery was established against the examination marks and the Raven's Progressive Matrices.

Mehrotra (1972) followed the Wechsler model in developing a group test of intelligence for children of 11 to 17 years. The scale with verbal as well as nonverbal subtests was standardised on 2101 students drawn from various districts of Uttar Pradesh. The split-half reliability was found to be 0.88 and the retest 0.85. Validity against teachers' ratings was 0.87, with examination marks it was 0.39 and against Jalota's test 0.47.

The group test of intelligence attempted by Upadhyay (1972) covered the age 8+. The twenty-five item test in Hindi was administered to 312 school going students in Allahabad to work out the test reliability and percentile norms. The split-half reliability was found to be 0.78. Two group tests have so

far been developed in Marathi. One of them by Pathak (1961) for the age group nine to thirteen years was standardised on a random sample of 10738 boys and girls of Bombay, Poona, Ratnagiri, Thana and Surat schools. The retest reliability of the test was 0.89 and the validity against Kamat's test was 0.74. The other test in Marathi was by Oak (1967) who used the omnibus spiral arrangement in his test which was standardised on 4350 boys and 3596 girls of classes VII to XI, randomly selected from eighteen schools of Bombay city. Age norms, grade norms, IQ, percentile ranks, and stanine scores were computed. The stability and internal consistency coefficients varied from 0.84 to 0.93 and 0.88 to 0.94 respectively. The test scores were correlated with Otis Advanced Examination (0.65), the Army Alpha Test (0.68), Desai's Test in Gujarati (0.82) and Nafde's NVTI (0.51).

Hundal (1963) and Singh (1963) devised their scales for Punjabi speaking children. Hundal administered the scale on a random sample of 1882 students of age group thirteen to seventeen years selected from the schools in the Punjabi speaking areas of Punjab. The retest reliability for different grades ranged from 0.87 to 0.90 and the validity coefficient against academic achievement was 0.83. Singh's group test of general mental ability for school going children in Punjab was mainly an adaptation of the Jalota's General Mental Ability Test in Hindi. Out of seven subtests five were taken from Jalota's scale and only two were developed afresh. The test was standardised on a sample of 2985 school going students of classes VIII to X of schools in Punjab. The split-half reliability was 0.93 and correlation with school marks varied from 0.41 to 0.50 for different subjects.

Pillai (1955) constructed the general mental ability test in Malayalam for school children. The standardisation sample consisted of 2000 students of all school going age groups from the upper, middle and lower social strata representing the Malayalam speaking population of Travancore-Cochin State. All the seven tests included in the scale were found to be highly saturated with 'g'.

Kaul (1966) developed a group test of intelligence in Urdu for 12+ to 16+ in Kashmir. The test was standardised on a sample of 5872 pupils of thirtyone schools of three districts in Kashmir. The split-half reliability of the test was 0.94 and that by retest 0.90. The correlation of test scores with teachers' estimate was 0.52 and that with the Raven's Progressive Matrices 0.77.

Pandey (1961) prepared and standardised a

group test of intelligence for school going children in Nepal. The standardisation was done on 2674 Nepalese students of classes VIII to X representing different social strata of Nepal. The K-R formula 21 was used to estimate the reliability which was found to be varying between 0.83 and 0.89 for different classes. The 'g' factor loading on various elements of the test ranged between 0.54 and 0.76.

Attempts have been made to adapt WISC and WAIS for use in India. Mallin (1964) worked on the first Indian adaptation. Only verbal subtests were modified to suit Indian conditions and performance part was retained as it was in the original WISC. The test was standardised on 656 children in the age range six to fifteen years drawn from urban schools with English medium. The retest reliability for the verbal part was 0.92, for performance scale 0.93 and for the full scale 0.91. The scale was validated against teachers' ratings (0.61), Draw-a-Man Test (0.71) and the California Test of Mental Maturity (0.63). Bhatt's (1970) adaptation of WISC was primarily meant for Gujarati population. All the twelve subtests were adapted in Gujarati. The scale was standardised on a sample of 440 children of Ahmedabad city in the age group 5+ to 15+. The retest reliability for the verbal scale was 0.98 and the split-half reliability was 0.90. For performance scale the retest reliability was 0.97 and for full scale it was 0.99. Validity was established against school marks and other tests of intelligence in Gujarati. The Hindi adaptation of the verbal part of WISC was attempted by Yadav (1970). He standardised the scale on about 700 school going children in the age group eight to twelve years selected from schools in Delhi. Using Mosier's formula the reliability of the total scale was found to be 0.96. The unifactor structure of the scale as a whole was evidenced by the centroid method of factor analysis where seventy percent of variance was accounted by the first factor. The validity coefficients of the total scale against a nonverbal test and other measures ranged from 0.51 to 0.66. Prabha Ramalingaswami (1969) adapted the performance scale of WAIS. The test was standardised on a sample of 604 literate adults of both sexes in the age group fifteen to fortyfive years representing Delhi's population. Reliability of subtests, viz., picture completion, block design, picture arrangement and object assembly were worked out by using the formula Coefficient Alpha suggested by Cronbach. Retest reliability was found out for the subtest digit symbol. Total test reliability was determined by Mosier's formula. The reliability of individual subtests ranged from 0.63 to 0.94. Three techniques were followed to determine

the validity of the test, viz., the construct, the factorial and comparison of results with those obtained by Wechsler. The results indicated that the test could be considered as a valid measure for assessing the intelligence of an Indian adult.

Shah (1971) adapted the 1960 revision of the Stanford-Binet Intelligence Scale for Gujarati children in the age range 2+ to 18+. The scale was standardised on a group of 400 children representing each age group between 2+ and 18+. The retest reliability of the test was 0.95 and the reliability by the average difference method was 0.96. Validity coefficients against eight different tests of intelligence ranged from 0.48 to 0.79.

In the area of nonverbal tests of intelligence, Phatak (1955) made the pioneering study of Goodenough's Draw-a-Man Test and developed a new scoring method in her standardisation of the test for Gujarati children. Validity of the new scoring plan was established by correlating the scores with Kamat's Intelligence Test and the correlation was found to be 0.50. The reliability of scoring system by retest method was 0.81. Norms were developed on 722 drawings of children in the age range 6+ to 8+. Validity of the major scoring points was tested by simple criterion of increase in the scores at successive ages. Nafde (1961) prepared a nonverbal test of intelligence on the model of NIIP 70/23 and Test of Abstract Reasoning (DAT). The test was administered to 10,000 boys and girls mainly from the high schools in Bombay city. The samples also included college students of science and arts as well as students of engineering, medicine and some post graduate students. For norm purposes, however, answers of 6654 students were found to be useful. The split-half reliability of the test on a sample of eightyone was 0.88 and by retest on a sample of eighty was 0.91. The validity of the test against school marks in three classes was found to be 0.47, 0.54 and 0.35 for a sample of 29, 26 and 27 children respectively. The test correlated 0.62 with marks in mathematics, 0.43 with science, 0.45 with English and 0.49 with Hindi. Age norms, class norms and IQ distribution were worked out. Premalatha's (1962) battery of nonverbal tests of intelligence was designed for children of seven to thirteen years of age. The test was standardised on a sample of 7841 boys and girls drawn from rural and urban areas of Mysore State. The split-half reliability of the test was 0.97 and the K-R 0.99. The test correlated with school marks (0.37), teachers' estimate (0.35) and a standardised verbal test of intelligence in Kannada (0.69). Shah (1964) develop-

ed a nonverbal measure of intelligence and standardised it on Gujarati children in the age range seven to thirteen years. The reliability was found to be 0.96 by the method of rational equivalence, 0.94 by the retest method, and 0.92 by the split-half method. The validity of the test was 0.70 against a verbal test, 0.55 against examination marks, and 0.53 against teachers' estimate. Bhavsar (1967) prepared a nonverbal test for high school students of grades IX to XI corresponding to thirteen to eighteen years age group. A sample of 3184 boys and 2718 girls drawn from fortyfour schools of sixteen districts of Gujarat was used for standardisation. Age norms, grade norms and sex norms were worked out. The retest reliability of the test was found to be 0.91, and split-half was 0.93. The test correlated 0.61 with the Desai's Group Test of Intelligence, 0.79 with Desai-Bhatt's and 0.77 with Nafde's Nonverbal Test. Nair (1970) developed a nonverbal measure of intelligence and standardised it on a sample of 5252 students of class VIII to X selected from twelve educational districts of Kerala. Proportionate representation was given to sex, rural-urban residence, school management, and the three educational levels of students in the sample. Reliability by retest with an interval of three months, one month and one week was 0.76 ($N=246$), 0.75 ($N=124$) and 0.80 ($N=121$) respectively. By rational equivalence method the reliability of the whole test was found to be 0.86 ($N=100$). The test was validated against the Raven's Progressive Matrices, the Kerala University Verbal Group Tests of Intelligence, teachers' ratings and school marks and the correlation varied from 0.21 to 0.78 for a sample of 256 students. Deviation IQ norms were worked out for the ages thirteen to seventeen years. Separate and combined norms were prepared for boys, girls, rural and urban subjects. Jain's (1965) nonverbal test was based on Spearman's two factor theory. The test, with a parallel form, was administered to 1000 cases which included students of Delhi region who had appeared for the higher secondary examination, and applicants for commission in the officer cadre of the Defence Services. The correlation between the scores on the two forms of the test was 0.80. Factorial study demonstrated that the two forms of the test had high 'g' saturation.

Trivedi (1972), Patel (1974) and Singhal (1965) also constructed nonverbal group tests of general ability. Trivedi's test for students of grades VII to IX in Haryana was administered to 2483 students in the age range 12+ to 14+ to study its psychometric properties. The retest and split-half re-

liability of the test were found to be 0.94 and 0.97 respectively.

Patel's test with items in pictorial form were designed to measure individual differences in intelligence of children studying in grades V through VII. The author reported that intelligence of pupils increased with age, reliability of the test decreased with increase in time interval and pupils who scored well were good at mathematics.

The test battery of Singhal consisted of four subtests, namely, picture completion, reversed similarities, similar opposites and classification. Its target population comprised students in the age range eight to fourteen years covering grades III, IV and V. A sample of 2000 children of schools run by Municipal Corporation in Calcutta and Delhi was used in the study. All the four subtests were reported to have shown high reliability.

Three performance scales of intelligence other than Bhatia's are that of Bhatia and Tandon (1964), Bhattacharya (1964) and Patel (1973). The Bhatia and Tandon battery consisted of two forms — Form A for the age group three to five and Form B for the age group six to thirteen. The scale was standardised on a stratified sample of 1100 children in the age range three to thirteen years, 100 children for each age level, drawn from Moradabad town and its suburbs. The reliability of the test by split-half and K-R 20 for Form A ranged from 0.87 to 0.95 and for Form B it varied between 0.91 and 0.93. The test was validated against parents' and teachers' estimate of child's ability.

Bhattacharya (1964) devised a battery of four performance tests of intelligence for the eight to twentytwo age groups which included the Dearbon's Form Board Test, the Alexander's Passalong Test, the Goddard's Cube Construction Test and the Koh's Block Design Test. The battery was validated against verbal intelligence scale prepared by Calcutta University.

The performance scale of intelligence constructed by Patel (1973) for the age range 6+ to 15+ in Gujarat was validated factorially following the principal axes method. The three curves of mental growth for boys, girls and the mixed group were found to be regular.

APTITUDE TESTS :

In the area of aptitude tests, Varma (1960) constructed a battery of differential aptitude tests based on Thurstone's primary mental abilities. The tests were in Marathi and standardisation sample

consisted of only boys of classes IX and X of Nagpur schools. Decile norms were prepared for rural and urban boys separately. Reliability coefficients for individual tests ranged between 0.60 and 0.93 and validity coefficients varied from 0.45 to 0.66. An adaptation of DAT battery was attempted by Ojha (1965) in Hindi for students of higher secondary schools. A sample of 251 students of class XI, selected at random from two rural and two urban schools of Delhi, was utilised for developing norms. Inter-correlations between various tests of the battery ranged from 0.19 to 0.46. Reliability of the battery by K-R 21, split-half and parallel form methods was found to be above 0.90 for most of the tests. The battery showed satisfactory predictive validity for different school courses. Mukherjee (1966) prepared another differential aptitude test battery in English which was standardised on 2000 students of class VIII.

Aptitude tests have been developed to screen candidates for admission in engineering colleges.

Guha (1957) constructed the Indian Engineering Aptitude Test with forty items covering (i) mechanical interest and trend of mind, (ii) power of observation, interest in engineering and logical reasoning, (iii) knowledge of elementary scientific laws and relation between shapes, (iv) basic knowledge of physical instruments and their application, and (v) mathematical interest with a comprehensive knowledge of their application in scientific and mechanical investigation. A sample of 334 students of Jadavpur Engineering College in Calcutta who had earlier passed the first year science examination was used for standardisation purpose. The reported split-half reliability of the instrument is 0.89. Validity was established against the examination marks.

Deb's (1968) battery incorporated the Bose and Datta Group Intelligence Test, the Deb Engineering Aptitude Test, Deb's modified form of the Strong Vocational Interest Blank Test, and the Bernreuter Personality Inventory adapted by Saha and Gayen. Annual examination marks were used as the criterion for determining the predictive validity of the battery. The reported correlation between the battery of tests and the criterion was 0.66 ($N=378$). The standardisation sample was drawn from the students of Jadavpur Engineering College.

The Entrance Test developed by Pratap (1972) comprised eight subtests: classification, analogies, numerical reasoning, verbal reasoning, pictorial reasoning, space relation, engineering and science. The test with a parallel form was standardised on freshmen engineering students of Roorkee University.

Content and predictive validity of the test were established. Correlations of scores on the entrance test with first and second year annual examination marks for Form A were 0.91 and 0.78 and for Form B 0.64 and 0.60. Correlation of Form A with Form B was 0.75. All the subtests had high loading on factor I calculated by Thurstone's Centroid Method.

The battery constructed by Oommentharakan (1973) included items on physical science comprehension, mathematics and formulation, spatial relations, and mechanical reasoning. Stratified random sample of 1527 students drawn from colleges all over Kerala was employed for working out reliability, validity and norms. The reported reliability of the battery was 0.92.

Besides the engineering aptitude tests, studies have been carried out to devise aptitude tests for teaching, scholastic aptitude and clerical ability.

Srivastava (1965) developed the teaching aptitude test for primary and junior high school teachers. The 150 item scale was standardised on a representative sample of 1050 pupil-teachers drawn from basic training institutions in the Vindhya region. The retest and split-half reliability were 0.94 and 0.91 respectively.

Majumdar's (1966) target population for his scholastic aptitude test was the higher secondary level of Bengali speaking students of Calcutta schools. The test was found to be reliable (split-half: 0.93, K.R.: 0.92, retest: 0.80) and valid (correlation with examination marks for different subtests ranged from 0.57 to 0.88).

Some special aptitude tests have also been constructed though their number is very small in comparison to the number of occupations. Sharma (1963) developed a mechanical aptitude test battery in Hindi. He administered the battery to 640 students belonging to class IX of ten multipurpose higher secondary schools of Madhya Pradesh and Uttar Pradesh and those who were admitted to first year class of Delhi Technical Higher Secondary School in 1962, for developing norms. Reliability of the battery by split-half technique was between 0.80 and 0.98 for different tests. Correlations between the scores on the battery and aggregate marks in different technical subjects ranged from 0.64 to 0.72. Dave's (1964) Scientific Aptitude Test was designed to select students for science at the university level. It was standardised on a sample of 1218 students of S.S.C. class in Gujarat schools, selected randomly from among thirty-two schools and three coaching classes of seven districts of Gujarat. Reliability of the test by test-retest,

split-half, rational equivalence, and analysis of variance methods was 0.92, 0.92, 0.91 and 0.89 respectively. Deshpande (1967) and Venkataramana (1970) also devised tests for assessing aptitude for science. Deshpande's battery was meant for selecting students for science courses at the end of class VIII and its normative sample consisted of 856 students from seven schools of Nagpur and Amravati. The reliability by Mosier's formula for the composite test was 0.94. The validity coefficient of the test, using Thompson's Inverse Matrix Method and Aitken's Method of Pivotal Condensation, was found to be 0.56. Venkataramana's test was standardised on a sample of 2000 students of class IX drawn from thirtynine schools in Andhra Pradesh. The split-half reliability of the test was found to be 0.88 and K-R was 0.90. Validity against examination marks and teachers' ratings was 0.72 and 0.76 respectively.

Two tests have been developed to measure numerical aptitude. Bhavsar's (1970) Numerical Aptitude Test was designed for students of classes IX to XI of schools in the Saurashtra area of Gujarat. Norms were prepared for different age groups of boys and girls separately. The normative study was done on a sample of 5431 students drawn from rural and urban areas of Saurashtra region. The retest and split-half reliability of the test varied from 0.84 to 0.94 and validity coefficients ranged between 0.43 and 0.75 for different subtests. Shah's (1971) Numerical Ability Test had the spiral-omnibus format and it was administered to 3743 boys and 3249 girls of secondary schools in Gujarat for computing percentile grade norms separately for boys and girls of high schools in Gujarat. The retest reliability for different parts of the test ranged between 0.52 and 0.88 and the split-half ranged from 0.76 to 0.93. The correlation of the test with marks in the annual examination varied from 0.33 to 0.75 for different subjects. Desai (1970) constructed a language aptitude test in Gujarati for students of classes VIII to X of secondary schools in Gujarat. Stratified random sample of 4044 boys and 2477 girls drawn from urban and semi-urban areas of Gujarat and studying in VIII to X standards of secondary schools in Gujarat was used for developing norms. Separate norms were worked out for each grade, sex and culture. The retest and split-half reliability of the test for different subtests ranged from 0.32 to 0.82. The test was validated against examination marks, teachers' estimates of pupils' language aptitude and the correlations varied from 0.30 to 0.51. An office work aptitude test was prepared by Naik (1970) and it was standardised on a sample of 9150 subjects drawn from high

school boys and girls, students of first year, intermediate and senior classes of arts and commerce colleges of Greater Bombay, and persons belonging to industrial and educational organisations in Bombay. Age and grade norms were prepared separately for boys and girls and for different professional groups. The retest reliability of the test was found to be 0.81 for one month interval. The test was validated against the Clerical Aptitude Test of the Institute of Vocational Guidance and the correlation was 0.76 ($N = 282$). The Clerical Ability Test of Bhavsar (1974) for pre-university students consisted of six subtests. The retest reliability for various subtests worked out on a sample of 1476 students drawn from various colleges of Saurashtra varied from 0.45 to 0.74. Buch (1960) constructed a test of social intelligence for the selection of salesmen, insurance agents and supervisors. A representative sample of 954 girls and 3480 boys of S.S.C. class was drawn from eleven districts of the bilingual Bombay State (including Saurashtra and Greater Bombay regions) for the preparation of test. Reliability of the test was examined by K-R formula, analysis of variance and retest methods and it ranged between 0.91 and 0.93. Factor analysis revealed that the test had only one factor and the correlation of 0.16 with Desai's Test of Intelligence showed that the general factor of the present test was not 'g' factor.

Two more studies have been reported on the construction of scales to measure social intelligence at college level.

Ray (1972) developed a scale with subtests on judgment of social situation, observation of human behaviour, recognition of mental status, memory for names and faces, appreciation of humours, and adjustment. Four hundred Bengali speaking post-graduate students of three universities of the Calcutta city were administered the scale to work out the reliability, validity and norms. The reliability of individual subtests ranged between 0.47 and 0.83; validity coefficient was reported to be 0.50 with peers' ratings and 0.53 with teachers' ratings.

Gangopadhyay (1975) conducted his study on 1112 students of five universities in Gujarat and concluded that all the five subtests of social intelligence included in his scales measured a general common factor. A few investigators have explored new areas in test construction. Patel (1972) devised an objective measure to assess the level of achievement press of high school students. The specific construct measured was beta p Ach whose contents were the subjects' perceptions and apperceptions of the environ-

ment. Four forms of p Ach measure were developed. The K-R 21 estimates for p Ach I and II were 0.75 and 0.84. The stability coefficients for p Ach III and IV were 0.92 and 0.91. Percentile norms for each of the four measures were developed on a sample of 688 pupils drawn from Delhi schools.

Dhamankar's (1970) test of aesthetic development is a nonverbal measure with high reliability (split-half 0.95, rational equivalence 0.96 and Hoyt's variance 0.93).

Sinha (1972) employed the Q-sort technique in studying the study habits and attitudes of undergraduates.

Lidhoo (1972) constructed a psycho-diagnostic tool for the detection of potential delinquents in the age range fourteen to nineteen years. The tool was administered to 200 delinquents and 200 nondelinquents and showed significant discrimination between delinquents, potential delinquents and well socialised youngsters. The test was reported to be a reliable (K-R 20 method-0.92) and a valid measure.

A diagnostic test in algebra was developed by Bhirud (1975) using a sample of 1044 students of class IX of Jalgaon district. The test reliability was 0.90 by S-B formula, and the reported validity against examination marks was 0.78.

Kaul (1974) investigated the development of intelligence of 137 students of B.Ed. level of a Kanpur Training College. He found that the native intelligence or the genetic 'g' factor had its limitations but it was capable of development.

Probing with the problems of talented boys Mukerjee (1967) selected top three percent students on the basis of scores on nonverbal tests of intelligence of Nafde and NIIP 70/23 from among the students of class IX of sixtyeight schools in Bombay. Information on adjustment, study habits, vocational choice, parental attitudes towards boys, socio-economic status, hobbies and interests of the selected boys was collected. One hundred boys whose performance on Nafde's NVTI was at about the sixtieth percentile were selected to form the reference group. Findings of the study suggest that (i) both the talented and the reference group of boys were maladjusted to home, health and emotion, and a little better adjusted to sociability, and (ii) talented group had a greater choice in vocations than the reference group.

Among the nondoctoral studies carried out by some institutions in the areas of intelligence and aptitude testing, the work of National Council of Educational Research and Training, Indian Statistical In-

stitute, the Bureau of Psychology (Allahabad), College of Educational Psychology and Guidance (Jabalpur) and the Faculty of Education and Psychology (M. S. University of Baroda) deserves a mention here. Shanker and his associates (1957) in the Central Institute of Education (CIE) constructed an individual scale of intelligence in Hindi for age group of three to sixteen years. These tests were adaptations of Terman-Merrill Scale. The validity of test items was examined by calculating biserial correlations for each item as against the test as a whole. The scale has not so far been validated against any external criterion. Another scale was developed by the CIE (1959) for assessing general mental ability of children of eleven to fourteen years of age. This was an omnibus test in Hindi with a variety of items generally accepted as measures of intelligence. The normative sample consisted of 633 boys and 581 girls, selected randomly from schools in Delhi. The split-half reliability of the test was 0.97 and the test-retest reliability ranged between 0.73 and 0.87. Validity against school marks was 0.42 for boys and 0.33 for girls. The test correlated 0.60 with teachers' estimate, 0.71 with Jenkin's nonverbal test of intelligence and 0.43 with Raven's Progressive Matrices. Verbal group tests of intelligence were developed by the Bureau of Psychology for age groups 12+, 13+ and 14+. The test for 12+ was standardised on 1970 twelve-year old children studying in sixty-nine junior and higher secondary schools of Uttar Pradesh. The split-half reliability corrected by Spearman-Brown formula for a sample of 100 was found to be 0.97. Distribution of raw scores was found to be slightly negatively skewed. Mean and standard deviation were 51.71 and 25.06, and the large standard deviation suggested that the test is efficient in discriminating children particularly in the middle range of ability. The test for 13+ was standardised on about 1000 students drawn from twenty-seven high schools in Uttar Pradesh. Distribution of scores had a mean of 28.96 and standard deviation of 19.8 which was significantly skewed in the positive direction. Forty-one percent cases were found to be falling between mean scores of 29 and 100, meaning thereby that the test is more discriminating for the higher range of intelligence. The test for 14+ was standardised on 952 students of schools in Uttar Pradesh. The representativeness of the sample was determined on the basis of results in public examination, and the socio-economic status. The split-half reliability was found to be 0.96 and the test showed better discrimination at middle and higher levels of intelligence. Lele and his associates' (1957) group test of intelligence was designed for

age groups 11+ to 16+. The test was administered to 3685 students drawn from all over Gujarat, for establishing norms. Retest method was used for examining the reliability, and validity was established against Desai's Group Test of Intelligence, teachers' ratings and Raven's Progressive Matrices. Chatterji and Mukherjee (1967) developed a non-language test of verbal intelligence for class VIII students. The normative sample was drawn from six schools in Calcutta. The K-R formula (21) reliability coefficients for the four sections of the test were 0.64, 0.69, 0.76 and 0.79. Validity against school marks ranged between 0.22 and 0.64 for different subtests. Rao (1962) constructed tests to measure aptitudes of boys in eighth grade of higher secondary schools. The battery of seven subtests was administered to a sample of 800 students selected at random from eighteen schools in Madhya Pradesh. Percentile ranks and percentile age norms were computed for 13, 14 and 15 year groups of students. The split-half reliability for each of the subtests varied between 0.88 and 0.95. An attempt was made to observe the effectiveness of the battery in revealing intra-individual differences in cognitive abilities. This was done by plotting test profiles of 50 cases picked up at random from the standardisation sample. Differentiation of abilities was clearly evident in the profiles. Lele and Parikh (1965) standardised a scholastic aptitude test for admission to preparatory science courses. Five hundred students served as a sample for this test. Split-half technique was used for examining the reliability of the battery and marks in the preparatory science course of the M. S. University of Baroda were used for validation purposes. The validity coefficients ranged from 0.43 to 0.58 for various subtests. Shukla and his associates (1970) developed a scholastic aptitude test in Hindi for grades VIII to X. The standardisation sample was drawn from schools in Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh and Bihar using stratified random sampling technique. Reliability was worked out for each subtest separately on a sample of 200 cases from each state, which varied from 0.71 to 0.92. Correlations with school marks varied from 0.26 to 0.75 in respect of different grades and states.

PERSONALITY INVENTORIES

Very few doctoral studies have been attempted in personality measurement. Sohoni (1953) standardised a method of studying temperament, including dispositions and character traits of children of high schools. A sample of 2129 students in the age group fourteen to fifteen years was used for this purpose. The retest reliability for different traits was

found to vary from 0.44 to 0.54. Validity against teachers' estimates was in the range of 0.23 and 0.45 for different traits. Kundu (1961) constructed a test of personality to measure neurotic tendencies of adults of both sexes. The sixty-six item semi-projective inventory was standardised on 1000 college going students and fifty neurotic subjects. For the normal sample the reliability by the odd-even, and first half and second half methods was 0.90 and 0.80 respectively. The corresponding indices for the neurotic group were 0.80 and 0.72.

The multiphasic personality inventory was developed by Bengalee (1964) to screen the maladjusted students from the college going population. Validity and reliability were established by the extreme groups method, and retest and split-half techniques. Another test of temperament was devised by Tarachand (1965) to serve English and Gujarati speaking pupils of classes X and XI. Percentile and stanine norms were calculated for boys and girls separately. The retest reliability of the scale varied between 0.53 and 0.87 and split-half reliability ranged between 0.66 and 0.76 for different parts of the test. The validity coefficients by graphic scales varied between 0.34 and 0.74. The personality inventory standardised by Palsane (1965) measured introversion-extraversion, normal-neuroticism and normal-psychoticism dimensions of personality of college students. A sample of 370 college students was used in the study. The K-R, split-half and retest techniques were used to study the reliability of the inventory which varied from 0.55 to 0.91 for different dimensions of personality. Concurrent and cross validities of the inventory were also examined. Singh (1967) attempted a personality adjustment inventory for college students and standardised it on a sample of 11083 men and women of Patna University and various other states. The sample was considered to be representative of the total population of India. The reliability by split-half, retest, K-R and Hoyt's methods varied between 0.92 and 0.94. Validity of the inventory was estimated against Asthana's Adjustment Inventory. The obtained correlation was 0.62. Percentile norms were worked out separately for men and women. Hussain (1969) attempted Hindi adaptation of the Bell's Adjustment Inventory and provided percentile norms for males and females separately for different educational levels. Another Hindi adaptation of the Bell's Adjustment Inventory was done by Saxena (1959) on a sample of 2529 students in the age range of eleven to twenty years representing the State of Uttar Pradesh. The reliability by split-half, retest and rational equivalence techniques varied from 0.87 to 0.90. The validity of

the inventory against Asthana's Inventory was 0.80. Tutoo (1968) developed a mirror tracing test to measure social maladaptation, and Dass (1967) developed a group test of personality for adolescents on the lines of TAT.

Tripathi (1971) adopted the forced choice technique in developing a personality test for the college going students of Hindi speaking regions. The retest reliability for various subscales ranged from 0.64 to 0.81. Inter correlations between subscales were generally low. Convergent and discriminant validity coefficients were established. The centile and T score norms were worked out.

Singh's (S. K. 1971) Hindi adaptation of Maslow's Security - Insecurity Test was done on a sample of 600 students of second year degree classes of colleges in Patna. The reported reliability by retest and split-half was 0.79 and 0.86 respectively. Correlation with other scales measuring neuroticism and extraversion ranged between 0.27 and 0.76. Percentile norms were developed for male and female students separately.

An adaptation of the Maudsley Personality Inventory in Hindi was attempted by Singh (1972). 370 students drawn from colleges in Patna were administered the adapted version to study the psychometric features of the measure. The retest reliability for the extraversion scale was 0.77 and for the neuroticism scale 0.82. The neurotic group consistently scored higher than the normal on the extraversion and neuroticism scales of the inventory. Concurrent validity of the inventory against Guilford Zimmerman Temperament Survey was also established.

Among the studies conducted at the institutional level, adjustment inventories constructed by Pasricha and others (1964), Bhattacharya and others (1967), Dasgupta (1969) and Ramji (1971) may be mentioned. Pasricha's inventory covered areas like personal, familial, educational, social and vocational and it was designed for college students to locate their adjustment problems in the above areas. Bhattacharya and associates aimed at locating adolescents who were considerably maladjusted with respect to their school and society. Dasgupta's study measured traits which he named as love-giving, love-seeking, self-love, self-aggression, object-aggression, assertion and submission, and happiness. Ramji, on the other hand, developed rating scales to assess some situational behaviours in school of primary school pupils.

INTEREST INVENTORIES

Relatively little work is done on interest measurement. Kuder's model seems to have been popular

with Indian researchers. Four investigators have attempted to adapt Kuder Preference Record (KPR). Naik (1969) adapted the KPR in Oriya, Singh (1965) in Hindi, Parikh (1971) in Gujarati and Gopalan (1972) in Malayalam. Nazre (1968) adapted the Gordon Personal Profile in Hindi and conducted a survey of interpersonal values of students of class XI in Bihar.

Prasad's (1968) inventory in Hindi of vocational values was standardised for undergraduate and postgraduate students of Patna University. Trivedi (1969) constructed an interest inventory for undergraduate students and Kaur (1970) developed a battery of tests to assess school students' abilities, aptitudes and interests. Palsane (1975) devised inventories to measure interest, adjustment and study habits for Marathi speaking population at school and college leaving stages. Stanine norms were also developed.

CREATIVITY

Recently attempts have been made to develop measures of creativity and to study its correlates. Baqer Mehdi (1970) devised a battery of tests to identify creative talent at the primary and middle school stages. The battery consisted of verbal as well as nonverbal tests of creative thinking. Verbal part included tests of consequences, unusual tasks, similarity and product improvement. Activities under nonverbal part were picture construction, incomplete figures, triangles and ellipses. The retest reliability for verbal tests ranged between 0.92 and 0.95; and for the nonverbal parts it varied from 0.93 to 0.95. The validity coefficients for fluency, flexibility, originality and total score were 0.40, 0.32, 0.34 and 0.39 respectively. Percentile norms for the verbal test of creative thinking were also established for pupils of VII and VIII grades in urban and rural areas.

Passi (1972) developed a battery of creativity tests for higher secondary school children. The battery consists of verbal and nonverbal tests.

Kaul (1974) developed a test of creativity for children of fourteen to sixteen year age group. The test with items on (i) sentence completion, (ii) uses, (iii) creative writing, (iv) consequences, and (v) problem solving was standardised on 1,000 students drawn from schools in Delhi. The retest reliability of the test was 0.75 ($N = 100$). Correlation with Torrance Test of Creative Thinking was found to be 0.72, with teachers' ratings 0.13, and with Raven's Progressive Matrices 0.26.

Ramachandrarachar (1975) developed a test to identify creative children at the school leaving age.

The subtests included in the test were (i) fluency, (ii) flexibility, (iii) originality, and (iv) elaboration. The reliability of the test was found to be 0.86 by split-half method and 0.71 by K-R formula. Validity ranged from 0.18 to 0.44 against various criteria.

Some studies have investigated the correlates of creativity. Khire (1971) administered a battery of creativity tests and some noncognitive measures on 1054 boys of grades VII through XI of the same school. The findings suggest that (a) aspects of creativity such as fluency, flexibility, originality of thinking and elaboration remain closer to one another but farther from intelligence, (b) at the age of 13+ creativity does not increase linearly like intelligence, (c) beyond 1.2 SD on the intelligence scale, creativity shows zero correlation with intelligence, (d) creativity has lower correlation with mechanical comprehension and higher with scholastic performance, (e) low academic performance is directly related to low intelligence, and high academic performance to high creativity, and (f) students who are high on creativity but low on intelligence perceive all teachers to be more or less alike.

Sharma (1971) used the factorial design to study the effect of intelligence, selected interest and the sociocultural variables on creativity. 414 male students of class X in the age range of fourteen to sixteen years drawn from high schools in Agra district were investigated. His findings revealed that (i) for both rural and urban boys creative thinking showed progressive trends with intelligence upto 120 IQ points and thereafter no further progress was observed, (ii) literary and agricultural interests did not show any effect on creativity, and (iii) on the whole, rural boys were found to be more creative than their urban counterparts.

Goyal (1974) focussed his study on the personality correlates of creativity in secondary school teachers under training. Five hundred teacher trainees in the age range of eighteen to fortyseven years, drawn from the training colleges in Panjab were administered Cattell's 16 PF and Torrance Tests of Creative Thinking. Findings suggest that highly creative persons do not enter teacher training colleges, and highly flexible teacher trainees appear to be more guilt prone and less imaginative. Intelligence and adventurous temperament emerged as the most frequently observed personality correlates of creativity in female teacher trainees.

Joshi (1974) in his study of the intellectually gifted students of age group twelve to nineteen years drawn from Gujarat region found that giftedness was

an effective contributor to all types of creativity scores.

Gakhar (1975) investigated a sample of 730 girls of higher secondary schools of urban Panjab and observed that (i) creativity and intelligence were two distinguishable modes of the same intellectual functioning, (ii) high and low groups of girls on verbal creativity differed significantly in respect of status, intellectual efficiency and flexibility, (iii) personality traits of self-acceptance and self-sufficiency were distinguishing characteristics of girls high on nonverbal creativity and (iv) there was a consistent increase in the scores on all the verbal as well as nonverbal measures of creativity upto the age of fifteen.

Jha (1975) probed into the personality profiles of thirtyfive creative persons. Using the centroid method he discovered four factors. The main factor reflected rational optimism, high ego strength, realistic and healthy attitude towards life, openness to experience, assertive self-confidence and tendency for self-actualisation.

MISCELLANEOUS STUDIES

A few miscellaneous studies have also come to light.

Shah (1959) conducted a normative survey of Gujarati children and adolescents in Greater Bombay and nearby suburbs to work out physical norms for the age range six to twenty years.

Palkar (1973) investigated some problems of educational statistics in group prediction of college success. He analysed the marks obtained by 278 students at the S.S.C.E. of the former Bombay State in 1957 and at the P.Sc. E. of the M. S. University of Baroda in 1958.

Ahluwalia (1974) constructed an inventory to study changes in professional attitude of student teachers. Five percent of student teachers in Hindi speaking states were administered the inventory. Findings revealed a downward trend in the mean scores of B.Ed. students at the end of one-year training.

What has been presented above is an overview of studies conducted in the field of psychological test construction during the last twentyfive years. Over the years, researchers' interest in this field has been growing steadily. Universities like Baroda (MSU), Bombay, Calcutta, Patna, Gujarat and Sardar Patel have contributed more to research in this field than other universities. Among the institutions, the NCERT (New Delhi), Bureau of Psychology (Allahabad), the Indian Statistical Institute (Calcutta), and the Faculty of Education and Psychology of M. S. University of

Baroda have done substantial work in test construction. The University Grants Commission has also been financing research on these developments.

Within the field of test construction 42% of studies fall in the area of intelligence testing and construction of interest inventories has been neglected. Qualitatively, there has been considerable sophistication in the use of statistics during the last decade. Due attention has been given to representation of the heterogeneity of the population through better and larger sampling. Certain trends are, however, disturbing. Although in most cases item analysis data are reported with difficulty and discrimination indices for each item, there is little evidence of the use of item statistics in improving distractors of multiple-choice item. Sampling has improved, but there is still a good deal of incidental rather than probability sampling. Discrimination validity as proposed by Campbell and

Fiske has not been utilised so far by Indian researchers.

Indian adaptations of Binet tests, WISC, WAIS, DAT battery, NIIP Tests, Goodenough's Draw-a-Man Test, Bell's Adjustment Inventory and many other foreign tests are now available, though each one may not be equally good.

Group tests of intelligence for the higher ages in schools are available in most Indian languages, but good tests for adults as also for primary schools are badly needed. A performance test battery, like that of Bhatia, needs to be standardised in different language areas to provide the link test in equivalence studies. The Differential Aptitude Tests developed in Hindi need to be translated and adapted in other languages. Work on personality tests and creativity has started recently. It is to be hoped that researchers' interest in these areas will grow in the years to come.

ABSTRACTS : 313-382

313. *BAQER MEHDI, Development of a Battery of Tests for Identifying Creative Talent at the Primary and Middle School Stages, Dept. of Psy., AMU, 1970. (UGC financed)*

The present study was an attempt for developing a battery of tests for identifying creative talent at the primary and middle school stages. The battery consisted of two tests, namely, the verbal test of creative thinking and the nonverbal test of creative thinking.

The verbal test included four subtests, namely, consequence test, unusual test, similarity test and product improvement test. Three types of activities were used for nonverbal test of creative thinking, namely, picture construction activity, incomplete figures activity, and triangles and ellipses activity. The final forms of the tests were administered to a sample of 300 urban and 175 rural pupils studying in classes VII and VIII. The total time required for administering the verbal test of creative thinking and nonverbal test of creative thinking was fortyeight minutes and thirtyfive minutes respectively.

The findings of the study were : (i) The items in each activity correlated high with the total activity scores and indicated that the items in each activity were internally consistent. (ii) There was significantly high degree of relationship between the activities of the nonverbal test of creative thinking and the total creative score. The correlation ranged from 0.634 to 0.941 for urban and 0.312 to 0.850 for the rural sample. (iii) The inter correlations among the three activities were found to range from 0.303 to 0.477. (iv) The test - retest reliability coefficients for elaboration, originality, and total creative score were found to be 0.932, 0.947, and 0.946 respectively. (v) The validity coefficients against the teacher ratings for elaboration, originality, and total creative score were found to be 0.346, 0.329, and 0.385 respectively. (vi) The correlations between four test activities, namely, consequences test, unusual test, new relationship test, and product improvement test and the total creative score for urban and rural students were 0.180, 0.862, 0.806 and 0.761, and 0.646, 0.741, 0.695 and 0.541 respectively. (vii) The test-retest reliability coefficients for the verbal test of creative thinking were found to be 0.945, 0.921, 0.960 and 0.959 for fluency, flexibility, originality, and total creative score respectively. (viii) The reliability of the total creativity score was found to be 0.959 for verbal test of creative thinking. (ix) The validity coefficients for fluency,

flexibility, originality, and total creative score were found to be 0.40, 0.32, 0.34, and 0.39 respectively, which were significant beyond 0.01 level. The percentile norms for urban and rural samples of pupils studying in classes VII and VIII were established for verbal test of creative thinking.

314. *BENGALIEE, M. D., A Multiphasic Personality Inventory Suitable to Indian Conditions Or Youth Adjustment Analyser, Ph.D. Psy., Bom. U., 1964.*

The study aimed at standardising a multiphasic personality inventory to screen the maladjusted students from the college-going population.

The multiphasic personality inventory which was named as 'The Youth Adjustment Analyser, had 240 items of various types at the first stage. These items were related to five different personality areas, namely, unhealthy parental attitudes, general home adjustment, aggressive behaviour, neuroticism, and interests. It also included two qualifying scales, namely, 'the lie scale' and 'the question mark scale' for purposes of knowing the trustworthiness of responses. Two independent scales, namely, 'the Parental Attitude Scale' and 'the General Home Adjustment Scale' were constructed to assess two out of the total five personality areas mentioned above. The Parental Attitude Scale comprised five subscales for Dominance, Submission, Acceptance, Rejection, and Total Parental Attitudes. Out of forty-six items only thirty-five were finally retained after item analysis from the responses of a sample of 211 adjusted and 100 maladjusted students. Validity was demonstrated by the extreme group method and also against the external criteria of the Bell's Home Adjustment Scores and pupils' ratings. Test-retest and split-half reliability coefficients were also worked out. The norms by employing 2000 students were established. The second scale, namely, the General Home Adjustment Scale having thirty-eight items was prepared in English, Gujarati and Hindi. Validity and reliability were established by employing the procedure as that of the Parental Attitude Scale. Norms with a sample of 1590 students were established. The samples for standardising the Youth Adjustment Analyser were drawn from usual school - and college - going population and the court committed students of David Sassoon Industrial School, Bombay.

The study resulted into a standardised tool, namely, the Youth Adjustment Analyser meant for screening the maladjusted children.

315. BHATTACHARYA, C. C., *On Concrete Intelligence (An Inquiry into its Nature)*, D.Phil. Psy., Cal. U., 1964.

The major objective of the study was to construct a battery of tests of intelligence that would be applicable to the population of the state of Bengal. The second objective of the investigation was to check the possibility of a prediction of the verbal intelligence score or the IQ from the test scores of the performance tests of intelligence.

The total sample consisted of 1433 students of age groups from eight to twentytwo years with more or less 100 in each age group. Superior, average and poor schools were classified on the basis of the percentage of passes in the school final examination. The students selected were all Bengali born children of West Bengal. A battery of four performance tests of intelligence was formulated. Tests included in the battery were : (i) the Dearbon's Form Board Test, (ii) the Alexander's Passalong Test, (iii) the Goddard's Cube Construction Test, and (iv) the Koh's Block Design Test. A verbal intelligence scale prepared by Calcutta University was also administered to all the students as the criterion test.

The study revealed as follows : (i) The multiple correlation coefficients at each age were found to be significant at 0.01 level of confidence. (ii) The battery of performance tests was as valid a measure of the intelligence of an individual as the verbal type of test. (iii) The performance tests used might be considered as suitable measures of general intelligence with the same weights or credits for each item passed correctly in each of the tests; (iv) The individual tests of the battery of performance tests became effective in appraising the intellectual ability of an individual. It could be presumed that different abilities measured by the criterion test were covered by the battery of performance tests. (v) These tests of intelligence may be used in respect of the age of arrest of mental development. This age of arrest was found to be advanced by about three years and seemed to be located somewhere in the age group of nineteen. (vi) The age progression in the performance tests was not statistically significant except in a few ages. Thus the performance tests of intelligence used here, did not fulfil Binet's criterion of age progress.

316. BHAVSAR, S. J., *Developing and Standardizing a Clerical Ability Test for Pre-University Students*, Dept. of Edu., Sau. U., 1974.

The study had the following objectives : (i) to help administrators, employers and personnel offi-

cers in locating candidates with good clerical ability; (ii) to study sex differences in clerical ability; and (iii) to compare clerical ability of the students of the arts, commerce and science faculties.

The first form of the test was prepared after studying different clerical ability tests, observing the job of the clerks, and interviewing some clerks. The first draft of the test consisted of six subtests. It was administered to ten subjects — five clerks and five B.Ed. students. The first draft was then corrected and administered to a sample of 160 students — thirty-one drawn from pre-arts, fiftyseven from pre-commerce and seventytwo from pre-science. The final form of the test consisted of six subtests, namely, (i) name checking (twenty items), (ii) checking of money items (twenty items), (iii) sentence checking (twenty items), (iv) addition and subtraction (twenty items), (v) use of tables and ready-reckoners (twenty items), and (vi) alphabetical classification according to English alphabet (fifty items). It was administered to a sample of 1476 students (954 boys and 522 girls) drawn from pre-arts, pre-science, and pre-commerce classes from various colleges of the Saurashtra University. Mean, median, standard deviation, standard error of the mean and skewness were found out. The test-retest reliability coefficients for different subtests varied from 0.45 to 0.74 and for the whole test it was 0.73. Factorial validity of the test was established by finding intercorrelations between the subtests which were significant, but not high enough to nullify the need of any subtest.

The findings of the study were : (i) there was no sex difference with respect to clerical ability and (ii) there was no difference in the clerical ability of the students of different faculties included in the study.

317. BHIRUD, G. L., *The Construction and Standardisation of a Diagnostic Test in Algebra*, Ph.D. Edu., Poona U., 1975.

The main purpose of the study was to construct and standardise a diagnostic test related to some selected units of factorisation in standard IX. The study also aimed at analysing the data keeping in view some selected variables like sex and socio-economic background of students.

Examination of algebra exercise books of the pupils helped to list learning points related to factorisation. Discussions with experienced teachers about these learning points helped to formulate test items. These items were reviewed for clarity of directions, gradation, discriminatory value, appropriateness of content and adequacy of correct answers. This re-

sulted into an exploratory test which was administered to seventyfive pupils. Based upon the responses of the pupils the exploratory test was improved into a tryout test. The tryout test was administered to 370 pupils. Item analysis was carried out by finding difficulty and discrimination values of items. The final test consisted of fiftyfour items divided into several areas, such as, preliminary knowledge, knowledge of the type, knowledge of the factors of the type, knowledge of application of the formula, and knowledge of computation, substitution and simplification. The final test was administered to 1,044 pupils of standard IX in twentyeight schools of Jalgaon district. Test reliability coefficients for subtests ranged from 0.80 to 0.96. The concurrent validity against the marks obtained in the questions on factorisation in the annual examination papers, was found to be 0.78. Content validity of the test was also demonstrated. The remedial exercises had been developed and outlined.

The following were some of the findings of the study : (i) Pupils were found to be examination and certification oriented. (ii) Urban pupils were found to be significantly weaker than the rural pupils. (iii) Girls were also found to be significantly weaker than boys. (iv) Presentation of simple remedial exercises in the form of charts caused improvement in performance. (v) Weakness about signs, coefficients and indices were some of the basic hindrances to understand and perform algebraic factorisation.

318. DATTA, S. K., *Adaptation and Standardization of the Holzinger-Crowder Uni-Factor Tests*, D.Phil. Psy., Cal. U., 1967.

The purpose of the study was to adapt and standardize the Holzinger-Crowder Uni-Factor Tests (1952-53) into Bengali language.

The tests were nine in number. These tests measured four factors, viz., Verbal, Spatial, Numerical and Reasoning. The test scores on verbal, numerical and reasoning factors yielded scholastic aptitude scores. Pre-tryout was carried out on a sample of fifty students of grade VIII. The sample for standardization testing consisted of 314 boys and 106 girls from twelve schools of Tripura. Item analysis was done.

The index of internal consistency of the tests ranged from 0.56 to 0.89. The coefficient of validity by means of multiple group method was found to be 0.62 (N=400). Percentile rank and standard scores were calculated for all the tests.

319. DEB, M., *Development of a standardised Battery of Tests for selection of Engineering students*, D.Sc. Psy., Cal. U., 1968.

The purpose of the investigation was to develop a battery of tests which would help to predict success in the academic career of engineering students.

The battery consisted of the following four tests : (i) The Bose and Dutta's Group Intelligence Test, (ii) The Deb Engineering Aptitude Test, (iii) Deb's modified form of the Strong Vocational Interest Blank Test and (iv) The Bernreuter Personality Inventory (short term) adapted by Saha and Gayen. The tests were administered to a sample of 378 entrants of Jadhavpur Engineering College in 1963. The age group of the sample was between 17 and 19. All the students in the sample had passed the higher secondary examination. The test battery was again administered to 382 entrants of the same engineering college in 1964 for determining the predictive validity of the battery. Annual examination marks of the students were used as the criterion for determining the predictive validity of the battery.

Detailed analysis of the candidates' scores on each test along with the examination marks revealed the following : (i) The correlation of interest scores with the criterion scores was found to be 0.53. It was found that the interest test served best as a simple predictor test. (ii) Aptitude, intelligence and interest tests were essential for predicting future programme of academic career in a professional college. Each of these tests had positive and significant correlation with the criterion. Their correlations with criterion were 0.48, 0.39 and 0.53 respectively. (iii) correlation between personality test and the criterion for different personality traits varied from 0.02 to 0.07 and none of which was significant even at 5 percent level. (iv) Correlation between the combined weighted scores and the criterion was 0.66 while between the criterion and the interest test was 0.53. (v) The correlation between the battery of tests and the criterion was 0.66 which was significant at 0.01 level. The combined weighted tests could be planned as a valid battery of tests. (vi) Correlations between the scores on the test battery and results of 1963 and 1964 groups of students varied from 0.64 to 0.67.

320. DESAI, H. G., *Relationship of Intelligence to Sibling-Sex and Ordinal Position*, Dept. of Edu., Sau. U., 1963. (U.G.C. financed)

The main purpose of the study was to find out

answers to the following questions : (i) Do boys having a brother as an elder sibling differ in intelligence from boys having a sister as an elder sibling? (ii) Do boys having a brother as an elder sibling differ in intelligence from girls having a brother as an elder sibling? (iii) Do boys having a brother as an elder sibling differ in intelligence from girls having a sister as an elder sibling? (iv) Do boys having a sister as an elder sibling differ in intelligence from girls having a brother as an elder sibling? (v) Do boys having a sister as an elder sibling differ in intelligence from girls having a sister as an elder sibling? (vi) Do girls having a brother as an elder sibling differ in intelligence from girls having a sister as an elder sibling? (vii) Which sibling-sex combination is linked with high verbal intelligence? (viii) Do children with a male sibling differ in verbal intelligence from those with a female sibling?

A large sample of 2,699 children of first through tenth birth orders and studying in eighth, ninth and tenth grades in different high schools of Bhavnagar city was chosen. Of these, 573 children were second born. Among the second born, 166 were boys having a brother as an elder sibling, 166 were boys having a sister as an elder sibling, 128 were girls having a brother as an elder sibling, and 113 were girls having a sister as an elder sibling. Subjects were administered the Desai-Bhatt Group Intelligence Test verbal) and the Kuppaswami's Socio-economic Status Scale (urban). Data regarding intelligence of these second born children were analysed from the viewpoint of different sex-combinations. The study revealed the following findings : (i) Boys having a brother as an elder sibling, showing a tendency for higher intelligence, did not in fact differ in intelligence from boys having a sister as an elder sibling. (ii) Boys having a brother as an elder sibling, showing a tendency for lower intelligence, did not in fact differ in intelligence from girls having a brother as an elder sibling. (iii) Boys having a brother as an elder sibling, showing a tendency for lower intelligence, did not in fact differ in intelligence from girls having a sister as an elder sibling. (iv) Boys having a sister as an elder sibling were significantly lower in intelligence than girls having a brother as an elder sibling. (v) Boys having a sister as an elder sibling, showing a tendency for lower intelligence, did not in fact differ in intelligence from girls having a sister as an elder sibling. (vi) Girls having a brother as an elder sibling, showing a tendency for lower intelligence, did not in fact differ in intelligence from girls having a sister as an elder sibling. (vii) Girls having a brother as an

elder sibling had the highest verbal intelligence among all sibling sex combinations. (viii) Children with a male sibling did not differ in verbal intelligence from those with a female sibling.

321. DHAMANKAR, V. V., *Construction and Standardisation of an Aesthetic Test*, Ph.D. Soc., Nag. U., 1970.

The present study had two major groups of objectives. In the first place it intended to develop a standardised instrument to measure various basic elements forming the structure of aesthetics in order to predict individual's aesthetic development and help the art instructors. Secondly it attempted at studying the relationship between aesthetic sense and the age, sex, and the linguistic group an individual belonged to. The hypotheses stated were : (i) aesthetic sense would increase with age; (ii) females would have more aesthetic sense than males; and (iii) aesthetic sense would differ in different linguistic groups.

The aesthetic test consisted of the subtests, namely, pattern (P), symmetry (S), form (F), design (D) which included rhythm, radiation, balance and proportion, colour (C) and tone (T). The test was a nonverbal, paper-pencil type test, and was free from cultural contaminants. The pilot test contained 205 items. On the basis of item analysis, 105 items were finally retained. The reliability of the test by the split-half method was 0.95, by the method of rational equivalence 0.96 and by Hoyt's variance method it was 0.93. The study claimed that the correlational evidence of validity of the test was satisfactory. Factor analysis indicated two factors, that of Form and Colour. Percentile scores and T scores were developed. The aesthetic quotient which would give the aesthetic measure of personality was computed. For the second phase of the study, this test was administered to 1632 subjects who were equally distributed over the variables, namely, sex, age ranging between 9+ to 16+, and six language groups — Bengali, Gujarati, Hindi, Marathi, Tamil and Telugu.

The analysis of the data indicated that (i) aesthetic sensitivity developed with age, the rate of development being highest between nine and eleven years of age; (ii) females had more aesthetic sense than males; (iii) Marathi, Bengali and Gujarati groups were aesthetically more sensitive than the Tamil, Telugu or Hindi linguistic groups; and (iv) the aesthetic profiles of age groups pictured that tenth year was an outstanding age for aesthetic development.

322. *DHONDIYAL, S. N., Art as a Projective Technique for Children, Ph.D. Edu., Raj. U., 1964.*

The main purpose of the study was to develop and standardise a procedure of collection of spontaneous art of children by evolving objective techniques of scoring and interpreting art, establishing norms, and determining reliability and validity of the technique of interpretation involved.

The method employed was case study within the framework of an experiment. Sex, age, educational class and economic status were kept constant as far as possible. In addition, contrasted groups within experimental setting were studied. The tools used were Teacher's Rating Scale, Semi-projective Questionnaire (both designed for the purpose of the study), the CAT, the Rorschach Ink Blot Test, interview and intelligence tests like the Goodenough's Draw-a-Man Test, the Cattell's Culture Fair Intelligence Test, and the CIE Individual Scale of Intelligence. All these tools were used with fiftyone boys belonging to the age group of ten years and a half to eleven years and a half. Besides, case studies of eight boys were made in the process of the tryout collection of spontaneous art and of the development of a standard procedure for collection of the spontaneous art of children. The total number of spontaneous art productions of these subjects collected were 1,136. Only drawings and paintings were collected.

A technique of scoring art productions in terms of observables and measurables was evolved. Art productions of contrasted groups, from well adjusted to psychotics, provided a rich variety and characteristic differences which resulted into 194 scoring symbols. These were divided into nine categories, namely, content, element, human figure, other ego denoters, inner living, control over emotions and feelings, orientation, design, and unity. The technique of interpretation evolved consisted of three major steps, namely, structural analysis, thematic analysis, and integration of the two analyses. The reliability of the technique evolved was calculated both at the scoring and at the interpretative levels. The repeat collection of art productions of ten cases indicated that the correlations between the scorings of these two collections ranged from 0.87 to 1.00 for different sub-categories. Inter-scorer reliability was very high. For calculating reliability of interpretation of scores, the interpretative statements of the above mentioned ten cases were matched with the interpretations of the repeat collections. The matchings were hundred percent. Validity of the technique of interpretation evolved

was examined by preparing classified tables of interpretative statements taken from the results of the different projective tests used in the study. The table showed that 78.4 percent of art interpretations were matched. To interpret correctly the Rorschach responses of fiftyone subjects, the Rorschach norms for this age group in Indian conditions were established.

- *323. *DUARI, P., Evaluation of General Ability of 7 to 16½ and Adult Age Groups, Ph.D. Edu., Cal. U., 1976.*

The main aim of the present investigation was to construct and standardise the group verbal tests of general ability which could be applicable to the individuals belonging to 7—16½ year age groups at ½ year age intervals, and to adults.

Samples were drawn from all parts of West Bengal both at the try-out stage and at the standardisation stage. Samples were selected from the modal age groups of different grades so as to enable determination of both age norms and grade norms on the basis of same sample data. The sample size for different sets of test at the normative stage were as follows : 3078 for set I, 4098 for set II, 4075 for set III, 6624 for set IV and 3566 for set V. While administering the tests on the above sample, general instructions were first given to the testees and then specific instructions were given regarding the items. The estimates of the reliability for the sets I, II, III, IV and V were 0.95, 0.96, 0.97 and 0.97 respectively.

Thus, altogether five sets of tests were developed in accordance with their suitability for different age groups. In each of the set of tests there are two parts : the numerical part consisting of four/five types of 40/50 items and verbal part consisting of four/five types of 40/50 items. The item types are : Part A (numerical) — (i) number series, (ii) number matrices, (iii) fundamental operations, (iv) symbolic operations, and (v) generalisation of results; Part B (Verbal) — (i) classification, (ii) analogy, (iii) logical arrangement of words, (iv) logical arrangement of sentences, and (v) inference.

324. *GAKHAR, S, Intellectual and Personality Correlates of Creativity. Ph.D. Psy., Pan. U., 1975.*

The objectives of the present study were : (i) to identify such measures of intelligence and traits of personality that acted as correlates of creativity; and (ii) to find out the developmental trends of creativity for girls in grades IX through XI. The study hypo-

thesised relationships between creativity, intelligence, personality traits and difference in grade levels.

The sample of the study comprised 730 girls selected from grades IX (N = 281), X (N = 246), and XI (N = 203) of higher secondary schools of urban areas in Punjab. The age of the sample ranged from thirteen to seventeen years. The technique of sampling adopted was multistage randomisation of clusters. The tools used were: (i) the Torrance Tests of Creative Thinking, Verbal Form A and Figural Form A, (ii) the Group Test of General Mental Ability by Jalota and Singh, (iii) the California Psychological Inventory, and (iv) the Bernreuter Personality Inventory. The final data included scores on verbal and nonverbal intelligence, different aspects of creativity and personality traits. Descriptive statistics like mean, median, mode, SD, skewness and kurtosis were worked out so as to ascertain the nature of score distributions pertaining to each variable under consideration. Product-moment correlation, multiple correlation, t ratios and factor analysis were also utilised in the statistical analysis of data.

The major findings of the study were as follows: (i) Factor analysis brought forth a 'General Factor of Intellectual Functioning', a 'Group Factor of Verbal Creativity' and a 'Group Factor of Nonverbal Creativity' indicating thereby that both creativity and intelligence were two distinguishable modes of the same intellectual functioning, yet at the same time they were not distinctly independent of each other. (ii) Unique constellations of traits of personality and measures of creativity existed in terms of common factors in different combinations and provided an empirical basis for identifying the personality correlates of creativity. (iii) The traits of social presence, psychological-mindedness and femininity did not correlate significantly with verbal creativity, whereas capacity for status and flexibility did not act as correlates of nonverbal creativity. (iv) Obtained values of correlations showed that out of twenty-four personality traits chosen in the study, fifteen were correlated positively with verbal creativity while eighteen were correlated positively with nonverbal creativity. (v) High and low groups of creative girls as identified on the basis of total verbal creativity differed significantly in respect of status, intellectual efficiency and flexibility, and when identified on the basis of total nonverbal creativity, the groups were found to be significantly differing on the personality traits of self-acceptance and self-sufficiency. (vi) It was observed that twentyone traits of personality as independent variables conjointly influenced verbal and

nonverbal creativity accounting for higher values of correlations. (vii) A consistent increase in the mean scores from grades IX to XI on all the measures of verbal and nonverbal creativity showed that creative development took place on all measures until about the age of fifteen years, although some of the measures of nonverbal creativity were found to develop even beyond this age.

325. GANGOPADHYAY, P. K., *Social Intelligence And Its Relationship With Abstract And Mechanical Intelligence*, Ph.D., Edu., MSU, 1975.

The major objectives of the present study were: (i) to construct and standardise a test of social intelligence; (ii) to find out the relationship of social intelligence with abstract and mechanical intelligence; (iii) to help teachers in providing the right type of guidance to the pupils regarding the development of this ability in them and choosing suitable occupation for them; and (iv) to help the recruiting authorities of different establishments to select appropriate personnel for the occupations where ability to deal with human beings was required.

The total sample of 1,112 students was selected from the five universities of Gujarat by random sampling technique. The derived sample comprised boys and girls from rural, semiurban and urban areas and from English and Gujarati knowing students of arts, science, commerce, education, medicine, technology and engineering faculties. The first phase dealt with the construction and standardisation of a test of social intelligence. Five subtests for the test were: (i) memory for names and faces; (ii) judgment in social situations; (iii) observation of human behaviour; (iv) recognition of the mental state of the speaker; and (v) sense of humour. The reliability of the test was determined by test-retest, split-half and by rational equivalence methods. The content, construct, congruent, concurrent, factorial, and cross validities were established. Standard score norms, percentiles, percentile ranks and grade norms were established. The second phase dealt with the relationship of social intelligence with abstract and mechanical intelligence. The tools employed were: (i) the Desai-Bhatt Verbal Group Test of Intelligence, (ii) the Mechanical Reasoning Test, and (iii) the Ganguli's Test of Social Intelligence.

The findings of the study were: (i) all the five subtests measured a general common factor which had significantly high loadings on all the tests; (ii) boys and girls did not differ significantly in the performance on the social intelligence test; (iii) the mean

performance of the urban students was significantly higher than that of semiurban and rural students; (iv) the students studying in the technology and engineering faculty secured the highest mean score, whereas the lowest mean score was obtained by the arts students; and (iv) there was significant positive relationship between social intelligence and abstract and mechanical intelligence.

326. GOYAL, R. P., *A Study of Some Personality Correlates of Creativity in Secondary School Teachers under Training*, Ph.D. Edu., Punjabi U., 1974.

The investigation aimed at studying the personality correlates of creativity in secondary school teachers under training. Specifically the study included in its scope, determination of personality differences in relation to sex and subject groups as well, besides creativity differences in relation to sex and subject groups. The study also determined relationship of creativity with teaching success. Preparation of norms for variables of personality and creativity was another objective.

The tools employed were the Cattell's 16 PF for measuring personality factors and the Torrance Tests of Creative Thinking — both verbal and figural — for assessing creativity and its dimensions. The two tests of Torrance were : (i) Thinking Creatively with Words, Booklet A, and (ii) Thinking Creatively with Pictures, Booklet A. The above tools were translated into Punjabi and Hindi. These were adapted to local conditions. The norms in T-Score form were available for these two tools. The sample of the study consisted of 500 student teachers enrolled in five training colleges of Punjab. Efforts were made to give fair representation to geographical areas and sex. The sample comprised 200 males and 300 females from five training colleges in the districts of Patiala, Ferozepur, Amritsar, Jullunder and Ludhiana. The age ranged from eighteen years to fortyseven years with a mean age of 21.83 years. For the purpose of statistical analysis the sample was divided into groups of boys and girls, extreme high and low groups, and subjectwise groups. Significance of difference between means and also Pearson's product moment correlations were employed in analysing the data statistically.

The main findings of the study were as follows : (i) Highly creative persons did not enter the teacher training colleges, and therefore, only slight personality differences existed between high and low creative student teachers. Intelligence was the only

factor which had consistently been found as the personality correlate of creativity in teachers under training. (ii) High flexible student teachers were found to be more guilt prone and less imaginative than their low flexible counterparts. (iii) Intelligence and venturesome temperament emerged as the most frequently observed personality correlates of creativity in female teacher trainees. (iv) High creative females tended to be victims of self-conflict. They were moralistic and socially precise, and, at the same time, socially bold and were not having inhibition. (v) Toughmindedness and suspiciousness were found to be associated with low as well as high creativity more in male student teachers than in female student teachers. (vi) High creative science group was found to be more characterised by higher guilt proneness and higher strength of self sentiment than high creative science-mathematics group. (vii) Social boldness and high strength of self sentiment were more associated with high creativity in science student teachers, but these were more associated with low creativity in science-mathematics student teachers. (viii) A common core of personality consisting of higher intelligence, higher emotional stability, toughmindedness, and better adjustment, etc., ran through the science-mathematics group at higher as well as lower levels of creativity. This core differentiated it from the language and social science groups at both the levels. (ix) Imaginativeness was found to be associated with low creativity more in science-mathematics than in language — social science student teachers.

327. GUHA, M., *Construction and Standardisation of the Engineering (Mechanical and Electrical) Aptitude Test*, D. Phil. Psy., Cal. U., 1957.

The purpose of the study was to construct and standardise a paper-pencil test for Indian students seeking admission to graduate colleges of engineering with the help of which the presence or absence of a special aptitude for engineering profession (mechanical and electrical) could be detected in them.

The tryout form of the test was administered to a sample of 100 students of the first science class. The final form of the test was administered to a sample of 334 students who had newly joined the Jadavpur engineering college. The students had passed the first year science examination and were mostly in the age group of 18 to 20. Along with this an intelligence test developed by Bose and Datta, and a temperamental questionnaire developed by the Calcutta University, were also administered in order to ascertain if any student in the sample was imbalanced.

The annual performance of these candidates at the college examinations was recorded for three consecutive years. The test in its final form, which was named as the Indian Engineering Aptitude Test, consisted of forty questions with a time limit of twenty minutes. The forty questions were grouped under five sets, namely, (i) mechanical interest and trend of mind; (ii) power of observation, interest in engineering and logical reasoning; (iii) knowledge of elementary scientific laws and relation between shapes; (iv) basic knowledge of physical instruments and their application; and (v) mathematical interest with a comprehensive knowledge of their application in scientific and mechanical investigation.

The split-half reliability of the test was found to be 0.89. The validity of the test was established by correlating the test scores with the examination results of the standardisation group for three years.

- *328. GUPTA, K., *Construction and Standardisation of Clerical Aptitude Tests in Hindi*, Ph.D. Psy., BHU, 1969.

The study was attempted with the purpose of constructing and standardising a battery of clerical aptitude test in Hindi.

Out of 700 items used for item analysis, 388 items were retained in the final form. These 388 items were distributed in the seven subtests, namely, (i) Test of Intelligence (40); (ii) Test of Numerical Ability (50); (iii) Test of Language Usage (60); (iv) Test of Classification (48); (v) Test of Filing (80); (vi) Test of Copying (50); and (vii) Test of Checking (60). The final tryout has been done on a sample of 1500 clerks who had passed intermediate or an equivalent examination from various employment exchanges of U.P., out of which 1,440 were men and sixty were women.

Percentile and stanine norms were developed. Reliability was obtained for various tests on a sample of 250 cases. The estimated reliability coefficients of various tests ranged from 0.957 to 0.980. Index of reliability ranged from 0.949 to 0.978. Mean phi-coefficients of items selected for various subjects were found to be 0.45, 0.46, 0.47, 0.59, 0.65, 0.56 and 0.50 respectively. Intrinsic validity was found to be 0.949, 0.961, 0.968, 0.986, 0.972, 0.976 and 0.978 respectively for the subtests of the battery. Validity coefficients against the criterion of supervisors' quantitative rating ranged from 0.427 to 0.662 for various subtests, whereas those obtained against the criterion of supervisors' qualitative rating ranged from 0.462 to 0.714. Validity of entire battery estimated by mul-

tiple correlation using Atkin's method of pivotal condensation amounted to 0.786 which was statistically significant beyond 0.01 level of significance.

- *329. JANI, A. V., *Need and Scope of Educometrics in Developing Education as a Behavioural Science*, Ph.D. Edu., Bom. U., 1977.

The objectives of the study were : (i) to study all the variables of the educative process; (ii) to study conditions and factors that have a great impact on them; (iii) to study other behavioural sciences like psychology, sociology, economics and psychiatry and research findings in these disciplines to critically examine their claim as behavioural sciences; and (iv) to suggest some of the items, instruments or scales, tests and criteria for measuring the variables of the educative process.

The normative method along with the extensive library reading and cross-section reference was adopted for this study.

The study arrived at the following conclusions : (i) It is not only necessary but is an urgent need of the present day that the discipline of educometrics should be developed. (ii) The tools of psychometrics, sociometrics and econometrics are to be accepted as a great help but they are inadequate to study all the variables of education. (iii) The process of preparing different measures and new tools should be started with identification and classification of variables and more towards the precise measurement and prediction of results. (iv) The new concept of educometrics is definitely interdisciplinary and so there is a great scope for comments and suggestions by expert viewing of the subject from different angles. (v) In order to be called the behavioural science, the field of education will have to be investigated and studied with the tools developed through educometrics.

330. JHA, S. K., *An Analysis of Certain Dimensions of Creativity*, Ph.D. Edu., MSU, 1975.

The main purpose of the study was to explore and analyse certain personality dimensions and to obtain some personality profiles of creative persons.

In order to draw a sample of highly creative persons the nomination method was adopted. For this purpose information was collected from the list of winners of National Awards of the erstwhile Bombay State, the Times of India Directory and Yearbooks, India-Who is Who, the Filmfare files, list of the recipients of Bharat Ratna, and Padma National awardees. This resulted into a preliminary list of 166 persons either from Gujarat or Maharashtra. This list was sent to judges drawn from university pro-

of 1,002 pupils were found to be gifted. The Torrance's Creativity Test and the Cattell's 16 Personality Factor Test were administered to these pupils. At the end of the study the dropouts brought down the sample to 935. Annual examination marks were treated as achievement scores of the pupils. Statistical techniques used were item statistics, T Scores, t test, r, and F test.

Following were important findings of the study : (i) giftedness was the most effective contributor to all types of creativity scores; (ii) age was an important correlate of creativity at fifteen year age-level; (iii) none of the main effects of IQ, age, and sex upon the personality factor A (Cyclothymia versus Schizothymia) was significant; (iv) giftedness was a significantly contributing factor to personality factor B (General Intelligence versus Mental Defect) in all cases; (v) giftedness was contributing to emotional maturity in case of boys; (vi) giftedness, sex, and age did not contribute significantly to surgency; (vii) there was low positive significant correlation between intelligence and all types of creativity scores; (viii) almost all creativity scores had low positive correlation with achievement scores in all school subjects except English; (ix) there was no significant correlation between different creativity scores and different personality traits except in factor B (General Intelligence versus Mental Defect), factor G (Character or Super Ego Strength versus Lack of Rigid Internal Standards), factor I (Premia versus Harria), factor L (Protension versus Relaxed Security), factor Q₁ (Radicalism versus Conservatism of Temperament), factor Q₃ (High Self Sentiment Formation versus Poor Self Sentiment Formation), and factor Q₄ (High Ergic Tension versus Low Ergic Tension).

333. KAPAT, G., *Construction and Standardisation of a Group Intelligence Test for Juniors*, D.Phil. Psy., Cal. U., 1960.

The purpose of the study was to standardise a group intelligence test in Bengali for children of classes V and VI, i.e., for those who were just entering or who had just begun their secondary school career.

The sample for the tryout study consisted of 228 children of both sexes belonging to grades V and VI of five different schools of Calcutta and its suburbs. Sample for the final study consisted of 396 children which included 203 boys and 193 girls. The subjects were all Bengali speaking children studying in classes V and VI of eight secondary schools. The test in its final form consisted of seventyfive items — forty nonverbal and thirtyfive verbal. The test was divided into five subtests, viz., classification, analogy,

series completion, synonym-antonym and practical judgment. Separate time limits were fixed for each subtest.

The important findings were : (i) Items had a wide range of difficulty and discrimination. (ii) The split-half reliability coefficient for different subtests ranged between 0.76 and 0.88, and that of the entire battery was found to be 0.90. (iii) The validity coefficients of the test battery ranged from 0.32 to 0.70. (iv) Factor analysis yielded one factor, the psychological correlate of which could be interpreted as 'relational thinking'. (v) The group differences studied through analysis of variance indicated that the scores did not differ significantly with respect to sex; however, the difference was significant at 0.01 level with respect to grades. Separate grade norms and percentile norms were established.

334. KAUL, B., *Construction and Standardisation of a Test to identify Creative Children in the age range of 14 to 16 years*, Ph.D. Psy., MSU, 1974.

The study was undertaken to develop and standardize a test of creativity for children in the age group of 14 to 16 years.

The test consisted of five subtests, viz., (i) sentence completion test (ten items); (ii) uses test (ten items); (iii) creative writing test (ten items); (iv) consequences test (ten items); and (v) problem solving test (nine items). The initial tryout of the test yielded the optimum time limit to be given for the test to be three and a half hours. Since it was found that it was a very long time to create fatigue for the subject, each subtest was treated as a separate test and in each session three groups of subjects were tested simultaneously giving subtests I and II to a group, subtest III to another and subtests IV and V to yet another group. In three sessions all the subjects took all the five subtests in rotation. Item analysis was done after administering the test to a sample of 350 subjects. Discrimination index was computed. The sample for the preparation of norms consisted of 1,000 students from the different schools of Delhi. For the present test decile norms, standard score norms were established.

The reliability of the test by using test-retest method was found to be 0.75 (N = 100). The present test gave a correlation coefficient of 0.72 with the Torrance Test of Creative Thinking 0.13 (N=70) with a teacher's rating scale, and 0.26 (N = 50) with the Raven's Standard Progressive Matrices. The test also correlated high with the Shanker's On the Spot Painting and Writing Test.

fessors and renowned professionals. The judges suggested eightyeight more names of highly creative persons. The judges also ranked these 254 persons for their creativeness. The final selected sample consisted of sixty-six creative persons. Out of sixty-six, data of only thirty-five persons could be collected. Data on a questionnaire having eighty statements were collected. The data were further supported by a Self Data Card filled by the respondents. The data were subjected to factor analysis by employing centroid method.

The main findings of the study were related to following four factors: (i) the first factor emerged with the description of the creative person as having rational optimism, high ego strength, realistic and healthy attitude towards life, openness to experience, assertive self-confidence, and tendency for self-actualisation; (ii) the second centroid was a bipolar factor having high positive loadings with religious dedication, religious mystical, fatalistic, and faith in supernatural powers, whereas it had negative loadings with practical, nonreligious, outspoken, and self-confident; (iii) the third centroid was also a bipolar factor having high positive loadings with mystical-intuitive guidance from inner self, whereas it had negative loadings with nonmystical, industrious, exerting, and extravert behaviours; and (iv) the fourth bipolar centroid was positively loaded with self expression, openness to experience, flexible value orientation and negatively loaded with fixed value orientation, methodical, social, extrovert, and sensational type of behaviours.

*331. JOSHI, D. C., *Construction of a Battery of Selection Tests for Pupils Seeking Admission in Technical Higher Secondary Schools of Delhi*, Ph.D. Edu., Kur. U., 1978.

The objective of the study was to develop a battery of selection tests for pupils seeking admission in technical higher secondary schools of Delhi. It was hypothesised that success in technical courses were related to: (i) verbal ability, language usage, numerical ability and general information; (ii) mechanical knowledge and comprehension, perceptual ability, and spatial ability; and (iii) school achievement and school examination marks in mother tongue, mathematics and science.

A verbal ability test, a language usage test, a numerical ability test, a general ability test and a general information test were developed for the battery. The Atmanand Sharma's Mechanical Aptitude Test was used to measure the mechanical ability. Students' home examination marks provided the scores

for the achievement of students. A total of 253 students studying in IX grade of technical higher secondary schools constituted the sample. The split-half reliability was computed. Pearson's product-moment correlation and multiple regression analysis were used for analysis of data.

The odd-even reliability for the verbal ability test was 0.816; for language usage test it was 0.837; for numerical ability test it was 0.851; and for the general information test it was 0.876. The verbal ability test had significant relationship with all the criteria of school performance except workshop. Its predictive validity was 0.361 with total, 0.356 with theory and 0.290 with practical. The language usage test had significant relationship with all criteria except workshop and physics practical. Its predictive value for total was 0.304, for theory was 0.332 and for practice was 0.173. The numerical ability test had significant relationship with all the criteria. Its predictive value for the total was 0.486, for theory was 0.487 and for practice was 0.356. The general information test had significant relationship with all the criteria except physics and chemistry practicals. Its predictive values were 0.301 for total, 0.302 for theory and 0.225 for practice. While comparing common variance between the sets of predictors, the four tests appeared to conform to the pattern of long-range prediction.

332. JOSHI, R. J., *A Study of Creativity and Some Personality Traits of the Intellectually Gifted High School Students*, Ph.D. Edu., MSU, 1974.

The study was conducted to fulfil the following objectives: (i) to locate intellectually gifted children from the secondary schools; (ii) to study sex differences in creativity and personality traits of the gifted children; (iii) to study differences in creativity and personality traits of the gifted children with respect to their age; (iv) to study the creative ability of these gifted students by relating creativity with intelligence, achievement and personality traits; and (v) to offer some suggestions based on these findings.

The study employed descriptive correlational survey method of research. The sample was drawn from six districts of Gujarat State, namely, Ahmedabad, Baroda, Broach, Kaira, Panchmahals, and Surat. The pupils were randomly drawn from standards VII to XII of twenty-three secondary schools of the above six districts with age ranging from twelve to nineteen years. Out of the available population of 8,216 pupils, only 3,503 pupils were administered the Desai-Bhatt Group Test of Intelligence. The pupils with IQ 120 and above were termed as gifted children. A total

335. KAUL, K. K., *Horizontal Versus Vertical Development of Intelligence*, Ph.D. Edu., Kan. U., 1974.

The purpose of this study was to see whether intelligence — innate or acquired — benefited by experience in order to make an effective adjustment with the environment.

The sample consisted of 137 entrants to the B.Ed. class of Dayanand Women's Training College, Kanpur, for the session 1969-70. After giving intensive training and constructive suggestions and help during their practice teaching, it was seen how far they improved in those areas. The tools used for the study were: (i) the Bansidhar's Group Test of Intelligence; (ii) the Bureau of Psychology, Uttar Pradesh, Test No. 11, for Adult Intelligence; (iii) the Jalota's Group Test of General Mental Ability (1964, 1966); (iv) the Joshi's Humanities Group Test of Mental Ability (1964); (v) the Mehta's General Intelligence Test (1963); (vi) the Tandon's Group Test of Intelligence (1961); and (vii) the Painted Adult Intelligence Test. Inter-correlations between various items were worked out according to the Thurstone PMA and the Thorndike CAVD.

The following were the main findings: (i) the CAVD covered the items originally analysed under Cognition Memory, Reasoning and Conceptualisation. The PMA did not yield very useful results; (ii) the native intelligence or the genetic 'g' factor had its limitations but it was capable of development; (iii) there might be a lag between those with a high 'g' factor and those below the average, but perseverance would narrow the gulf; and (iv) the 'g' factor was primarily genetic but it admitted vast horizontal development through environmental experiences which consisted of various factors of which education was the most important factor.

- *336. KHANAPURKAR, H. K., *Construction and Standardization of a Group Test of Intelligence in Marathi for the Children of Age Group 13 to 17 years and residing in Marathawada Region of Maharashtra State*, Ph.D. Edu., MSU., 1976.

The purpose of the study was to construct and standardise a verbal group test of intelligence for the children of age group thirteen to seventeen years and residing in Marathawada region of Maharashtra State.

The first try out of the test was done on 370 students studying in standards VIII to X. The second try out of the test was done on a representative sample of 2471 students studying in standards VIII, IX and X

drawn from twentyone schools belonging to the five districts of the region under study. The final form of the test consisted of 154 items distributed over eight subtests, namely, (i) synonyms, (ii) antonyms, (iii) analogy, (iv) classification, (v) reasoning, (vi) logical inferences, (vii) arithmetic problems, and (viii) number series. The final form was administered on a representative sample of 7745 students to establish norms.

The coefficients of reliability as found by test-retest, split-half, and K-R methods were respectively 0.81, 0.95, and 0.84. The coefficients of validity against school marks and the Nafde's Nonverbal Test of Intelligence were 0.5552 and 0.8586 respectively. When factor analysed by centroid method, the factors extracted were 'g' factor (seventynine percent), Numerical Factor (thirteen percent), and Verbal Factor (eight percent). Norms for each age group were developed.

337. KHIRE, U. S., *Creativity in relation to Intelligence and Personality Factors*, Ph.D. Psy., Poona U., 1971.

The main objectives of the study were: (i) to find out the characteristics of creative thinking; (ii) to find out the relationship between creativity and intelligence; and (iii) to study the personality characteristics of creative persons.

The sample for the study consisted of 1054 boys of grades VII through XI of a single school. A battery of creativity tests patterned after Guilford and Wallach and the Raven's Advanced Progressive Matrices were used to measure creativity and intelligence respectively. These formed independent variables. The dependent cognitive and noncognitive measures included the scores on the Bennett's Mechanical Comprehension Test, school marks, interests regarding academic subjects, games and hobbies, students' ratings of peers and teachers, and the scores on the Bernreuter's Personality Inventory. For the upper extreme groups — first twentyfive on creativity and the first twentyfive on intelligence — some more measures were obtained which included scores on the instruments such as the Bell's School Inventory, the Pasadena Pupil Judgement Test, the speed of verbal thinking, an indirect sentence completion test, the Self-Perception Test, the Personal Data Sheet, the Your Expectations About your Child (for mothers), and the teachers' ratings. Nine top most creative students were further studied through home visits and interviews. The statistical techniques employed comprised means, standard deviations, analysis of variance, chi-square test, t test, correlation and factor analysis.

The following were some major findings : (i) the chosen variables of creativity (abilities of fluency, flexibility and originality of thinking, or redefinition and elaboration) remained closer to each other, and at the same time farther from intelligence; (ii) at the age of 13+ creativity did not increase linearly just like intelligence; (iii) above 1.2 SD distance on the positive side on intelligence scale, creativity showed zero correlation with intelligence; (iv) creativity had lower correlation with aptitude of mechanical comprehension and higher with scholastic performance as compared to intelligence; (v) poor quality of academic performance was directly related to low intelligence, and high quality with high creativity; and (vi) the high creative, low intelligent students found that all teachers were more or less alike.

*338. KUNDLEY, M. B., *A Test of Literary Creativity in Marathi, Ph.D. Edu., Nag. U., 1977.*

The study aimed at (i) preparing a battery of tests for assessing literary creativity of students in Marathi; and (ii) analysing literary creativity, finding out some of the functional constituents of literary creativity, the common factors which run through varied manifestation of creative writing and at quantifying the selected test variables and their contributions to literary creativity. The concept 'creativity' has been defined as an ability to write creatively or a potentiality or aptitude for creation of new works of beauty of any size and form through the medium of language.

The test variables were : (i) poetry writing, (ii) short story writing, (iii) imagery formation, (iv) poetry completion, (v) story completion, (vi) descriptive style, (vii) emotional writing, (viii) dialogue writing, (ix) sentence fluency and (x) verbal fluency. Guidelines from previous tests, theory of literary criticism in Marathi and consultation with twentyfive creative Marathi writers were the sources for determining the constituents of literary creativity. The test consisted of ten sub-tests. A total of 1200 boys and girls studying in standard X were included in the sample.

Reliability of each test was established. Inter-correlations of the tests were found out. The data were also subjected to factor analysis.

The reliability coefficients of the tests in order were 0.814, 0.881, 0.794, 0.728, 0.884, 0.518, 0.827, 0.818, 0.918 and 0.798 respectively. The correlation matrix showed that correlations between the different tests ranged from 0.3226 to 0.5984; and number of them were very high. It showed the indepen-

dent nature of different tests. Factor analysis revealed two factors. Factor I represented the Emotive Language and factor II represented the Architectonics of Content. The average performance of the students in all the tests was very poor, and distribution was highly skewed. All the ten tests were validated against the criteria of teachers' rating obtained on a five point scale. The value was found by computing Multiple R. The R was +0.697. The coefficient established a good predictive validity of the battery.

339. KUNDU, R., *Construction and Standardisation of New Personality Test, D.Phil. Psy., Cal. U., 1961.*

The aim of the study was to construct and standardise a suitable test of personality to measure neurotic tendencies of adult people of both sexes.

The inventory consisted of sixtysix statements (in English) which covered symptoms of general psychoneurosis and which were slightly projective in nature. The sample for the tryout study consisted of 360 students belonging to eleven different colleges situated in and around Calcutta. In addition to this, data were also collected from a criterion group of fortytwo neurotic patients undergoing treatment at different hospitals of Calcutta. Sample for the final standardisation consisted of 1,000 students, of which 692 were males and 308 were females, and a criterion group of fifty neurotic subjects.

In case of the normal group the coefficients of reliability by odd-even and first half and second half methods were 0.90 and 0.80 respectively. The corresponding indices for the neurotic group were 0.80 and 0.72 respectively. The coefficients of validity of the inventory for male and female subjects were found to be 0.86 and 0.87 respectively.

340. LIDHOO, M. L., *An attempt to construct a Psycho-diagnostic Tool for detection of Potential Delinquents among Adolescents aged 14 19 years, Ph.D. Psy., Pan. U., 1972.*

The present study was an attempt at constructing psycho-diagnostic tool for prediction of delinquency potential of adolescents.

For compilation of items ex post facto method was adopted. An intensive study of sixty delinquents of Central Jail, Delhi was conducted through interview and study of police records. Four factors were found, viz., family, dependence/independence, sex and emotionality. A set of 400 items based on this study, and standardized tests and inventories were drafted in Hindoostani language. This first draft was administered on sixty institutionalized delinquents and

sixty non-delinquents. On the basis of item analysis result, 115 items that discriminated at one percent level were retained. The final distribution was thirty-five items on family, twenty-six items on dependency/independency, twenty-eight items on sex, and twenty-six items on emotionality. The test was administered further to 200 delinquents and 200 non-delinquents. Reliability coefficients by formula K-R 20, came to 0.824 for family, 0.719 for dependence/independence, 0.771 for sex, 0.836 for emotionality, and 0.919 for the whole test. The validity of the test was established by follow-up study of extreme cases. The point biserial correlation was 0.66, and by correlating it with teacher rating the coefficient of correlation was 0.82.

The scale, termed as LD Proneness Scale, showed significant discrimination between delinquents, potential delinquents and well socialised youngsters. The delinquency seemed to spring mainly from homes which were broken, discordant and poor in moral fibre. These delinquents and potential delinquents were emotionally unstable, aggressive, affectionless, adventurous and prone to risk.

341. MAJUMDAR, P. K., *Construction and Standardisation of a Group Scholastic Aptitude Test*, D. Phil. Psy., Cal. U., 1966.

The major objectives of developing this test were :

- (i) it should assess the level of higher secondary Bengali speaking students of Calcutta schools so that their future grade achievement could be predicted;
- (ii) profile obtained from the test should facilitate guiding students for selection of academic streams after the completion of the eighth grade.

Tryout study was conducted on a sample of 370 students selected randomly from a total of 9,000 students of Calcutta. Final standardisation of the test was carried out with a sample of 1,815 school going students of ages eleven to nineteen and grades VIII to XI of the multipurpose higher secondary schools located in the different parts of Calcutta. The schools in Calcutta city were divided on zonal basis as those belonging to south zone, central zone and north zone of Calcutta. On the percentage of success in the public examinations, these schools were again classified into three grades, namely, A, B and C. The test included nine subtests relating to functional measures of ability perceived in logical relations, reasoning ability and ability to use symbols. The nine subtests were : (i) information, (ii) similarities, (iii) comprehension, (iv) analogy, (v) deductive reasoning, (vi) mathematical reasoning, (vii) vocabulary, (viii) classifica-

tion, and (ix) inductive reasoning. The final form of the test included 103 items in all.

Some of the findings were : (i) Split-half reliability for the full scale was 0.934, K-R reliability was 0.92 and test-retest reliability ranged from 0.80 to 0.90. (ii) Correlations of test scores with school examination results reported one term after the testing ranged from 0.57 to 0.88 for the different subsamples and the correlation of test scores with school examination results reported approximately at the same time of testing ranged from 0.62 to 0.78. (iii) The test could not be of much help in guiding the students to select streams after the completion of eighth grade. (iv) No significant difference was noticed in the profile patterns of the humanities and the science groups. (v) It was found that if there was any significant difference in the performance of the two groups, it was only in the level. The science group was consistently the better achiever in all the subtests. (vi) The factorial composition of different tests failed to differentiate the two groups.

342. MEHROTRA, P. N., *Construction and Standardization of a Group Mixed Test of Intelligence for Children from 11 to 17 Years*, Ph.D. Psy., Agra U., 1972.

The study aimed at constructing and standardising a group mixed test of intelligence for children of the age range 11 to 17 years.

The scale was constructed on the lines of the Wechsler-Bellevue Scale of Intelligence (in group form). The scale consisted of ten subtests, five verbal and five nonverbal. The verbal subtests were analogy test, number series test, classification test, vocabulary test and reasoning test of verbal type. The non-verbal subtests were analogy test, arrangement test, classification test, digit-symbol test and part-fitting test of nonverbal type. Twenty items in each subtest were constructed in the preliminary form. This was tried out on a sample of 200 pupils drawn from different institutions of Moradabad town. Item analysis was carried out. The final form of the scale consisted of two tests, verbal and nonverbal, each containing five subtests. Under each test 50 items were organised in an omnibus selective form. Since the scale consisted of both verbal and nonverbal tests, it was called a scale of mixed test of intelligence. The final form of the scale was administered on a sample of 2101 pupils drawn from various schools selected from 13 districts of Uttar Pradesh, which was stratified into three regions.

It was found that the verbal test, nonverbal test

and the full scale gave coefficients of reliability by split-half method as 0.91, 0.81 and 0.88 respectively; by K-R formula 0.90, 0.80 and 0.85 respectively; and by test-retest method 0.89, 0.82 and 0.85 respectively. The verbal test, nonverbal test and the full scale gave coefficients of validity against teachers' ratings as 0.86, 0.72 and 0.87 respectively; against examination marks as 0.36, 0.30 and 0.39 respectively; against the Jalota's Group Test of General Mental Ability 0.54, 0.37 and 0.47; and against the Bhatia's Intelligence Test 0.53, 0.61, and 0.56 respectively. All subtests except analogy on nonverbal test of the scale were found to be highly saturated with 'g' factor loadings which ranged from 0.2478 to 0.8269. Factorial validity was established by the Hotteling's Principal Component method. Ten factors were extracted by the method given by Kendall. Factor loadings revealed that the test was heavily loaded with 'g' factor. Age norms, grade norms, standard scores, T scores, deviation IQs, and centile norms were developed.

343. MUKERJEE, N., *Talent Search*, Dept. of Applied Psychology, Bom. U., 1967. (NCERT financed)

The present study aimed at finding out how far the talent of the Bombay school population fulfilled the promise held by their general intelligence. The term 'Talent' is referred to those whose scores on the intelligence test belonged to the top three percent of sample.

A representative sample of 10,492 boys studying in IX standard of sixtyeight secondary schools of Bombay was selected. The Nafde's Nonverbal Test of Intelligence (NVTI) was administered and the first 750 boys were selected. A final group of 305 boys were selected as talented on the basis of their performance on the Nonverbal Intelligence Test 70/23 of the National Institute of Industrial Psychology of Great Britain. To compare the achievement, in general, of the talented group, 100 boys whose performance on the NVTI was at about sixtieth percentile was selected to form the reference group. The Bell's Adjustment Inventory was administered to both the groups to know the adjustment of the two groups in the four areas, viz., home, health, emotion, and social. Study habits, vocational choice, parental attitude towards boys, the attitude of boys towards their parents, and the parents' income and educational status were found out through questionnaires which were administered to boys and their parents. A checklist was used to tap information about the boys' hobbies and interests.

The following were some of the salient findings : (i) It appeared that both the talent and reference groups were maladjusted to home, health, and emotion but a little better adjusted to sociability. (ii) Fiftyeight percent of talent came from the highly educated homes, forty percent from semi-educated homes and 23.8 percent from not well educated homes. (iii) In terms of income groups, 31.6 percent of talent came from the income group of over Rs. 1000, 33.5 percent from the income group of Rs. 501-1000, 19.6 percent from the income group of Rs. 301-500, 12.7 percent from the income group of Rs. 151-300, and 2.7 percent from the income group of less than Rs. 150. (iv) Talent group had a greater choice than the reference group in the vocations, viz., engineering, architect, chartered accountant, priesthood, I.A.S., musician, medical, scientist, technician, artist, and I.F.S. The reference group had a greater choice than the talent group in the vocations, viz., defence service, business executive, clerk, lawyer, independent business and farmer.

344. NAIR, S. K., *An Analytical Study of the Factor Patterns of Verbal and Non-Verbal Tests of Intelligence*, Ph.D. Psy., Ker. U., 1973.

The present study was undertaken to find out whether the tests, the items of which were predominantly verbal, nonverbal or numerical, measure the same or different factors.

The battery of verbal tests consisted of eleven subtests of intelligence, namely, analogies 1, number series, syllogisms, word meaning, word opposites, arithmetic reasoning, analogies 2, best answers, word classification, letter series, and proverbs. The preliminary form of these tests was administered to a sample of 370 pupils. The final form of the tests was prepared after item analysis. The test-retest reliability coefficient for these tests ranged from 0.71 to 0.92. The final form of the tests thus developed, the Kerala Nonverbal Tests of Intelligence, the Nonverbal Tests of Intelligence (NVTI), the General Mental Ability Test (Nonverbal), and the Raven's Standard Progressive Matrices were administered to a sample of 400 pupils studying in standards VIII, IX and X in the high schools of Trivandrum Educational District. When the scores were analysed it was found that only sixteen of the twentyseven variables gave a normal distribution. Only the scores of these sixteen variables were considered for the final analysis. Correlations among the sixteen variables were computed using the Pearson's product-moment method. The correlation matrix was factor analysed using Principal Axes solu-

tion. The residuals after the fourth factor were found to be not significant. The factors were then rotated using the varimax method.

Among four factors extracted one was found to be predominantly verbal, another nonverbal, the third numerical, suggesting that content was the chief determiner of factor structure. The third factor was named as Numerical Reasoning factor. The fourth factor, though not clear, seemed to be determined by the mental functions involved in these tests, in which both verbal and nonverbal tests were combined. It appeared that some type of logical thinking was the ability commonly required for the solution of problems posed in these tests, irrespective of the content in which they were presented. Hence this factor was identified as a Logical Reasoning factor.

345. NAZRE KHALIQUE, *Bihar Adaptions of Gordon Personal Profile, Gordon Personal Inventory and Survey of Interpersonal Values*, Ph.D. Psy., Pat. U., 1968.

The major objective of the study was to construct adapted versions in Hindi of the Gordon Personal Profile, the Gordon Personal Inventory, and the Survey of Interpersonal Values (SIV).

The items in the above tools were translated into Hindi. The translations were examined by ten language experts and seven psychologists. The translated versions of the tools were administered to a sample of twentyseven high school students of class XI. After due modifications, they were administered to an incidental sample of 453 students drawn from class XI of twelve high schools of Bihar. Item analysis was carried out using the technique of chi-square.

The coefficient of reliability for the scales of the Profile, Inventory and SIV were found to range from 0.79 to 0.95, 0.69 to 0.79, and 0.73 to 0.88 respectively when found by test-retest method and 0.65 to 0.71, 0.55 to 0.83, and 0.88 to 0.94 when found by K-R method. To determine validity, the nature of relationship between the factors on the scales of the adapted tools and intelligence as measured by the Raven's Standard Progressive Matrices was studied. It was found that the coefficients of correlation were not significant in all cases except that between conformity and intelligence which was positively significant and that between vigor and intelligence which was negatively significant. Significant positive relationship was found to exist between emotional stability and personal relations, responsibility and personal relations, sociability and personal relations, conformity and responsibility, leadership and ascendancy, and leadership and original thinking. It

was also found that boys scored higher on emotional stability and recognition scales and that girls scored higher on ascendancy, vigor, conformity, and benevolence scales. The percentile norms for high school boys and girls with respect to each scale of the Profile, the Inventory and the SIV were developed.

346. OOMENTHARAKAN, P. N., *A Restandardisation of a Battery of Engineering Aptitude Tests*, Ph.D. Psy., Ker. U., 1973.

The purpose of the study was to prepare and standardise a battery of engineering aptitude tests in the situation existing in Kerala so that it could be used for vocational guidance and counselling.

The subtests selected for the pilot study were : (i) physical science comprehension; (ii) mathematics and formulation; (iii) spatial relations; and (iv) mechanical reasoning.

The sample for the pilot study consisted of 415 students from two colleges. The internal consistency item analysis was adopted and the point biserial correlation was calculated as an index of item discrimination. In the light of the item analysis, the entire battery was re-edited and modified. The final study was conducted on a stratified random sample of 1,527 students from the different colleges in the whole of Kerala state. The reliability and validity of the battery were estimated. The reliability was found to be 0.92. The percentile norms and the T score norms were prepared for the population.

- *347. PAKNIKAR, K. K., *Developing Performance Tests for the Blind*, Dept. of Applied Psy., Bom. U., 1975.

The objective was to develop an intelligence test for the blind.

The performance test consisted of a few subtests. These were : (i) (a) one semi-circular part and two halves of the same, cut of a wooden circle of diameter 4.4 inches with 1/4 inch thickness, (b) four equal parts of the circle; (ii) (a) a large square part and four large round parts to fill in the gaps, (b) four right angled triangles to construct the square part and four rounds; (iii) (a) hexagon parts and six small circles, (b) six equilateral triangles to construct the hexagon and six small rounds; (iv) six trapeziums, six small equilateral triangles, and six small rounds; (v) eight large round parts, eight smaller round parts and one small circle; (vi) to form a circle with pieces given without the case : (a) two ovals pointed at both ends and two parts to fill in gaps in both sides, (b) eight equal parts of the two ovals and two parts to fill in the gaps on both sides; (vii) to sort

out similar forms from (a) five pairs of different forms, small plastic pieces of equilateral triangle, square, rectangle, rhombus and a cross, (b) six pairs of six forms — two similar right angled triangles added to (a); (viii) roughness discrimination test — to arrange in order of grade of roughness of five sand papers with graded roughness mounted on the pieces of sunmica and five small steel cylinders with graded roughness on sides, (ix) weight discrimination test — to arrange articles of same size but of different weight in order of heaviness — (a) to arrange five weights : 30 gms, 24 gms, 18 gms, 12 gms, and 6 gms, and (b) to arrange seven weights : 30 gms, 24 gms, 18 gms, 15 gms, 12 gms, and 6 gms, (x) constructive ability test — to construct a steel rod out of smaller steel rods of given length with threads at one end and with holes or closed at the other end — (a) two rods of three inches each, (b) three rods of two inches each and (c) three rods of one inch each. The test was administered to 408 boys and girls of six to twentytwo years. The mean, SD and percentages for superior, average and below average levels at each group was found out. In certain cases composite mean scores of age groups eleven and twelve, thirteen and fourteen, fifteen and sixteen, seventeen and eighteen, and nineteen, twenty and twentyone have also been found out.

The index of measurement of efficiency, and the coefficient of reliability of different age groups ranged between 0.70 and 0.94 which is significantly high.

348. PALKAR, S. G., *Some Problems of Educational Statistics in Group Prediction of College Success*, Ph.D. Stat., MSU, 1973.

The objectives of the study were : (i) to study whether or not prediction of achievement in English and Mathematics at college level calculated by linear mathematical function could be improved by non-linear polynomial regressions; (ii) to study the prediction of P.Sc.E. — English (Preparatory Science Examination — English) and P.Sc.E. — mathematics differently and the prediction of P.Sc.E. — science with regard to two basic predictors of S.S.C.E. — English (Secondary School Certificate Examination — English) and S.S.C.E. — mathematics; (iii) to examine the extent to which S.S.C.E. marks in English and mathematics would be reliable for selecting right persons for admission to the Prescience Course; and (iv) to study whether or not addition of an extra aptitude test would improve the prediction of success.

The data for this study consisted of the marks obtained by 278 students at the S.S.C.E. of the former

Bombay State in the year 1957 and at the P.Sc.E. of the M.S. University of Baroda in 1958. The marks in S.S.C.E. — English, and P.Sc.E. — English, as well as S.S.C.E. — mathematics, and P.Sc.E. — mathematics were set up in bivariate distribution and the least square method was used for analysis. The discriminant function and the Wald's U-Statistic methods were used to find out the discriminant function between passed and failed students. The multiple regression analysis and discriminant analysis were employed to test the significance of additional prediction by the aptitude test.

The major findings were : (i) the prediction of P.Sc.E. — mathematics was significantly improved by nonlinear quadratic regression in case of S.S.C.E. achievement test in mathematics as well as numerical aptitude test; (ii) in case of the prediction of P.Sc.E. — mathematics from the combination of English and numerical tests, the curvilinear relationship given by the general equation of the second degree raised the level of accuracy of the prediction significantly well above the linear combination; (iii) the use of additional test improved the result of prediction; and (iv) the upper and lower curvilinear solutions could be appropriately utilised for selection of top cases and rejection of bottom cases, but they provided better results than if not used at all.

349. PALSANE, M. N., *Project on the Measurement of Some Psychological Characteristics*, Poona U., 1975. (UGC and SIE, Poona financed)

The purpose of the project was to standardise three inventories, namely, (i) interest inventory, (ii) adjustment inventory, and (iii) study habits inventory for the Marathi speaking population at the school leaving stage as well as at the college stage.

The sample was drawn from the various districts of Maharashtra covering students from various faculties, namely, arts, science, commerce, and agriculture and from higher secondary schools. The interest inventory covered thirteen different areas. The prominent ones were clerical, computational, mechanical, scientific, natural or outdoor, social service, business or commercial, literary, artistic and musical. The adjustment inventory covered areas, namely, adjustment to home or adjustment to family, emotional or personal adjustment, social adjustment, educational adjustment, and health adjustment. Some of the areas covered by study habits inventory were time scheduling, reading habits, learning and memory techniques and examination skills. The inventories were prepared in simple statement forms with true-false or

like-dislike answer categories. Item analyses were carried out. Norms in the form of stanine scale were developed on the cross-sectional population of Maharashtra, namely, Marathi speaking population at the school leaving stage as well as at the college stage.

350. PATEL, J. Z., *Construction and Standardisation of General Ability Test for Classes V, VI and VII, Ph.D. Edu., SPU, 1974.*

The main purpose of the study was to construct a nonverbal group test of general ability that included items measuring information and reasoning with a view to (i) providing schools with a suitable standard tool to measure individual differences of school going children, and (ii) studying whether there existed any sex differences with regard to general ability.

On the principles of Flanagan, the investigator constructed the general ability test. The test was a nonverbal group test and test items at all grades were in pictorial form. The items included in the test were pertaining to information and reasoning. As many as 181 test items in pictorial form were prepared and tried out on small groups of pupils. The test was administered for the second try-out to 389 pupils. For the final administration, the test was given to 821 pupils of classes V, VI and VII in ten districts of Gujarat.

The major findings of the study were : (i) while fixing the grade norms no sex difference was found; (ii) intelligence of the pupils increased with the age; (iii) reliability coefficient of the test decreased with the increase in the time interval; (iv) information score was higher than the reasoning score; and (v) pupils who scored well were good at Mathematics.

351. PATEL, L. K., *Construction and Standardisation of Performance Tests of Intelligence for Students of Standard II to XI in Gujarat, Ph. D. Edu., Guj. U., 1973.*

The purpose of the study was to construct and standardise 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 first tryout of the tests was administered to twenty pupils of different age groups. The second tryout was carried out with fortyfour students of age groups 6+ to 15+. For the third tryout, eleven students of each group including two accelerated, two retarded and seven normal, were tested. The data were statistically processed for calculating the indices of item difficulty and item discrimination. The final form of the test was given to 400 students, forty in each age group. Intelligence quotients on the present

tests were correlated with the intelligence quotients on Desai-Bhatt group tests, Bhatt group tests, Bhavsar non-verbal group tests, Shah's non-verbal group tests, and adaptation of Wechsler Intelligence Scale for children in Gujarat.

The factorial validity of the tests was established by principal-axes method following Hotelling. The three curves of mental growth for the boys, girls and mixed groups were found to be regular in spite of the small sample size. The test was applicable to lower age group. It could be used whenever measurement of general intelligence was needed for guidance and selection purposes.

352. PATEL, M. T., *Construction and Standardisation of General Ability Test for Classes VIII, IX and X, Ph.D. Edu., SPU, 1974.*

The present investigation was an attempt to develop a general mental ability test for the children of Gujarat with a view to studying the significance of sex differences with reference to their general ability and also to providing the secondary schools with a standardised tool to measure individual difference in general mental ability of children.

The sample consisted of 6,659 pupils of classes VIII, IX and X selected from various districts of Gujarat state. The present test was in pictorial form.

The investigation revealed that (i) there was no significant sex difference with reference to general mental ability; (ii) the test did yield significant difference between the mean scores of age groups of twelve and thirteen, and seventeen and eighteen; (iii) the factorial study indicated that there was one common factor in the subtests; (iv) the test was found to be useful in classifying the pupils and in guidance and counselling; and (v) the reliability coefficient of the test was found to be ranging from 0.83 to 0.97.

- *353. PATEL, P. M., *Differential Aptitude Test Battery, NCERT, New Delhi, 1976.*

A series of tools have been developed in Hindi for measuring developed abilities of the pupils in class VIII of the schools in the Hindi region. The battery consists of 11 tests which were tried out and finalised on the basis of item analysis. These are : (1) Word Meaning, (2) Verbal Reasoning, (3) Word Usage, (4) Abstract Reasoning, (5) Space Visualisation in two dimensions, (6) Space Visualisation in three dimensions, (7) Number Series, (8) Arithmetic Problems, (9) Perceptual Speed and Accuracy, (10) Addition, and (11) Subtraction. The tests are for use in guidance and counselling. Percentile and T

score norms have been set up for male, female and combined groups. Reliabilities of the tests are established.

354. PATEL, P. M., *Measurement of Achievement Press, Ph.D. Psy., Del. U., 1972.*

The present study was designed to devise an objective, reliable and valid tool for measuring achievement press (p Ach). The specific construct measured was beta p Ach whose contents were the subject's perceptions and apperceptions of the environment.

Twentyeight ideas related to various aspects of educational achievement were put in the form of incomplete sentences to elicit pupils' perceptions about them. These twentyeight plus a dummy set of seventyseven incomplete sentences were administered to a sample of 128 pupils. Qualitative analysis of responses to twentyeight sentences led to a selection of 196 responses. These in turn were administered to another sample of 210 pupils to obtain (a) p-values, proportion of pupils endorsing an item and (b) item-scale/total correlations where scale refers to an incomplete sentence which were twentyeight in all. On the basis of the above information four measures of p Ach were constructed. The test of p Ach I consisted of twentyone incomplete sentences each of which was followed by four responses. The test of p Ach II consisted of nineteen stems which varied among themselves in terms of the number of alternatives under each. The test of p Ach III contained twenty stems each followed by two alternative completions which were so selected that the difference between their p-values was minimum and the difference between their item-scale correlations was maximum. The test of p Ach IV consisted of twenty stems each followed by a pair of completions selected in such a way that the difference between their item-scale correlations was minimum and their p-values was maximum.

The K-R 21 estimates of reliability for p Ach I and p Ach II were 0.75 and 0.84, while those obtained by means of an adaptation of the Spearman-Brown Formula were 0.87 and 0.91 respectively. The coefficients of stability of the performance of tests in two independent samples obtained from the same parent population were 0.92 and 0.91 for p Ach III and p Ach IV, respectively. Percentile norms for each of the four measures of p Ach were developed on a sample of 688 pupils.

355. PRABHA RAMALINGASWAMI, *Development of an Individual Adult Intelligence Scale Applicable to Indian Population, Ph.D. Psy., And. U., 1969.*

It was proposed in the present study to develop

and standardise an adult intelligence scale applicable to the Indian population. To this effect the study aimed at adapting the WAIS to Indian conditions.

As a preliminary study the WAIS was administered to twenty persons having college education. On the basis of the results, some items were adapted, the verbal portion was translated into Hindi, and a new set of Hindi words were developed for the vocabulary test. Using the 1961 Census Reports of Delhi, and considering the strata of age, sex, and educational level, a stratified sample of 604 persons between the ages of fifteen and fortyfive (all residents of Delhi) was drawn. The first tryout was administered to a sub-sample of 150 persons out of the main sample. Modifications in the test were made on the basis of the first tryout analysis. The final tryout was done on the rest of the sample. Means, SDs and inter-test correlations were found out. Normality of the scores was tested using chi-square technique. Construct validity and factorial validity were established by comparing the results with Wechsler's results.

It was found that the values of the coefficients of reliability obtained for the various tests in the present study were closer to those obtained by Wechsler. The procedure adopted by Wechsler for setting up WAIS IQ tables, was followed. Norms were set up for each age group separately.

356. PRASAD, M. S., *An Inventory of Vocational Values, Ph.D. Psy., Pat. U., 1968.*

The present study was undertaken to construct in Hindi an inventory for assessing the vocational values of students.

The following nine areas were selected to be included in the inventory, viz., altruism, economic returns, physical conditions of work, power, prestige, security, self enhancement, social climate, and tradition. The preliminary form of the inventory consisted of 216 items. This was administered to an unselected sample of 100 postgraduate students of the Patna university. The final form of the inventory which consisted of seventytwo pairs of items covering all the nine areas equally, was administered to students of the faculties of arts, education, medicine, and engineering.

The reliability coefficient of the nine subtests by odd-even method corrected by Spearman-Brown formula, K-R formula 20, and test-retest methods ranged from 0.90 to 0.97, 0.81 to 0.92, and 0.80 to 0.92 respectively. The validity as estimated by correlating the ranks based on the scores of the inventory and

the ranking of the nine value-areas by the testees themselves was found to be 0.80. Percentile norms for both male and female students of the faculties of arts, education, and medicine and for only male students of the faculty of engineering were established.

357. PRATAP, S., *Construction and Standardisation of an Entrance Test for Students in Engineering and Technology*, Ph.D. Psy., MSU, 1972.

The study aimed at constructing and standardising an entrance test for the selection of engineering students. The investigator constructed eight subtests, namely, (i) classification, (ii) analogies, (iii) numerical, (iv) verbal reasoning, (v) pictorial reasoning, (vi) space relation, (vii) engineering, and (viii) science. Each subtest was having fifty items in the primary stage.

The subtests were administered to 100 students of all the different fields of engineering for pre-try-out. Twenty items for each subtest were selected and were randomly distributed for two parallel forms A and B. The revised test was administered to all the freshmen engineering students of Roorkee University for pilot testing. The selection of items for the final form was based partly on detailed specification of the context and partly on statistical characteristics of each item. The final form of the test comprised ten items in each subtest with the time limit of forty minutes. Content and predictive validity of the test were established. Form A rendered correlation coefficients of 0.91 and 0.78 with the first year and second year examination marks respectively. For form B the correlation coefficients for the I and II year examinations were 0.64 and 0.60 respectively. The correlation coefficient of form A and B was 0.75. All the subtests had high loading on factor I calculated by Thurstone's Centroid Method. It was 36.16 percent of the total common factor variance while verbal reasoning had a relatively lower loading. Reliability of the tests was established by using the alternate or parallel forms.

The mean of the test scores was found to be 44.72, the median 46.32 and the standard deviation 46.32. The measure of divergence of the frequency distribution showed Skewness at -0.43 and kurtosis at 0.25. Norms were established in the form of standard scores, T-scores and percentile norms.

- *358. PURNIMA, *Construction of Scale for Assessing Neuroticism and Introversion as Co-variables in Adolescents*, Ph.D. Psy., BHU, 1970.

The objective of the study was to construct a

scale for measuring the personality traits of neuroticism and introversion.

Initially a scale of seventy items (thirtyfive for neuroticism and thirtyfive for introversion) was tried out on a sample of 150 boys and 150 girls who were intermediate students of age group fourteen to eighteen years, selected from all the districts of Meerut (U.P.). The time limit for the test was twenty to twentyfive minutes. After item analysis the finally selected fifty items were equally divided between the traits of neuroticism and introversion. The scale was standardised on a sample of two thousand students drawn from urban schools and colleges of Meerut region. Purposive sampling technique was utilized in drawing the sample.

It was found that (i) the reliability coefficients of the whole test by the methods of test-retest, split-half and rational equivalence were 0.76, 0.81 and 0.85 respectively; the corresponding figures for neuroticism scale were 0.79, 0.78 and 0.98 respectively, and those for the introversion scale were 0.71, 0.71 and 0.96 respectively; (ii) the indices of reliability for the neuroticism, introversion and the whole scales were 0.98, 0.97 and 0.92 respectively; (iii) norms of the scales were established in terms of percentiles, stanines and T-scores; and (iv) the validity of the neuroticism and introversion scales of the present test was established by comparing them with the corresponding scales of the MPI. The respective validity coefficients were found to be 0.76 and 0.69.

- *359. RAM, U., *Measurement of the Degree of Mental Retardation*, Ph.D. Psy., Poona U., 1978.

The objective of the study was to construct and standardise tools to measure intelligence and social maturity.

The tools developed in this study were : (i) an intelligence test which is a battery of two verbal and five nonverbal subtests and (ii) a social maturity checklist. The language of the intelligence test was Marathi and the test was standardised on school-going children in Poona city. The age range was 5+ through 10+ years. The raw scores were converted into T-scores which, in turn, were converted into DIQ. The split-half reliability coefficients were found out. Factorial analysis was carried out. The social maturity checklist was prepared with twelve statements at each age level. Cross-validation was carried out with a group of forty mentally retarded subjects. The two criteria used were Kamat's Indian Version of Stanford Binet and the psychiatric social worker's assessments.

The split-half reliability coefficients for the subtests of the intelligence test ranged from 0.73 to 0.99, while that for the composite score was 0.96. When validated against Draw-a-man test the coefficient of correlation obtained was 0.70 at age 6+. The test-retest reliability in case of social maturity checklist was found to be 0.81. Also a validity coefficient of 0.53 was obtained when correlated with psychiatric social worker's assessment. A multiple correlation between the DIQ and the checklist score on the one hand and the psychiatric social worker's overall ratings on the other was found to be 0.81. This indicated the superiority of the combined measures for the diagnosis of mental retardation over either of the scores alone.

360. RAMACHANDRACHAR, K., *A Study on Creativity — Evolving a Test to Identify Children with Creative Ability at the School Leaving Age*, Ph.D. Psy., MSU, 1975.

The objectives of the study were : (i) to evolve a test which differentiated between creative and non-creative children; (ii) to study analytically the nature of factors contributing to the phenomenon of creativity described by the test.

The sample consisted of 426 standard IX children of six secondary schools of Gujarat and Mysore state. A final sample of 370 students was selected for item analysis. The test was constructed to identify creative children by means of testing the following factors : (i) fluency, (ii) flexibility, (iii) originality, (iv) elaboration. A pilot study was conducted with a view to construct the final test. Items for the final test were selected from the items of the pilot study after proper screening. Split-half reliability based on separately timed parts of the test corrected to full length by Spearman-Brown formula was found to be 0.86. The reliability by using K-R formula was found to be 0.71. Validity coefficients were found to be between 0.18 and 0.44 on different criteria.

Some of the findings of the study were as follows : (i) creative individuals were relatively more fluent and gave a wide variety of responses; (ii) creative individuals preferred indirect literary expressions to direct ordinary expression; (iii) the noncreative showed less or no elaboration; and (iv) creative children in general showed above average performance on the two symbolic abilities.

*361. RAO, S., *Standardisation of Culture Free Intelligence Test — Scale I (For Age Group 5-9 years in Indian Condition)*, Dept. of Psy., Ran. U., 1975. (NCERT financed)

The study attempted to adapt the Cattell's Cul-

ture Free Intelligence Test-Scale I to the Indian conditions. The study further attempted to compare the performance of tribal and Hindu children on the culture free intelligence test and to examine whether separate norms for tribal children were necessary.

The sample consisted of 1089 boys and girls in the age range of five to nine years drawn from Hindu and tribal cultural group from various schools in and around Ranchi and also non-school going children. Analysis of variance and t test were employed to analyse the data.

The following were the findings of the study :

(i) The reliability coefficient by test-retest method ranged for the various tests between 0.74 and 0.96 in both the original scale and the adapted scale. The test-retest reliability of the total score in the original scale was 0.94 and in the adapted version was 0.90. (ii) The validity coefficient based on a sample of children between the test scores and both teacher's rating and achievement in terms of performance in mathematics in school examinations ranged between 0.64 and 0.85 for the total score.

362. RAY, T., *Construction and Standardisation of a Social Intelligence Test*, D. Phil. Psy., Cal. U., 1972.

The study aimed at developing a test in Bengali for the objective measurement of social intelligence. The test was expected to be used as a vocational aid for the educated adult group.

Pre-tryout administration was conducted on a sample of fifty postgraduate students of the Calcutta University. The final tryout was conducted on a stratified sample of 400 Bengali speaking postgraduate students of three universities of the Calcutta City. The upper and lower twentyseven percent technique, as modified by Davis, was employed for estimating the difficulty values and discrimination indices of the individual items.

Final form of the test had eighty items distributed over six subtests corresponding to six different areas of human behaviour, namely, (i) judgement of social situation, (ii) observation of human behaviour, (iii) recognition of mental status, (iv) memory for names and faces, (v) appreciation of humour, and (vi) adjustment. The test was meant to be used for university graduates of age eighteen and above. Reliability coefficient for the whole test was found to be 0.737, while for the individual subtests these coefficients ranged from 0.471 to 0.828. For establishing the validity of the test, two criteria were considered — peers' rating on social abilities and teachers'

rating on social adjustment of their students. Validity coefficients estimated in the form of product-moment correlation between test scores and the criterion scores were found to be 0.50 in case of peers' ratings and 0.53 in case of teachers' ratings. Multiple correlations were found to be 0.6039 and 0.6844. Factor analysis study resulted in the extraction of three factors. A tentative grouping could be made between tests I and IV, test II and III, and tests V and VI. Norms in the form of percentiles and normalised standard scores were established on the basis of the test scores of 1000 subjects (500 males and 500 females). Separate norms were established for males and females.

- *363. SAMAL, S., *Construction of a Vocational Interest Inventory to Study the Interest Pattern of High School Seniors and its Relationship with their Intelligence, Socio-Economic Status and Academic Success. Ph.D. Edu., Sam. U., 1977.*

The objectives of the investigation were to have a differential study of the interest pattern of high school seniors sexwise and placewise; and to study the relationship of interest with intelligence, socio-economic status and academic success.

The study was undertaken on a stratified, randomised sample of 570 boys and 580 girls of tenth class of the recognised high schools of Orissa. The Vocational Interest Inventory developed for the purpose was an interactive free response variety of self-reporting instrument giving measures on eight scales of vocational interest, namely, scientific, mechanical, agriculture, business, social service, arts, clerical and administrative. The odd-even reliability of the interest scales ranged from 0.79 to 0.93. Intercorrelations among the scales varied from -0.06 to 0.31. The instrument was validated against the California Interest Inventory. Assuming that education, occupation, and income are the potential contributors of one's socio-economic status, a scale was devised to measure this variable. Intercorrelation among three aspects of the scale ranged from 0.36 to 0.62. Correlation coefficients between partial and total weighted scores were 0.85 for education, 0.75 for occupation and 0.77 for income. The CFIT Scale 3 was used to measure the subjects' intelligence. School examination marks in three consecutive examinations in five curricular subjects were processed to give estimation of the subjects' academic success. Correlation between vocational interest and other variables was computed by the product moment and chi-square methods. F test

and t test were applied for differential study in respect of interest.

The findings of the study were as follows : Sex-wise difference was found significant in administrative, business, social service and arts scales of interest. Placewise stratification had no impact on variation of interest scores. The sample displayed a very high degree of interest in social service, agriculture and science. Interest in agriculture, business and clerical activities correlated negatively with socio-economic status. None of the interest scales correlated significantly with intelligence and there was no marked difference in interest of high and low intelligence groups. Trend of relationship between academic success and interest suggested that success in any curricular subject required interest in related vocational area.

364. SHAH, B., *Construction and Standardisation of the Omnibus Test of Intelligence in Gujarati for Age-group 13+ to 16+ Ph.D. Edu., Bom. U., 1975.*

The main objective of the study was to construct and standardise an omnibus test of intelligence for Gujarati speaking children of Greater Bombay between the age group 13+ to 16+.

Items of fifteen different types were constructed, revised, and improved according to the suggestions of experts and were tried out in three stages. At the pre-tryout stage, the sample consisted of thirtytwo students of standard VIII. At the first tryout stage, items, after screening, were administered to a group of 121 students of standard VIII. At the second tryout stage, all items with five alternatives were arranged in an omnibus form. This form of the test was administered to 464 students of standards VIII and IX in seven schools from different parts of Greater Bombay. Discrimination value of each item was ascertained by using Stanley's formula, Flanagan's table, Davis' Discrimination Index, and Lawshes' Nomograph. The discrimination indices of the items in the final form of the test ranged between 0.34 and 0.83. Reliability of the test was established in terms of the coefficient of stability, the coefficient of internal consistency and the coefficient of item consistency. The reliability coefficients thus obtained, ranged from 0.77 to 0.88 for different groups. The index of reliability was found to be 0.94 and the standard error of measurement for the group of boys was 3.73 while for girls it was 3.63. Concurrent validity was established against the Desai's Group Test of Intelligence, a scholastic aptitude test and a nonverbal test of intelligence. The concurrent and predictive validity

values of the test ranged from 0.51 to 0.84. For establishing the norms, the final form of the standardised test was administered to 8850 students (4382 boys and 4468 girls) studying in standards VIII and IX in Gujarati medium secondary schools. This sample included students of fiftyfour private schools and five municipal corporation schools. It was selected by stratified random sampling technique. Age and grade norms were established. Deviation IQs, sigma scores, standard scores, percentiles, and stanines were computed.

Some of the important findings revealed from the study were : (i) practice had a significant positive influence on the performance of the pupils; (ii) pupils from private secondary schools scored higher than their counterparts from municipal corporation schools; (iii) boys showed superiority over the members of the opposite sex when compared gradewise; and (iv) the growth of intelligence stopped at the age of sixteen years six months in case of boys and at the age of sixteen years in case of girls.

365. *SHAH, P. G., Physical Norms of Gujarati Children, Gujarat Research Society, Bombay, 1959. (MOE financed)*

The study aimed at establishing physical norms in terms of heights and weights for Gujarati speaking school going children in Greater Bombay city and suburban areas.

The study was conducted by employing normative survey method. The sample belonged to fortyone schools of the city and suburbs of Bombay. As many as 15,852 Gujarati speaking school going pupils were selected. These were 9,564 boys and 6,288 girls. The age range was six years to twenty years. The selection of sample subjects was guided by factors like economic, social, cultural background and also age, sex, and mother tongue of the pupils. For collecting data related to age, sex, weight, height, income of parents, etc., a data card was developed. To have accurate data, detailed procedures and outlines for measurements of height and weight were prepared. Also the field workers were sufficiently trained. Descriptive statistics like mean, median, standard deviation, percentage, etc., were worked out. Absolute and relative growth rates, height quotient and weight quotient were worked out.

The study had the following main findings : (i) the average height was found to be increasing upto nineteen years for boys and seventeen years for girls; (ii) the average weights of boys and girls was found to be increasing with age with differences in growth rates; (iii) the growth of both vegetarian as

well as non-vegetarian boys and girls with respect to their height as well as weight was almost same except in case of girls in earlier age groups and later age groups; (iv) the chest girth was found to be increasing till the age of fifteen years for girls and twenty years in case of boys; (v) height quotient (HQ) and weight quotient (WQ) tables had been provided for boys and girls.

366. *SHARMA, K. N., Creativity as a function of Intelligence, Interest and Culture, Ph.D. Psy., Agra U., 1971.*

The main objectives of the study were : (i) to study the effects of intelligence upon creativity; (ii) to study the effects of interests upon creativity; (iii) to study the effects of culture upon creativity; (iv) to study the interacting effects of intelligence and interests upon creativity; (v) to study the interacting effects of intelligence and culture upon creativity; (vi) to study the interacting effects of interests and culture upon creativity; and (vii) to study creativity as affected by the interaction of intelligence, interests and culture simultaneously.

The present study, being an ex-post facto one, employed a factorial design of 2 x 2 x 2 type. The two variables, namely, intelligence and the ten interests were taken at two levels — high and low, while the socio-cultural variable had its two levels as the urban and the rural. Two tests, namely, the Sarjanatmaka Pariksha and the Varn Viparyas Pariksha, were developed to measure creative thinking. A sample consisting of 414 (204 urban and 210 rural) class X male students in the age range of fourteen to sixteen years, studying in high schools and intermediate colleges of the Agra District was selected using stratified random sampling technique. The two tests as mentioned above, alongwith the Jalota's Samoo-hika Mansika Yogyata Pariksha and the Chatterji's Nonlanguage Preference Record Form —962 were administered to the sample. The data were analysed using extreme group analysis and inter level analysis.

Some of the major findings were : (i) high intelligent subjects were significantly higher in creative thinking than the subjects of low intelligence; (ii) in both the urban and rural samples, the creative thinking showed significant progressive trends with intelligence upto the IQ of 120 or so and thereafter no progressive trend was observed clearly; (iii) literary and agricultural interests did not affect creativity at all; (iv) fine arts interest affected creativity to some extent; (v) scientific, medical, technical, crafts, outdoor sports and household interests showed inconsis-

ent effect over creativity; and (vi) the rural sample was found to be more creative than the urban.

367. SHUKLA, N. N., *Intelligence of Gujarati Children, Gujarat Research Society, 1975.*

The study aimed at revision of the Shukla's test for measuring intelligence of Gujarati Children.

After the test items were ready and scrutinised by five experts, they were administered to 918 school going as well as nonschool going children between the age groups of two and twenty years from various localities of the city and suburbs of Greater Bombay. The mother tongue of children was Gujarati. The item validity of each item with the mental age as determined by the scale as a whole was found out by using the coefficient of association. The values of the coefficient ranged between 0.71 and 0.99. Chi-square was used to analyse the data.

The following changes were introduced in the present revision : (i) The first revision had no tests for the age group two. In the present revision six items for age group two were introduced. (ii) From ten years to sixteen years there were six items for each of the alternate age groups, namely, twelve, fourteen, and sixteen. In the present revision six items for each of the consecutive age groups from ten to fourteen were introduced. (iii) In the first revision there were one to three items for each of the age groups included in the tests as alternative test items to be used when one or more of the six items of the tests in an age group could not be used for one reason or the other. In the present revision uniformly two alternative test items for every age group were included in the test. (iv) Norms for the revised version of the test were established.

*368. SINGH, B., *Development of Some MMPI Scales in Indian Conditions, Ph.D. Psy., BHU, 1965.*

The main purpose of the study was to develop and standardise : (i) four clinical scales, viz., Hypochondraisis (HS), Hysteria (Ry), Masculinity-Femininity (Mf), and Psychopathic-Deviate (Pd), and (ii) one validity scale, viz., Lie (L).

For the five scales, as many as 218 items were prepared primarily and tried out on 431 students. Item analysis was done. Internal consistency indices and discrimination power of the items of the five scales were determined. On the whole, 167 items were found to be internally consistent and discriminating between high and low criterion groups. The final test was administered to a purposive sample of 2506

urban students, including 310 girls, studying in first year through sixth year of twelve colleges of Varanasi and Agra.

The findings of the study were as under : (i) There was significant relationship between the three scales of the MMPI and M factor (introverted Vs practical) of the 16 PF. (ii) Factor O (anxious, insecurity Vs security) significantly correlated with all the five scales of the MMPI. All the five scales of the MMPI except L also correlated significantly with factor Q4 (high ergic tension Vs low ergic tension). The L scale of the MMPI correlated negatively with factor O. All the four scales, i.e., HS, Hy, Mf, and Pd correlated positively with factors M, O and Q4, the only exception being with Hy where the scores did not correlate significantly with M factor. (iii) The indices of reliability ranged from 0.904 to 0.967 for various scales and for different groups. (iv) The stability coefficients ranged from 0.723 to 0.886 for the various scales with SER of 0.167 at the time interval of twelve days. (v) The coefficients of reliability of the test calculated by split-half method, alternative or parallel form and test-retest method, were found to be high. (vi) There was no significant difference on the five MMPI scales on the basis of age factor. (vii) The female subjects scored significantly higher on HS, Hy, Mf and L scales and lower on Pd scale than the male subjects. (viii) The rural subjects scored significantly higher on HS, Mf, and Pd scales than the semi-urban and urban subjects.

369. SINGH, I., *Standardisation of an Adaptation of the Maudsley Personality Inventory (in Hindi), Ph.D. Psy., Pat. U., 1972.*

The purpose of the present study was to adapt the Maudsley Personality Inventory in Hindi.

Keeping in view the different Hindi versions of the M.P.I. in use, all the items of original M.P.I. version were rendered in Hindi. This Hindi version of M.P.I. was administered to 370 students drawn from various colleges. Following the Kelley's method, item analysis was carried on. The scores on the two dimensions of extraversion and neuroticism were correlated by employing product-moment correlation. This was done in order to see the orthogonality of the two scales. The correlation happened to be -0.39. The other statistical techniques used were chi-square, percentile, standard scores and t test.

The test was found to have test-retest reliability coefficients of 0.77 for the extraversion scale (E) and 0.82 for the neuroticism scale (N). The validity for both the scales was worked out by employing contrast groups of neurotic versus stable, criminals

versus noncriminals, and accident versus nonaccident group of automobile drivers. Contrast groups of 645 college students on the basis of their teachers' rating were also used. The rated neurotic group of college students was having significantly higher mean scores on N scale. Similar was the case for E scale. Concurrent validity against the Guilford-Zimmerman Temperament Survey was also established. The percentile norms for males and females, arts and science, and rural and urban college students were developed.

370. SINGH, R. N., *Construction and Standardisation of a Battery of Tests of Verbal, Abstract and Numerical Reasoning*, Ph.D. Psy., Mag. U., 1971.

The study aimed at constructing and standardising a battery of tests which could measure the general mental ability and also certain special abilities of the pupils of higher secondary schools and pre-university classes (covering the age range of thirteen to twenty years) for the purpose of educational guidance and counselling.

The battery of tests which was named as 'A Battery of Verbal Numerical and Abstract Reasoning Tests (VNART)' or 'A Test of General Mental Ability' consists of verbal reasoning test (VRT), numerical reasoning test (NRT), and abstract reasoning test (ART). The subtests included in the battery were word classification, word analogy, number series, arithmetic problems, figure analogy and figure series. Items were developed on each of the subtests and were administered, as a pilot study, to a sample of thirty students each of the classes IX, X, XI, and pre-university. For the purposes of item analysis the battery was administered to 370 students from each of the above mentioned classes. Item analysis was carried out employing the procedure suggested by Gullicksen. The battery was standardised on a sample of 4,500 students.

The coefficients of split-half reliability for the VRT, NRT, ART, and VNART corrected by the Spearman-Brown formula were found to be 0.82, 0.92, 0.91, and 0.94 respectively. The coefficients of reliability by test-retest method were found to be 0.73, 0.80, 0.70, and 0.80 respectively. The coefficients of reliability by K-R formula were found to be 0.82 for VRT, 0.94 for NRT, and 0.96 for ART. The coefficients of validity against the school examination marks for VRT, NRT, ART, and VNART were found to be 0.50, 0.37, 0.46, and 0.56 respectively. The VRT and VNART had a coefficient of validity of 0.70 and 0.61 respectively, against a verbal intelligence test. The coefficient of validity against

the Raven's Standard Progressive Matrices was 0.60 for ART and 0.63 for VNART. The coefficient of validity against scholastic aptitude test was 0.74 for NRT, and 0.70 for VNART. Standard scores and deviation IQs were also developed.

371. SINGH, S. K., *An Adaption in Hindi of Maslow's Security - Insecurity Test*, Ph.D. Psy., Pat. U., 1971.

The study attempted to develop in Hindi an adapted version of the Maslow's Security - Insecurity Test.

A Hindi version having seventyfive items was prepared. This was administered to a sample of 400 male and female students of the pre-university and B.A. part I classes of two colleges of Patna. Item analysis was carried out by computing the chi-square values. The final version of the test included seventy items. The reliability of the test was established by test-retest, and odd-even methods. The validity of the test was established by using contrast groups and by finding correlation with the Maudsley Personality Inventory and the Verma's Schedule of Socio-Economic Status. To develop norms, the test was administered to a sample of 600 students of the second year degree classes of various colleges in Patna.

The reliability coefficients by test-retest and odd-even methods were found to be 0.79 and 0.86 respectively. The coefficient of correlation between security - insecurity, and neuroticism, extraversion and socio-economic status (as measured by the Verma's Schedule of Socio-Economic Status) were found to be 0.76, 0.27 and 0.58 respectively, all values being significant at 0.01 level. Percentile norms were developed separately for male and female students.

372. SINGHAL, S., *A Non-Language Test Battery for predicting Primary School Success*, D.Phil. Psy., Cal. U., 1965.

The study aimed at constructing and standardising a nonlanguage test battery for young school-going children, which could help in (a) assessing the general ability, (b) comparing the test performance by age and grade, (c) predicting their primary school success, (d) making cross-national comparisons, and (e) casting reflections on existing educational policies and programmes.

The sample consisted of 2000 children selected from fifteen schools run by municipal corporation in Calcutta and fifteen in Delhi and New Delhi area by stratified random sampling. The age range in both cases was eight to fourteen years and grade ranged

from class three to class five. The test battery consisted of four subtests, namely, picture completion, reversed similarities, similar opposites and classification. The items were of multiple choice type. Statistical techniques used were mean, variance, correlations, multiple regression and centroid factors.

The study revealed that (i) the reliability coefficients for two samples ranged between 0.65 and 0.87; (ii) all the four subtests had high reliability for the three class groups in the two states; (iii) a general and consistent trend of increased score was found with advance in age and education; (iv) age and level of education contributed to the growth and development of general ability; (v) the differences in school, economic and educational level of parents could lead to differential intellectual performance of children; (vi) cultural and linguistic factors were not found to have significant effect on the performance of test battery; and (vii) Perceptual Ability factor and the Relational Thinking Ability factor were extracted through the centroid method.

373. *SINHA, J. N., Construction of a Study Habits and Attitude Q Sort Test, Ph.D. Psy., Pat. U., 1972.*

The objective of the study was to construct a test for measuring study habits and attitude using the Q-sort method.

The first draft of the test consisted of a pool of 150 items. The test was administered to one hundred students each from first year arts and first year science classes. Following Nunnally's suggestion this was divided into thirteen piles. The items were retained on the basis of critical ratio and reasonableness. Only thirtysix items were retained. The test was administered twice on 200 first year arts students.

The test-retest reliability was found to be 0.61. The test was validated against Wrenn's and Jamuar's test of study habits. The correlations between this test and Wrenn's and Jamuar's tests of study habits were 0.17 and 0.26 respectively. The concurrent validity of this test was determined by observing its relationship with the achievements of the students. The value obtained for 'r' was 0.40 which was significant at 0.01 level; chi-square value was 25.83 which was significant at 0.001 level. The 'C' value was found to be 0.25 which was significant at 0.01 level. Percentile norms for male students of the sample were also calculated.

*374. *SREE RAMA MURTHY, M., Construction and Standardisation of a Scale for Assessing the Emotional Behaviour of Secondary School*

Children as a Basis for Educational and Vocational Guidance, Ph.D. Edu., Osm. U., 1978.

The objective of the study was to develop a scale for assessing the emotional behaviour of the school-going children for providing educational and vocational guidance.

Through an opinionnaire, opinions of teachers and industrial supervisors, foremen, etc. were obtained as to the dominant emotions pertinent to the field of education and vocation. These emotions were listed as: wonder, distress, superiority, inferiority, and creativeness. Incorporating these areas, a self-reporting inventory was constructed. This inventory does not analyse the fitness of an individual who answers this to any particular field. It provides information concerning one vital phase and the complex matter of setting the individual's plans wisely and planning a programme for attaining his goals. Norms were obtained by administering the inventory to 1250 students who had completed seventh grade and had commenced eighth grade of English medium schools of twin cities of Hyderabad and Secunderabad. Reliability was established for each area of the inventory. To substantiate the standardisation of the inventory, a rating scale was also developed. Correlation coefficients between the two for each area were found out. Expectancy tables for predictive purposes to be used with industrial groups were also constructed.

Test-retest reliability coefficients established area-wise for the inventory were as follows: wonder 0.73, distress 0.85, superiority 0.78, inferiority 0.84, and creativeness 0.88.

The coefficients of correlation between the inventory and the rating scale areawise were: wonder 0.99, distress 0.98, superiority 0.98, inferiority 0.99, creativeness 0.97. Further, expectancy tables for all predictive purposes to be used with industrial groups were also constructed.

375. *SRIVASTAVA, R. P., Construction and Standardisation of an Aptitude Test for Teaching, Ph.D. Psy., Sag. U., 1965.*

The aims of the study were (i) to construct and standardise a teaching aptitude test with special reference to teachers working in primary schools and junior high schools; and (ii) to find the relationship between the teaching aptitude scores and the internal assessment marks obtained in their home examination. The proposed hypotheses were: (i) there would be positive relationship between the teaching aptitude test scores and the assessment marks in theory and

practice during the training period of the pupil teachers; and (ii) there would be a high positive correlation between the scores on the TAT and rated scores by the principals and lecturers.

The items for the test were developed on the components of teaching. The final test consisted of 150 statements each having five alternative responses. In order to draw the sample for the administration of the test, all the government basic teachers' training institutions of the Vindhya region were divided into three grades — below average, average and above average, on the basis of the results of the institutions in the public and home examinations. A representative sample of 1,050 pupil teachers was drawn from eleven basic training institutions from the Vindhya region. All the testees were from the same socio-economic group, hailed from the rural area and were of the age range twenty to thirty years. For all the pupil teachers in the sample, the assessment marks in theory and practice during the training period, TAT scores, and the ratings by principals and lecturers were also collected.

The coefficients of reliability by test-retest and split-half methods were 0.94 and 0.91 respectively. Standard scores, percentiles and T-scores were developed. All the hypotheses stated were retained.

*376. TRIPATHI, R. B., *Construction and Standardisation of a Nonverbal Group Test of General Mental Ability for Children*, Ph.D. Psy., BHU, 1967.

The purpose of the study was to construct and standardise a nonverbal group test of mental ability which has been explained through a non-committal term 'g'.

The subtests selected were: classification, pattern completion, analogies and arrangement. On the basis of their 'g' saturation findings, each subtest had thirty items. The pilot study of the test was conducted on a sample of 500 children in the age group of eight to thirteen years studying in classes III to VII from two junior high schools of Moradabad which were selected by incidental sampling technique. After item analysis, the final form of test consisted of fourteen items in each of the classification and pattern completion, twelve and ten in arrangement and analogies respectively. The standardisation sample consisted of 3,253 students in the age range of six to fourteen years, studying in III to VII in primary and junior high schools in the northern, southern, eastern, western and central regions of the state of Uttar Pradesh.

The findings revealed that the coefficients of stability for the total test and its four subtests were sufficiently high ranging from 0.91 to 0.97 with SE ranging from 0.002 to 0.006. The coefficients of consistency of the total test and its four subtests were very high ranging from 0.97 to 0.99. Kuder-Richardson method had yielded a quite satisfactory reliability for the total sample and for different age-grades. The item validity in terms of internal consistency of the present test was assured as all the items included were significant at 0.01 level of significance. All subtests included in the present battery possessed 'g' saturation varying from 0.671 to 0.861. Correlation of the present test with the Joshi's Verbal Group Test of General Mental Ability was 0.79. Intrinsic validity of the test was found to range from 0.984 to 0.990 for the total and subtest-wise scores. Age-wise and grade-wise centiles and T scores were also prepared.

377. TRIPATHI, R. R., *Construction of a Personality Test with the SD Variable Controlled*, Ph.D. Psy., Pat. U., 1971.

The main purpose of the study was to develop a test of normal personality variables after devising adequate control over the SD variable in it.

The work had two phases. In the first phase, the constancy of the SD variables across two semantic forms of statements was examined. The SD scale values of these statements were derived from the rating of 100 males and 100 females. The statements were re-rated by the same subjects, correlation of two ratings being 0.96. In the second phase, the final scale consisting of fifteen subscales was developed. Following the forced choice technique, 200 pairs of statements were prepared. Out of these 200 pairs of statements, fifteen pairs with minimum scale separations were selected for constituting consistency items in the scale. The inter-class correlation between SD scale values of 200 statements designated as 'A' and the SD scale values of their 'B' partner was found to be 0.85. The scale was administered to a normative sample of 703 subjects (males and females) taken from eight universities of the Hindi speaking regions of the country. The internal consistency coefficients ranged between 0.82 and 0.99.

The test-retest stability coefficients ranged from 0.64 to 0.81. The centile norms and the T score norms were prepared for males and females separately. The inter-correlations among the fifteen subscales were generally low. Convergent validity coefficients (against the TAT, N=50) ranged from 0.56 to 0.93. The discriminant validity coefficients (against the Sinha Anxiety Scale, N=115) fell within the

range of zero to 0.24. The correlation coefficient between the proportion of endorsement for all the 200 'A' statements and their scale separations from their 'B' partners was only 0.11.

378. TRIVEDI, N., *Construction and Standardization of Non-Verbal Group Test of General Ability for the Children of Age Group 12+ to 14+ (Grade 7 to 9) of Haryana, Ph.D. Edu., Kur. U., 1972.*

The main objective of the study was to construct and standardise a nonverbal group test of intelligence for the age group 12+ to 14+.

The test consisted of 128 items which were put under five groups, namely, (i) series completion, (ii) classification, (iii) analogies, (iv) matrices, and (v) some practical work situations. The tryout form of the test was administered to 490 pupils drawn from randomly selected four schools (two boys' and two girls'). The items were subjected to item analysis. The final form of the test was administered to a representative and proportionate sample drawn from all the seven districts of Haryana which included both boys and girls. Thus the sample included 1799 boys and 684 girls drawn from thirteen boys' and seven girls' schools.

The coefficients of reliability by split-half and test-retest methods were found to be 0.973 and 0.948 respectively. The coefficient of correlation between the scores on the test and those on the Raven's Progressive Matrices Test was found to be 0.589.

*379. UMRAJWALA, V. R., *Construction and Standardisation of Reading Readiness Test for the Children of Central Gujarat, Ph.D. Edu., SPU, 1977.*

The objectives of the study were: (i) to provide pre-primary and primary schools with a valid and reliable tool for measuring reading readiness with norms for children of Central Gujarat; (ii) to study the reading readiness of pupils coming from different strata of the society; (iii) to study the influence of sex on reading readiness; and (iv) to compare the reading readiness of children from rural and urban schools.

The sample of the study comprised 1100 children of age ranging from 3.6 to 5.6 years, randomly selected from 32 kindergarten schools from the urban areas and 42 kindergarten schools in the rural areas again selected at random from a total of 513 kindergarten schools in Central Gujarat. To estimate the discrimination power and difficulty value of items, Kelly's method was used. Percentile norms and area-wise and age-wise T scores were established.

The study had the following findings: (i) There was no sex difference with regard to reading readiness of the children. (ii) The children of urban area were superior in reading readiness to children of rural area. (iii) Reading readiness increased with age. (iv) Those coming from upper socio-economic status had a better reading readiness. (v) Reading readiness had a positive relation with intelligence. (vi) Children having pre-primary school experiences were better prepared for learning reading than those who had not attended such schools. (vii) Reliability indices of the tool as computed by different methods ranged from 0.73 to 0.95. The concurrent validity of the test was 0.63. The average difficulty level of the test was 52.22.

380. UPADHYAY, S. D., *Verbal Group Intelligence Test for 8+ age-group Children, GCPI, Allahabad, 1972.*

The objective of this project was to construct a verbal group intelligence test for the children of age group 8+.

In the construction of the test, 200 items were taken contemplating the different aspects of mental ability, namely, (i) ability to discriminate; (ii) ability to find out similarity; (iii) ability to find out opposites; (iv) ability pertaining to digit-series; (v) ability to establish relationship; (vi) ability of reasoning; (vii) concepts related to (a) time, day, year, (b) directions (east, west, south, north), (c) left and right, (d) family relations; and (viii) general information. Two types of items, namely, recall type and recognition type were used. A sample of eighty-two students (fifty-seven boys and twenty-five girls) was taken from the Demonstration Basic School for the tryout of the test. Only forty-five items were retained on the basis of certain criteria like pass percentage, internal validity, and comprehensiveness. Two aspects of the mental ability, namely, (i) concepts related to time, directions, left and right, family relations and (ii) general information, were eliminated and the rest were included in the test. The forty-five items were re-examined by the experts of the institute and those items were eliminated whose pass percentage value and internal validity were found relatively low. Thus, only twenty items were selected. It was felt to add some items based on memory power and so five items were added to the selected twenty items, making the final number of items twenty-five. The final sample consisted of 312 students (218 boys and ninety-four girls) and was drawn from all kinds of schools of Allahabad.

The reliability of the test was found by split-

half method. The coefficient of correlation by product-moment method was found to be 0.78. Percentile norms were established.

- *381. UPADHYAYA, B. M., *Construction and Standardisation of the Aptitude Test for Secondary School Teachers*, Ph.D. Psy., Sau. U., 1976.

The major objectives of the study were : (i) to plan, construct and standardise an aptitude test in Gujarati for secondary school teachers and (ii) to study some correlates of aptitude for teaching such as sex, socio-economic background, academic discipline, and previous experience as teachers.

A preliminary form of the test was prepared. This test was administered to 130 students of two colleges of education. Item screening was done by calculating difficulty values and discrimination indices. Thus, items were scrutinised and the pilot form of the test consisting of 210 items was finalised. This form of the test was administered to a stratified clustered sample of 771 students drawn from nine colleges of education. The procedure adopted for item screening at pre-tryout level was repeated and as a result of item analysis 125 items were selected for inclusion in the final test. A standard procedure for administering the test was planned. The sample for test standardisation was selected from eighteen colleges of education that included 1409 student-teachers. Factor analysis by Thurstone's Centroid method was carried out upto two factors to study the nature of subsets.

The coefficient of stability by test-retest method was 0.77. The coefficients of correlation between the

ratings of the principals of the colleges of education and the test scores ranged between 0.32 and 0.48. General norms as well as specified norms were established. Both these norms were stated in the form of percentile scores, normalised standard scores, stanine scores and letter grades. It was found that sex and socio-economic background were not related to aptitude for teaching, whereas academic discipline and previous experience of teaching were found to be significantly related to aptitude for teaching.

- *382. VERMA, S. P., *A Hindi Adaptation of Allport-Vernon-Lindzey Study of Values*, Ph.D. Psy., Ran. U., 1972.

The study was undertaken to construct and standardise a test in Hindi in the light of local conditions on the basis of Allport-Vernon-Lindzey Study of Values scale.

The Hindi version of the scale was prepared which contained fortyfive problems or situations. This draft was tried out on a small group of persons and the final draft was administered to 100 college students selected randomly from the faculties of education, law, engineering, medicine, agriculture, science and arts of Ranchi University. The scale was administered to a sample of 500 subjects taken from agriculture and arts colleges of the Ranchi university to develop norms.

Some of the main findings were as follows : (i) The test-retest reliability coefficients were computed valuewise and they were found to vary from 0.71 to 0.83. The split-half reliability coefficients ranged from 0.71 to 0.82 for different values. (ii) The test was found to have a high validity valuewise.