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Tests and Measurement

A TREND REPORT

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Introduction

The earlier reviews of psychological tests constructed in India (Menzel, 1956; Harper, 1960; Krishnan, 1961; Jalota, 1965; Mitra, 1961, 1968, 1972; Mitra and Kuldip Kumar, 1972, 1978) have reported on studies up to 1978. A few studies which were conducted during this period but were not reported and the studies conducted later up to 1982 are reported in this review. The review also attempts to identify the gaps in terms of the dimensions (variables) measured, the languages/regions in which the tests are constructed, and procedures adopted particularly for the validation and reporting of norms. The gaps are identified with a view to helping the researchers and not to blame those who have worked in these areas previously. It seems to us that we have reached the first plateau and in order to move further we may have to change the designs of our research, reformulate our problems or pose new problems (search for new dimensions). This overview of the past is to help researchers to explore these new directions.

In this context, we have to redefine the term 'test'. These reviewers accept the definition given in the 'Standards for Educational or Psychological Tests' published by the American Psychological Association, 1972. "A test", according to them, "is a special case of an assessment procedure. It may be thought of as a set of tasks or questions intended to elicit particular types of behaviour when presented under standardized conditions and to yield scores that will have desirable psychometric properties such as high reliability and validity. Tests include standardized aptitude or achievement instruments, diagnostic or evaluative devices, interest inventories, personality inventories, projective instruments or related clinical techniques, and many kinds of personal history forms." It is accepted that the degree of standardization would vary, and to indicate these variations one may use the terms like test, inventories, self reports, observation schedules, scales, etc.

INTELLIGENCE TESTS

The total number of intelligence tests which are reported here (abstracts for some of them are given in the previous volumes of this survey) is 100. Their classification is given in Table 1.

Table 1
CLASSIFICATION OF INTELLIGENCE TESTS

	Before 1950	*1951-60*	*1961-70*	*1971-80*	*1981-Onward*	*Total*
A. Intelligence						
(a) Verbal	0	11	18	22	5	56
(b) Non-verbal	0	1	10	7	2	20
(c) Performance	0	0	2	5	1	8
Total						84
B. Social Intelligence	0	1	–	3	–	4
Total						88
C. Creativity	–	–	1	8	3	12
Grand Total	0	13	31	45	11	100

Intelligence

Although prior to 1950 intelligence tests were being used in India, they were either foreign test (e.g., Binet) or some adaptation of those (e.g., Binet-Kamat). The first Indian doctorate in test construction was awarded to Desai (1954) for developing a group test of intelligence in Gujarati. Since then we have both adaptation of foreign tests, particularly, Binet, Weschler, Progressive Matrices and original forms constructed in India. As one can see in Table 1, there are more verbal tests (56) than non-verbal (20) and performance (8).

Among the verbal tests, however, there does not seem to be an intensive and systematic effort to develop tests for dimensions like problem-solving ability, higher level of logical reasoning, cognitive styles, etc. The old Thurstone or Guilford model is still dominating the scene. Some researchers working in industries, defence or such other work organizations have developed a few tests simulating the work situations in the respective organizations. But these tests are not available for public use, or for training purposes in schools or colleges. In the abstracts presented in this report there are only two tests which claim to measure the problem-solving ability but none on higher cognitive abilities or styles.

The non-verbal tests are preferred to the performance tests because they can be administered in groups and still are relatively fair to different language groups. But are these tests fair to urban-rural or boys-girls or similar other dimensions? In most studies one finds that these tests are biased in favour of urban boys population. There are very few attempts to locate this item-bias (situation or item-type) with which one group out of the total population is more familiar than the other.

There is one test on Memory reported here (Pershad, 1976) which is designed to test the functioning of 'Recall' in the mental or neurological patients. We need many such tests or studies to see the impact of environmental and neurological variables on different aspects of cognitive functioning.

We also have a few studies reported here which are closer to Piaget model of cognitive functioning. We need many more, not just to replicate the studies by Piaget or Bruner but to find out how to accelerate the cognitive growth. To do such studies we need tests which measure different aspects of this growth.

It is true that many of these tests are going to be situational and, therefore, location specific. Developing one standardized form applicable to a certain age group throughout the country will not be practicable.

Social Intelligence

What is social intelligence? Is it accepting the social norms/standards given to the young generation by the conservative past? Is it awareness of the socio-economic political situation of the present? Is it how to influence people and win friends? The construct of social intelligence requires a sharper definition. Whatever the definition, here again the test situations (item-stimulus situations) are going to be relevant to one type of a target group rather than a very large population transcending urban-rural or sex differences. This is not to say that tests of social intelligence should not be constructed but to emphasize that the test constructor should define his construct more sharply as well as describe the characteristics of the sample on which he has standardized the test.

Creativity

Creativity can be looked upon as one aspect of cognitive functioning (divergent thinking) or as an interaction of both cognitive and affective (e.g., open-mindedness, self-confidence, etc.) functioning. There is very little work in our country in this area (eight tests in 1971-80 and a total of twelve till 1982). Most of the studies in this area are again tied up with Guilford's model. The new perspectives of Torrance and others have yet to influence Indian educators or test constructors.

Test Construction for Training

Most of the tests—intelligence or creativity—constructed in the previous decades in western countries as well as in India, were selection-oriented and not development- or training-oriented.

In the field of achievement testing the emphasis on criterion referenced (as distinguished from norm referenced) and formative (as distinguished from summative) test is gradually catching the attention of Indian educators. But can intelligence or creativity be 'taught'? Can training programmes help develop or accelerate cognitive growth? Even Piaget does not say that environment has no effect. The problem is to what extent, at what stage (readiness) and under what conditions (nature of stimulus or reinforcement) this can be done. To explore all these problems we need tools — tests, scales — both of verbal or performance type. We also need such tools to be used formatively in training situations.

Variation in Target Groups

In terms of the age groups these tests are serving, there is an imbalance as seen from Table 2.

Table 2
AGE-WISE CLASSIFICATION OF TESTS OF INTELLIGENCE

	0-6 yrs.	*7-12 yrs.*	*13-18 yrs.*	*18 or above*	*Total*
Verbal	1	9	36(+7)	3	56
Non-verbal	–	9	8	3	20
Performance	1	2	2	3	8
Social	–	–	–	4	4
Creativity	–	–	11	1	12
Total	2	20	64	14	100

A large number of our tests are constructed for the age group 13 to 18 — mainly the middle-or high-school-going children. For the higher adult level, the various work organizations, like defence, banks, are preparing tests which are not reported here. But the younger groups — pre-school and primary school—do not seem to get adequate attention. This may be because it is less costly and more convenient for a Ph.D. student (mostly from education and psychology departments of universities) to get the sample from high schools. The funding authorities like UGC, ICSSR or the State governments, however, should look into this matter and help initiate research useful for pre-school and primary school age groups.

But even at the 13-18 age group there is a big gap. What about those who leave school after primary school age or never go to schools. The non-formal education system is being developed for such young persons. Can our verbal or non-verbal tests of intelligence serve these target groups coming especially from lower socio-economic class, from rural areas or tribal areas? There is a large scope for research in the area of constructing tests for both selection and training purposes for these 'non-formal' groups who do not attend our middle or high schools.

Target Groups — Languagewise

One can study the picture of the target groups served from the language point of view. This is shown in Table 3.

Table 3
LANGUAGE-WISE CLASSIFICATION

Language	*Verbal Intelligence*	*Language*	*Verbal Intelligence*
English	2	Punjabi	2
Hindi	24	Assamese	2
Gujarati	14	Kannada	–
Marathi	4	Telugu	–
Bengali	3	Oriya	–
Malayalam	1	Kashmiri	1
Tamil	2	Nepalese	1
	50		6
Total			56

It seems from this table that the Hindi belt (particularly, the U.P. region) and Gujarat are relatively better served than most other regions in the country. This may be due to the existence of guidance services available in schools/colleges of that state and/or a strong/influential person heading a training college/university department at a particular historical period who could push the movement of test construction in that language. The story of non-verbal or performance tests runs parallel to the story depicted by Table 3. It may be stated that in practically all the states of India, some adaptation of Binet or WAIS/WISC is available. But the local norms on these are not published — not available readily to other researchers or users of these tests.

Reliability Procedures Adopted

In most of the test construction studies reported here, internal consistency reliabilities are reported. In some, test-retest reliabilities or equivalent form reliabilities are reported. These are usually satisfactory. But it is usually not noticed that the reliabilities of a test at different score levels are different depending on the item characteristics and the target group characteristics. A given intelligence test might be discriminating at a certain level of reliability at a lower level of intelligence, but would it be reliable at a higher level of intelligence? Many of these tests may have a ceiling in that they may not be distinguishing between highly intelligent children. Most of these tests again are standardized on school-going population which may or may not be representative of the non-school going children.

Validity Procedures Adopted

In the context of validity the problem of relevant

criterion (criterion bias) continues to haunt the test constructor. The concurrent validity procedure is easier, but how much biased the external criterion like teacher ratings or school examination marks are, is an unknown (or not measured) factor.

Not much is done in the context of construct validity. Routine factor analysis is done by some researchers particularly since 1971. But the meaningful interpretation of the various factor loadings are not reported. A few studies which are exception to this general observation can be mentioned here. Desai (1980) studied the comparative factorial structure of Raven's Standard Progressive Matrices, Cattell's Culture Fair Scale 3 and Desai-Bhatt Group Test of Intelligence on samples of various subcultures of Gujarat. Mishra (1979) and Nair (1972) also undertook similar studies.

Validation and Cross Validation

To conduct studies with large or representative samples is a costly affair and only a few studies reported here have used stratified random sampling procedures involving large groups. This is particularly difficult when somebody is working towards his Ph.D. or some such degree (time-bound). This is where cross validation data gathered by other researchers at other places or time, on similar groups would be very helpful. Either the author/researcher or the sponsoring agency should take this responsibility to collate and consolidate such data and record/publish the results with their own interpretation.

APTITUDE TESTS

The information on aptitude test available till 1982 is classified in Table 4.

Table 4
CLASSIFICATION OF APTITUDE TESTS

Category	*Publication Decade*					
	Before 1950	*1951-60*	*1961-70*	*1971-80*	*1981-*	*Total*
Scholastic	0	0	9	9	3	21
Differential	0	0	5	3	0	8
Vocational	0	1	6	3	0	10
Total	0	1	20	15	3	39

Guha (1957) started the work in this area. The problem before the researchers in this area is to distinguish between 'achievement' and 'aptitude'. Suppose a test of achievement in science and mathematics is used for selecting students for an engineering course. What is that achievement-information or skill which a student can learn in a short period after getting into the engineering college (or work situation) and what are those abilities — cognitive styles, skills which are relatively stabler and require long-duration training? There are no easy solutions to this problem. Work organizations can take certain decisions in terms of what kind of training they can provide after a person gets into the organization and what is it that they would expect that person to have achieved earlier before entering the organization. But the guidance services shall have to be much more careful in predicting a certain type of performance/success in career on the basis of scores obtained on an aptitude test which is closer to an achievement test. It may be noted that very few aptitude tests have a long-term predictive validity. It is difficult to collect data over years. On the other hand, most of the so-called scholastic aptitude tests are really achievement test. Some good illustrations of validity studies in this area are Desai (1981) and Chatterjee and Mukerjee (1969).

This whole area seems to be waiting for researchers having insights into both personality (interest, flexibility, adaptiveness, etc.) and cognitive (hierarchy of skills, cognitive strategies, etc.) aspects. The tests in this area have also training implications and the comments made earlier about intelligence tests are also applicable here.

Tests in Areas related to Congnitive Function

Shrivastav (1979) developed a Reading Readiness Test in Kannada to study the difference between first-generation learners and second-generation learners. Similar tests have been developed in a few other languages also. For instance, Thanedar developed a scale for evaluating handwriting of primary school children.

PERSONALITY MEASURES

Like ability test, personality measures developed in the country have generally followed the western models. Most of these have been adaptations of Bell's Adjustment Inventory, Kuder Preference Record-Personal, Guilford-Zimmerman Inventory, Strong Vocational Interest Blank, the MMPI and the Maudsley Personality Inventory. Decade-wise growth of measures in this area since Independence is shown in Table 5.

Table 5
DECADE-WISE GROWTH OF PERSONALITY MEASURES

Category	*Before 1950*	*1951-60*	*1961-70*	*1971-80*	*1981 onward*	*NR*	*Total*
A. Personality							29
1. Multiphasic	0	0	2	0	2	1	
2. Non-multiphasic	0	1	5	3	0	0	
3. Adjustment	0	1	9	4	0	0	
4. Value	0	0	0	1	0	0	
B. Interest	0	0	8	4	1	0	13
C. Attitude	0	0	0	4	1	1	6
Total	0	2	24	16	4	2	48

Sohoni (1953) made the beginning in this area by developing a measure to study temperament and character of high school students in cities.

A total of 48 personality inventories have so far been reported in the research journals or awarded Ph.D. theses as against 100 ability tests. Besides these, there are quite a few Indian inventories which are in use in the country. About 60 per cent of the inventories are related to personal-social-emotional adjustment and needs (especially achievement), 27 per cent to vocational interests, and the remaining 13 per cent are attitude measures. It may be noted that almost all these inventories (36 out of 48) have been developed for the age group 13 to 18 years, only two for the primary school students and none for the pre-schoolers. Age-wise classification of these measures is given in Table 6.

Table 6
AGE-WISE CLASSIFICATION OF PERSONALITY MEASURES

	0-6	*7-12*	*13-18*	*18 and above*	*NR*	*Total*
Personality	0	2	18	2	7	29
Interest	0	0	13	0	0	13
Attitude	0	0	5	1	0	6
Total	0	2	36	3	7	48

As already stated under ability tests, the test constructors have neglected the pre-school, primary and middle school populations, and there is an urgent need to develop parsonality measures for the out-of-school children and adolescents in their mother tongue. Presently most of the inventories are in Hindi and a few are in English as shown in Table 7.

Table 7
LANGUAGE-WISE CLASSIFICATION OF PERSONALITY MEASURES

Category	*Hindi*	*English*	*Marathi*	*Oriya*	*Telugu*	*Non-verbal*	*NR*	*Total*
Personality	9*	5	0	0	0	1	14	29
Interest	5	0	1	1	0	0	6	13
Attitude	1	1**	0	0	1	0	3	6
Total	15	6	1	1	1	1	23	48

*One Hindi inventory is also available in Gujarati and English.
**Also available in Hindi

Regarding the procedures followed in working out the reliability and validity of personality measures the observations made earlier on cognitive tests are also applicable for affective measures.

Future Research in Personality Tests/Inventories

One major shift in this context is from a personality trait approach to test construction to developing inventories/scales to measure environment-related behaviour. Behaviour — emotional, social — is a function of an interaction between a person and the environment. We need many instruments to assess these behaviours.

Adjustment inventories as distinguished from multiphasic personality tests based on traits is a move in this direction. But adjustment inventories are not an *ad hoc* assortment of items. There, too, the theoretical/psychological construct—the rationale is to be made explicit.

There is need for instruments/scales for measuring the interaction of a person and his environment.

MISCELLANEOUS STUDIES

Mukhopadhyaya (1982) studied the impact of introducing correction for guessing on the performance of polytechnic students. It resulted in lowering down the average scores but the correlation between corrected and uncorrected scores ranged between 0.59 and 1.00.

Chatterjee, S. *et al.* (1972) studied the use of 'wrong' scores to increase the predictive validity. They did not find any advantage in doing so.

Pathak (1977) studied the influence of cues in human figure drawing of pre-school children and found that cues helped to improve performance only at later age level (not before 4).

Gupta (1972) studied the effect of stimulant and depressant drugs on the test scores of fluid and crystallized intelligence of high school children and found the interaction effects with certain personality variables.

Some studies also report the use of self-assessment,

peer assessment and such other procedures of scoring and evaluating test performance. Such studies should be viewed as subsystems of a wider system of training where the pre-learning (entering) behaviour of the learner and his expectations and reward/punishment system constitute one set of variables.

Conclusion

Test Construction as an Integral Part of a Project

Tests are mainly used for (A) Selection, e.g. recruitment in industry, (B) Diagnosis — e.g., clinical analysis deciding on remedial treatment/instruction, (C) Prediction of future behaviour, and (D) Training — getting and giving feedback/knowledge of results to students improving instruction, designing new courses, curriculum, etc.

We have also realized that there are very few, if any, characteristics of a human being which are static (they are more or less stable, but never completely static) and that human behaviour is much more dependent on the environment (physical/social ecology) in which he is working. Hence we are gradually shifting from a trait — based approach in test construction which dominated our thinking for the last three decades. New types of tests, scales which are relatively more location specific and time specific, are emerging. The procedure of constructing them and standardizing them are also somewhat different from the procedures followed on the assumption of a normal curve (ability normally distributed among the population). It is time for the new researchers to get themselves acquainted with these new procedures and collect meaningful data-information relevant to the aims of the projects of which the tests are an integral part.

Need for Better Manuals

Most of the tests/inventories, etc., reported here have some kind of a manual. It must be emphasized that a manual helps not only the user of that test but also the test developer to organize his thinking, codify his procedures, and communicate his ideas and intentions to others.

In order to be useful the test manual should contain certain information. Most of the manuals of the tests reported here are inadequate and in some respects misleading. It is strongly suggested that all test developers follow the standards set by the American Psychological Association in the publication referred to earlier.

A few points which may be stressed here in order to improve the presently available test manuals are as follows:

1. A test manual should describe fully the development of the test, the rationale, specifications followed in writing items or selecting observations, and procedures and results of item analysis or other research. (A_2)
2. The manual should draw attention to and warn against any serious error of interpretation that is known to be frequent. (B 1.4)
3. The description of the norms group in the test manual should be complete enough so that the user can judge its appropriateness for his use. The description should include number of cases, classified by one or more of such relevant variables as ethnic mix, socio-economic level, age, sex, locale, and educational status. (D 2.2)

   It may be noted here that it is desirable to give the year when the norm data were collected. None of the tests reported give such information and some test manuals do not even give the year of publication.
4. Statements about validity should refer to the validity or particular interpretation or of particular types of decision. (E 1.1)
5. A criterion measure (used in concurrent or predictive validity studies) should itself be studied for evidence of validity and that evidence should be presented in the manual or report. (E 4)
6. If the author proposes to interpret scores on a test as measuring a theoretical variable (ability, trait, or attitude) his proposed interpretation should be fully stated. His theoretical construct should be distinguished from interpretation arising on the basis of other theories. (E 13)

In short, there is need for our test constructors/researchers to share their thinking, logic, rationale as well as qualitative information which will help the test users to make appropriate decision. It may be emphasized again that these standards are to be followed not only by tests for wider use but also by those tests/scales constructed for use in a work organization or in one educational institution. Many studies reported in this review need to be supplemented in this context.

ABSTRACTS : 659-741

659. AGNIHOTRI, P.N., *Construction and Standardization of Verbal Group Intelligence Test for the Age Group Eleven Plus in Madhya Pradesh,* Ph.D. Edu., Vik. U., 1965

The purpose of this study was to construct and standardize a verbal group intelligence test for the age group 11+. The tryout sample for the study was drawn from nine schools of Jabalpur, Bhopal, Ashta and Begumganj, comprising 397 children of whom 370 (267 boys and 103 girls) were finally selected for item analysis. The final tryout of the test was on 1,520 boys and 480 girls from forty–two boys' and fifteen girls' schools. The preliminary draft of the test included 200 items on classification, analogies, essentials, opposites, sentence completion, misspelt words, number series, arithmetical problems, disarranged sentences and following directions. All the items taken together fell into two main types — the recognition or multiple choice type and recall or open completion type. In the final draft, after item analysis, the items of each type were placed together in separate subtests or parts, beginning with the easiest and progressing by intervals to the most difficult. The tests were in Hindi.

The characteristics are: (i) The test consisted of 100 items on classification, analogies, essentials, opposites, sentence completion, number series, arithmetical problems, disarranged sentences and following directions. (ii) The reliability coefficient worked out by using Kuder-Richardson formula was 0.94. (iii) The validity was established by correlating the test scores with the class teacher's ratings on a five-point scale; the validity coefficient was 0.63. (iv) Norms were prepared on the basis of Age Allowances method. (v) The time required for administration of the test was forty-five minutes.

660. ANAND, C.L. and SUDHIRKUMAR, M.A., *Development and Standardization of a Modernity Attitude Scale (MAS),* NEHU, 1981

The study aimed at developing and standardizing a Modernity Attitude Scale (MAS). The MAS was designed as a five-point Likert-type forced choice scale consisting of five subscales assessing the social attitudes of the subjects. The five subscales measured attitude towards religion, marriage, family, status of women in society, and education.

The tryout form of the scale consisting of 200 statements was administered to 400 adults from 400 households selected randomly from two villages in Malabar in the State of Kerala. Item analysis was carried out on responses of 370 subjects. Eighty best discriminating items were selected taking sixteen statements (eight positive and eight negative) from each of the five areas under study, for developing the final form of the scale. This was subjected to statistical treatment in order to establish the norms, reliability and validity.

The split-half reliability of the full scale was found to be 0.76 and for the subscales it was found to range between 0.66 and 0.75. The test-retest reliability for the full scale was found to be 0.72 and for the subscales it was found to range between 0.69 and 0.74. The validity of the scale was assessed by finding correlations between the total scale and the score on each subscale using product moment method. Computed values of correlation ranged from 0.57 to 0.73. Percentile norms and stanines were developed.

661. BADAMI, H.D., *A Scale for Measuring Attitudes of College Students towards Education,* School of Phil. Psy. and Edu., Guj. U., 1973

The major aim of the investigation was to construct a scale to measure the attitudes of college students towards various aspects of education — instruction, curriculum, teaching methods, teachers and examination procedures.

The Likert technique of developing an attitude scale was employed. Eighty-five items were collected from earlier studies, students' own expression concerning education and discussions with teachers. The items covered five areas mentioned earlier. On the basis of discussion with experts, the items were modified or rewritten. Five positive and five negative items for each of the five aspects of education were retained. For each item, the respondent was to give a choice of rating on a five-point scale, from 'strongly agree' to 'strongly disagree.' A sample of 100 respondents was randomly selected from three different colleges of arts, commerce and science. Item analysis was carried out by taking two extreme groups, namely, upper 25 per cent and lower 25 per cent. Critical ratios were calculated for each item. Eight items having the highest values for each aspect were selected. Reliability indices were as follows: (i) Test-retest reliability was 0.77 (N=40). (ii) Split-half re-

liability adjusted by Speerman-Brown formula was 0.85 (N=100).

662. BANKER, H.R., *Construction and Standardization of Abstract Reasoning Test for the Students in Grades VIII and IX of the Secondary Schools of Saurashtra,* Ph.D. Edu., Sau. U., 1981

The main objective of the study was to construct and standardize an abstract reasoning test. Eight types of series were prepared and nearly 200 items were administered on 111 students for the pre-tryout. Selected items were administered on a stratified clustered sample of 370 students of eleven different schools of Amreli, Bhavnagar and Surendranagar districts. Item analysis and distractor analysis were carried out for the preparation of final test form. Very thorough cross-sectional sampling of students was done. Stratification was done according to sex, grade, area and district sampling. The final test was administered on 5,277 students of ninety-one different schools of fifty-nine different places of Saurashtra.

Reusable printed test booklets of the final form were prepared. A manual of directions was also prepared. The data were analysed by statistics like mean, median, SD, t-test and skewness. Reliability of the test was established by test-retest method (0.81), split-half method (0.94), Rulon formula (0.94), and Kuder-Richardson formula (0.95). The three types of validity established were congruent validity (r =0.84), concurrent validity (r = 0.63) and predictive validity ranging from 0.72 to 0.26. Three hypotheses were proposed relating to sex, grade, and area differences.

The findings indicated: (i) Different area sub-groups were not found to be significantly related to abstract reasoning. (ii) Significant sex and grade differences in reasoning were observed. Hence, separate norms were established for boys and girls of Grades VIII and IX, in the form of percentile ranks, standard scores, T scores, stanines and letter grades.

663. BHADAURIA, S.P.C., *A Comparative Study of Creativity, Self-Concept and Meaning of Success among Gifted and Other Science Students,* Ph.D. Psy ,Agra U., 1980

The aims of the investigation were: (i) to study the creativity of gifted and other science students, (ii) to study the self-concept of gifted and other science students. and (iii) to study the meaning of success of gifted and other science students and to examine the relationship between creativity, self-concept and meaning of success. Broadly, the study intended to provide educational and vocational guidance to the students of the residential schools scheme run by the Government of Uttar Pradesh since 1976. The students in the residential schools were treated as gifted.

The following hypotheses were proposed: (i) The creative potential of gifted students is higher than other science students. (ii) The meaning of success was different for the more creative and the less creative science students. (iii) The self-concept of the more creative and the less creative students differs significantly. (iv) A positive relationship exists between creativity, self-concept and the meaning of success. The study was conducted on a sample of male, gifted students of Classes IX and X selected by the Government of Uttar Pradesh on the basis of merit from among those studying in intermediate colleges as Awasiya Chattras. They received a stipend and a tutor-guardian during the period. The investigator used stratified random sampling for selecting 150 gifted students and an equal sized comparable group of science students from urban and rural background. The research tools used in this study were Creativity Test (Chauhan and Tewari), flexibility being taken as a measure of creative potential, Self-Concept Inventory (Bhatnagar), meaning of success — a questionnaire developed by the researcher. The study was concerned with the comparative assessment of creativity, self-concept and the meaning of success of gifted and other science students, so the researcher applied t-test in the case of creativity scores and chi-square test in the case of the meaning of success scores.

The conclusions were: (i) The gifted students showed significantly greater creative potential than the non-gifted science students on verbal and literary problems. (ii) The overall creative production, the mean score of the gifted students, was significantly higher than that of non-gifted students. (iii) The mean score on the originality of the gifted students was significantly higher than that on the originality of the non-gifted students. (iv) The gifted students scored significantly higher on adjustive and spontaneous flexibility than the non-gifted students. (v) The overall mean score of the gifted students was significantly higher than that of the non-gifted students; the gifted students had significantly higher positive aspects of self-concept. They showed significantly higher degree of confidence. The achievement scores were also higher. (vi) The non-gifted students had significantly higher negative aspects of self-concept. They exhibited significantly higher degree of withdrawal, in-

feriority feelings and emotional instability than the gifted students. (vii) The groups differed significantly in accepting the criteria, procedure and model of success; however, the difference in accepting the general means for achieving success was not significant.

664. BHALWANKAR, A.G., *A Study of the Reliability and Validity of the Process-Process Appraising Scale of Teacher Effectiveness*, S.N.D.T. College of Education for Women, Pune, 1979 (SIE, Pune-financed)

An instrument named Process-Process Appraising Scale of Teacher Effectiveness (PASTE) was developed by A.G. Bhalwankar, and A.N. Joshi. It was a scale containing fifteen teacher behaviour components and nearly 165 teacher behaviours and consequently generated pupil behaviours. The study aimed at establishing the reliability and the validity of this instrument.

In order to establish the inter-supervisor reliability, seven lessons were given by teachers and supervised by eight supervisors and again ten lessons were given by student-teachers and supervised by seven supervisors. In order to establish the internal consistency, ten teachers who had a stable style of teaching, were observed by two supervisors twice and again sixty lessons were observed by one supervisor using PASTE and another 10-point competency rating scale simultaneously. The content validity was established on the basis of opinion of experts and observation of a set of master teachers and poor teachers.

The major results were: (i) The inter-supervisor reliability was 0.92 when student-teachers were observed by supervisors. The inter-supervisor reliability in the case of school teachers was 0.53. PASTE was found to be a more reliable tool to measure the performance of student-teachers rather than teachers in general. (ii) The coefficient of stability of the instrument was 0.63. (iii) The coefficient of equivalance with the teaching competency scale was 0.69. (iv) The difference between the results of appraisal of the first lesson and the last lesson of twelve student-teachers was significant indicating that the instrument had content validity. (v) The validity coefficient with the grade of examination lessons as external criterion was 0.78. (vi) On the basis of indices of decision-making accuracy, the instrument was found to be valid. (vii) The PASTE scores of master teachers and poor teachers differed significantly, indicating that the instrument was a valid tool discriminating between good and poor teaching.

665. BHASIN, P.S.S., *An Analytical Study of Inventoried Interests*, Ph.D. Edu., MSU, 1980

The specific objectives of the investigation were: (i) to construct new keys on empirical basis from normative data, (ii) to determine the most efficient measure, (iii) to study the parsimonious nature of vocational interests, (iv) to compare the criterion group profiles, (v) to determine the overall relationship between the occupational membership and the vocational interest, (vi) to determine the profile reliability, (vii) to examine the applicability of the normal model in the vocational interest measures, and (viii) to provide a classificatory procedure.

The ten occupational groups of the normative sample of the Co-operative Test Development Project of the NCERT were used for the analytical purpose of the study. Data were collected from the official records. There had, however, been certain cuts on the sample sizes of various criterion groups on account of some untraced data cards, faking and disproportionate samples. The new keys were developed using cos-pi approximation to the tetrachoric correlation and its standard error item discrimination indices. They were validated comparing with the original keys. The interest factors were extracted using the principal component factor analysis method.

The major findings of the study were: (i) When the set of original keys were compared with the new keys, in this cross sample comparison of interest patterns, varying degrees of stability of vocational interests were found. (ii) The differential weights for the item formats used in the NII were determined with the help of two group discriminant function analysis. (iii) These differential weights have three distinct merits namely, (a) they reflected the efficacy of each format in differentiating the criterion group from the reference group, (b) they provided coefficients which could be used as regression weights in order to combine, linearly, the subscores of the four parts of the NII in an optimal way which led to reduction of the forty subscores to ten interest variables, and (c) the composite scores obtained by these differential weights were robust in nature and often resulted in normality even when the composing subscore distributions were non-normal. (iv) The most important factor, the first one, was a bipolar factor with technical interest on one extreme and literary interest on the other. (v) The second important factor was also a bipolar one with interest in economic and business pursuits as one pole and interest in educational and teaching occupations as the other. (vi) The third important factor represented outdoor interest and interest in protective services op-

posed to those with interest in medical. (vii) The fourth factor represented interest in secretarial jobs. (viii) All the ten groups under study were found to be distinct from one another when considered on their interest profiles. (ix) Regarding the form of subscore distributions it was found that in most cases the subscores were normally distributed. (x) The reliability coefficients ranged widely and some of the values were found to be negative too.

666. BHASKARA, S., *A Study of Effectiveness of Verbal Creativity, Instructional Materials at School Stage,* Ph.D. Edu., MSU, 1982

The specific objectives of the study were: (i) to assess the creativity of students of Standard VI in the Bangalore district of Karnataka, (ii) to prepare verbal creativity instructional materials for enhancing creative thinking abilities of Standard VI children, and (iii) to determine the relationship of verbal creativity instructional materials with certain variables, viz., different creative potentials, levels of socio-economic status, sex and rural-urban background, and their interactions.

To assess the creativity of students, Passi Test of Creativity (Verbal) was translated into Kannada and norms were developed by administering the test to 570 children studying in schools in and around Bangalore. The instructional material was scrutinized by ten experts in order to ensure content validity. They were then given to three children from Standard VI for identifying and changing different words and phrases in the material. Also, a pilot study was conducted on a sample of fifty-one urban and thirty-six rural school children. Final validation experiment was conducted adopting a pretest-posttest parallel group design. The sample consisted of Standard VI children from two urban and two rural schools. The treatment lasted for thirteen weeks and was spread over forty periods in each of the experimental schools. Various tests and instruments used in the study included Passi Tests of Creativity, Socio-Economic Status Scale of Aaron and others, Comprehension Test of Dave, Creativity Rating Scale developed on the lines of Foster, and Reaction Questionnaire and Interview Schedules developed by the investigator. The t-test, Wilcoxon test and Mann-Whitney test were used to find out the significance of difference between the means of various groups. Analysis of covariance was used to adjust the effect of pretest scores, wherever necessary. The reaction questionnaire and interview data were qualitatively analysed.

The main conclusions of the study were: (i) Verbal creativity instructional material significantly improved the creative thinking abilities of middle and low creative potential students, high and middle SES students, boys and girls, and students from rural and urban areas. (ii) Urban students excelled rural students and boys excelled girls in significant gains benefiting as it seemed by working on verbal creativity instructional materials. (iii) There was significant improvement in the case of urban experimental group over urban control groups, but the improvement of rural experimental group over rural control group was not significant at 0.05 level. (iv) Ratings given to the students by their teachers after the treatment were significantly higher. (v) Correlation coefficient between comprehension and pretest creativity scores was low, indicating that comprehension did not affect the fostering of creative abilities. (vi) The majority of the children liked the stories and the components indicating satisfaction with the approach used in the verbal creativity instructional material. (vii) High gainers in creativity differed from low gainers in important creativity characteristics as revealed by the interviews with students.

667. BHATT, G.C., *Construction and Standardization of Verbal Reasoning Test for the Students Studying in Grades VIII and IX of Secondary Schools in Saurashtra Area,* Ph.D. Edu., Sau. U., 1981

The major objectives of the study were: (i) to construct and standardize a verbal reasoning test in Gujarati, (ii) to check the significance of difference between subgroups based on sex, region and grades, and (iii) to prepare norms for boys and girls, separately.

The total sample of 5,449 students was selected from ninety-six different schools of sixty-two different places of Saurashtra region by the stratified random sampling technique. Items were constructed on the lines of the DAT. Two hundred items were constructed for pre-tryout. After the item analysis, 134 items were retained for the pilot test and divided into two forms. The final form of the test consisted of sixty items. Descriptive statistics like central tendencies, SD and skewness were worked out. Percentile scores, standard scores, T scores and stanines were developed. Reliability was established by test-retest, split-half, and Kuder-Richardson formulas 20 and 21. The reliability coefficients were 0.82, 0.93, 0.91, 0.82, respectively, validity of the test was established by correlation with intelligence tests, aptitude tests like abstract reasoning, numerical ability and ver-

bal reasoning test.

The findings of the study were: (i) The means of boys and girls of Grade IX were higher than those of Grade VIII. (ii) The means of boys were higher than those of girls in Grades VIII and IX and in the total sample. (iii) Urban and rural area differences were observed only in the case of the Grade IX sample.

668. BOSE, U., SINHA, S., CHATTERJI, S. and MUKHERJEE, M., *An Investigation into the Interest Patterns of the Students in Science, Humanities and Commerce Streams at the Higher Secondary Level*, Calcutta, 1970

The main aim of the study was to develop typical interest patterns for science, humanities and commerce streams. For measuring the interest of the students, Chatterji's Non-Language Preference Record (CNPR) was used. All the higher secondary schools of Calcutta were classified into several groups on the basis of area, as north, central and south. Then from each area four schools, two boys' and two girls', were selected at random. Only two other schools were taken in addition for the commerce stream. The sample included 628 students — 357 boys and 271 girls — studying in Class XI of the selected schools.

The findings of the study were: (i) Interest patterns for all groups were not identical and the pair-wise comparison indicated that there was a wide variation between the groups in this respect. (ii) There was much similarity between the interest patterns of the commerce and humanities groups but the science groups were much different from both commerce and humanities groups as far as interests were concerned. These similarities and dissimilarities in the interest patterns for different groups could provide adequate aid in a guidance situation. (iii) By using the total marks obtained by the students in the higher secondary as a criterion, three new scales of interest in the humanities, commerce and science streams were developed.

669. BUREAU OF PSYCHOLOGY, *Construction and Standardization of Non-verbal Group Test of Figural Ability for 12 Plus*, Allahabad, 1982

The study was an attempt to construct and standardize a figural ability test for the 12 plus students.

The test consisted of four subtests. The first subtest consisted of ten questions with two examples, the second and the third subtests contained ten questions and one example each, and the fourth subtest had twenty questions with five examples. The time for completing the first, second, third and fourth subtests was six minutes, three minutes, six minutes and nine minutes, respectively. The test was standardized on a sample of 1,130 students of Class VIII studying in various schools situated in Allahabad.

The test-retest reliability coefficient ranged from 0.6 to 0.7. The concurrent validity was established by using Form Relation Test developed by NIIP, London. The concurrent validity coefficients were fairly high. Thus, the reliability and validity data revealed that the test was highly reliable and valid.

670. CHAKRABORTY, S.C., *Construction and Standardization of a Performance Test Battery of General Mental Ability for the Children of Age Groups Six to Ten Years*, Ph.D. Edu., Gau. U., 1979

The major objective of the study was to provide an instrument to measure the general mental ability of children of age groups six to ten (studying in Classes I to V) for solving the problems related to school admission, classification of pupils into homogeneous groups, class promotion, diagnosis, prognosis, educational guidance and research.

A battery consisting of six tests, viz., Stringing Bead Pattern, Picture Sequence, Picture Assembly, Object Profile, Block Design and Symbol Substitution, was initially administered to 400 children (eighty from each class). Difficulty value and validity index were estimated for each item and finally sixty-one items were selected in the final battery. The standardization sample consisting of 1,000 children (200 from each grade level comprising 100 boys and 100 girls) was selected from 84 per cent of the total subdivisions of Manipur. Mean, median, standard deviation, etc., of the test scores were computed. Normality of the distribution of scores on the battery was tested by applying chi-square test. Skewness and kurtosis were also computed.

The major findings were: (i) The reliability co-efficients of the battery and its tests (except Symbol Substitution Test) were estimated by K-R formula. For the Symbol Substitution Test the reliability coefficient was calculated by test-retest method. The reliability coefficients obtained were found to range from 0.66 to 0.91. The standard errors of estimate were found to vary from 0.017 to 0.056. (ii) From factorial analysis it was found that the battery contained only one factor in the six tests

studied. The g factor loadings and centroid factor loadings of the test varied from 0.75 to 0.87 and 0.761 to 0.865, respectively. The community varied from 0.601 to 0.766. (iii) The coefficients of correlation between the scores on the battery and scholastic achievement in English, mathematics and science were found to range between 0.40 and 0.56. (iv) The coefficients of correlation between the battery scores and the scores obtained by the students on WISC and Performance Test of Intelligence (Bhatia) were 0.78 and 0.63, respectively. (v) The scores validity was also proved by correlating the battery scores obtained from extra samples (outside the original sample by including one extra sample for each class) with the scores of the corresponding classes of the original sample. The mean differences were not significant. (vi) The content, concurrent, factorial, cross and predictive validities of the battery were satisfactory. (vii) Grade and age norms were established separately for boys and girls. Grade percentiles for different classes (from I to V), and age percentiles for different age levels (from six to ten) were computed for boys and girls, separately. Raw scores for each grade and age level were converted into T-scores. Deviated IQ tables for each grade and age level were constructed for boys and girls, separately. Children were classified into seven categories, viz., extraordinary, very bright, bright, average, backward, very backward and mentally defective. The percentages included in these categories were 1.1, 8.8, 17.5, 48.4, 14.2, 7.7 and 2.3, respectively. (viii) Analysis of variance indicated that the effect of sex on performance on the test was not significant. (ix) The differences in the mean battery scores between the children of different age levels, except in the case of the children's score between seven and eight years of age, were significant at one per cent level. The scores showed increase with the increase in age.

***671** CHATTERJI, C., *Development of a Non-verbal Intelligence Test,* Indian Institute of Psychometry, Calcutta, 1982

The main aim of the study was to develop a non-verbal test of intelligence for children of the age of level of 13 to 15 years. In all, 200 items were developed with fifty items in each of the four parts, viz., analogy, analysis, series completion and matrices, and initially tried out on thirty-two school boys studying in Classes IX and X. The final form was administered on 100 students studying in Class IX of a particular school. Concurrent validity was found out by computing the correlation with NLTVI. The reliability was estimated by split-half method.

The major findings of the study were: (i) The four parts of the test were sufficiently highly correlated. (ii) The test was reliable and internally consistent. (iii) The test was a valid instrument for measuring the intelligence level of children.

***672.** CHATTERJI, S. and MUKERJI, M., *Application of Multivariate Analysis to Differentiate Several Groups on the Basis of Interest,* ISI, Calcutta, 1979

The main aim of the study was to investigate the differences in interest patterns of the delinquents and the non-delinquents, and to decide an appropriate procedure for spotting out delinquency-prone children in the population of school-going children on the basis of interest.

Interest was measured by using the Chatterji's Non-Language Preference Record, which was administered on three groups, viz., delinquents (N=125) living in a house of detention, school-going children (N=672), and children living in slums (N=125). The school-going children were drawn from five boys' and seven girls' schools selected at random from among the Bengali medium schools in Calcutta. The samples included both boys and girls and the environmental conditions of the groups were more or less similar. Difference in the means, the generalized distance between the groups, statistical criterion to determine the group to which an individual belonged were worked out and cross validation study was conducted.

The findings of the study were: (i) The interest pattern of the delinquents was markedly different from that of the school-going children. It was also distinctly different from the interest pattern of the children born and brought up under equivalent environmental conditions. Environmental conditions was not necessarily the major determinant of delinquency-prone interest pattern. (ii) Delinquency-prone children could be identified with a high degree of accuracy on the basis of their interest pattern.

***673.** CHATTERJI, S. and MUKERJI, M., *Construction and Development of a Non-language Test of Verbal Intelligence* (revised), Psychometric Research and Service Unit, ISI, Calcutta, 1982

The major objective of the study was to construct and

develop a non-language test of verbal intelligence (NLTVI). Based upon the results of a pilot study, an experimental form of the test was prepared and tried out on about 500 students reading in Class VIII in five different schools in Calcutta. Three-stage item analysis was done. Finally, sixty-two items were selected and arranged on the basis of their difficulty values separately for the four parts, viz., analogy, classification, opposites and picture arrangement, of the revised version of the test, which was then administered on 1,305 children (807 boys and 498 girls) reading in Class VIII in ten boys' and seven girls' schools in Calcutta. The reliability, validity and norms were determined.

The findings of the study were: (i) The reliability coefficients computed by KR-21 formula were found to vary from 0.51 to 0.83 for different parts of the test. Intercorrelations among the part scores were found to range between 0.30 and 0.56. (ii) Correlations between different parts of the test and the marks obtained in the annual examination in different school subjects were positive and significant at one per cent level. (iii) Concurrent validity study results proved that the test measured verbal ability though the medium used was non-verbal. (iv) The factor analysis study indicated two different factors, viz., verbal reasoning factor and verbal relation factor. Percentages of total communality for verbal reasoning and verbal relation factors were 66.4 and 33.6, respectively.

674. CHATTERJI, S. and MUKHERJI, M., *The Predictive Ability of a Differential Aptitude Test Battery — a Follow-up Study*, Research and Training School, ISI, Calcutta, 1969

The main aim of the study was to examine the predictive ability of a differential aptitude test battery. An aptitude test battery covering seven different tests, viz., English knowledge and comprehension, clerical aptitude, abstract reasoning, verbal reasoning, mathematics knowledge and aptitude, scientific knowledge and aptitude and mechanical comprehension, was designed. All these tests were in Bengali and the entire administration took about four hours. This battery was administered on a group of more than 1,000 students studying in Class VIII in twelve different schools. Grouping of the students was done stream-wise and sex-wise there were five groups to deal with. Regression equations were developed and multiple correlations with the school examination marks as the criterion scores, were computed.

The findings of the study were: (i) All the mutiple correlations with Class X examination marks were significantly different from zero except the one obtained with the boys' humanities group. (ii) All the multiple correlations for different groups with higher secondary marks as criterion scores were significant except that for the girls' science group. (iii) The battery possessed a high degree of predictive ability and was able to predict achievement which was measured after more than three years with a fair degree of accuracy. (iv) The battery possessed differential predictive ability.

***675.** CHATTERJI, S. and MUKHERJI, M., *Validity Study of a Selection Test Battery Used for Selecting Students at the Indian Institute of Management, Calcutta*, ISI, Calcutta, 1970

The main aim of the study was to evaluate the efficiency of the selection tests which were developed for selecting students at the Indian Institute of Management, Calcutta.

The selection procedure took into consideration different types of information, viz., educational qualifications, personal factors, interview evaluation and selection test. The selection test battery, consisting of six different tests, was administered upon 1,058 cases on the same day and at the same time at eleven different centres in India in the year 1965. The predictive ability of the selection test battery was studied by adopting different methods.

The findings of the study were that the selection test scores though not able to predict success in a few subjects covered had fair ability to predict the remaining ones. Moreover, these scores alone had more predictive ability than the other three factors considered for selecting the candidates including educational qualifications.

676. CHATTERJI, S. and MUKHERJI, M., *Verbal Intelligence as Measured by the NLTVI and Its Relation with Different Subjects Taught in School*, Psychometric Research and Service Unit, ISI, Calcutta, 1970

The major objectives of the study were: (i) to evaluate the predictive ability of the NLTVI with respect to different subjects, (ii) to get a linear composite score with the separately timed part scores of NLTVI which would have a maximum correlation with the total marks in three languages, viz., English, Bengali and Sanskrit included in the school syllabus, (iii) to get another composite score which would have maximum correlation with

total marks in the non-language subjects like mathematics, geography and science, and (iv) to test whether the ability measured through the NLTVI correlated more with the language subjects than with the non-language subjects.

The sample for the study consisted of Class VIII students from ten boys' and seven girls' higher secondary Bengali medium schools in Calcutta which were selected at random. The NLTVI was administered on 498 girls and 807 boys and their annual examination marks for Class VIII were collected.

The findings of the study were: (i) Boys and girls did not differ significantly on all the four parts of the NLTVI. (ii) Except for two correlations, namely, between Part I and Part II and between Part III and Part IV, other correlations between different parts of the tests were considerably low. (iii) The average performance of boys in the school examination was significantly better than that of girls, in five out of seven subjects. (iv) The zero order correlation coefficients between NLTVI and school examination marks ranged between 0.02 and 0.37. (v) The regression coefficients, multiple correlation coefficients and factor analysis results of school examination marks indicated that from the point of prediction of academic achievement NLTVI was comparable with a verbal intelligence test which used language as the medium.

677. CHATTERJI, S., MUKHERJI, M. and CHAKRABORTY, P., *Effect of Education Level, Culture, Grade or Division and Age upon the General Ability Test Score*, ISI, Calcutta, 1974

The major aims of the investigation were to examine the effects of educational level, culture, grade and age upon the scores on the General Ability (GA) Test. The sample comprised all the applicants who had applied for the Bachelor of Statistics course, Master of Statistics course and Research Course in the Indian Statistical Institute. They had completed either their higher secondary examination or a bachelor's degree examination or a master's degree examination. Their numbers were 168 (higher secondary), 180 (B.A./B.Sc.), 120 (M.A./M.Sc.), 77 (B.E./B.Tech). The tool used was a General Ability Test consisting of Verbal Reasoning (VR), Quantitative Reasoning (QR), and Data Interpretation (DI). The statistical techniques used for data analysis included Hotelling's test, Mahalanobis D^2 test, Kolmogrov-Smirnov two-sample test two-way analysis of variance.

The main findings of the study were: (i) Wide variation in the performance of the cadidates with different academic backgrounds on the GA test battery did not exist. (ii) The test of the mathematics used in the selection test battery was not found to have high correlations with different parts of the GA at various educational level except in two cases out of twelve. (iii) The culture effect or the difference in the standard of education at the different universities was not found to play an important role in making the performance on GA test battery different. (iv) The effect of age with respect to the group concerned was found to be insignificant.

678. CHATTERJI, S., MUKHERJI, M. and CHAKRABORTY, S.N., *Use of Wrong Score to Increase the Predictive Validity of Attitude Tests*, ISI, Calcutta, 1972

The main aim of the investigation was to study, on the basis of empirical data, the possibility of using a wrong score as separate measurement and, to see how far prediction of a criterion could be improved from the use of this score along with the right score.

The sample included three groups of students of business management of an institution in the years 1965, 1966 and 1967. Before being admitted to the course, these students had to qualify themselves through an admission test. The purpose of this admission test was to predict the criterion, namely, Comprehensive Grade Point Average (CGPA), obtained by the students at the end of their course. There were fifty-two, seventy-four and sixty-five students in the first, second and third groups respectively. The admission test scores and the final CGPA of these students were collected. Both the right and the wrong scores for each individual were also collected. Correlations and multiple regression analysis by utilizing the wrong scores along with the right scores was carried out.

The findings of the study were: (i) The wrong scores in different tests measured some factors which were neither completely dependent nor completely independent of the right scores. The magnitude of the correlations between the right and the wrong scores of the same test was not much different from that between the right scores on different tests. (ii) The criterion, however, was not much related with the wrong scores. The wrong scores of the tests included in the selection battery did not measure any factor which was present in the criterion in question. (iii) The predictive ability of the battery of tests could not be increased by considering the wrong

scores in the tests along with the corresponding right scores.

*679. CHATTOPADHYAY, S., *Construction of a Psychological Test for Selecting the Student Nurses*, Ph.D. Psy., Cal. U., 1979

The major objective of the study was to devise a psychological test selecting student nurses essentially having potentiality for success in nursing training. A literature survey of nursing education in India and abroad was carried out. The different course curricula of general nursing and midwifery training were thoroughly scrutinized and found to be subsumed under three principal disciplines, viz., social sciences, natural sciences, and health sciences. A test, consisting of five subtests relating to verbal ability, numerical ability, natural sciences, social sciences and health sciences, was prepared and pretried out on 400 trainees. In all, 104 items were selected primarily on the basis of item validity and item difficulty values. All the trainees of different nursing training centres in Calcutta comprised the sample. For the standardization of the test, 1,200 students comprised the normative group. Inter-subtests correlations, reliability, validity and norms were determined.

The study revealed: (i) The reliability coefficient obtained by split-half method was 0.71. (ii) The predictive validity of the test was quite high. It was computed by finding out the correlation values between the test scores and the examination results. (iii) Percentile norms on each of the subsets, a five-point prediction table, a conversion table and an individual student profile were prepared. Percentiles and their relative categories were also framed. (iv) The test rendered scope for easy categorization of the testees into five grades with reference to the test scores obtained by them and opportunity for ranking the testees from high to low by referring their individual scores to the standard scores.

680. DAVE, J.G., *Evolving and Trying Out a Test of Creativity in Writing in Gujarati for Standard X Pupils of Saurashtra Area*, Ph.D. Edu., Sau. U., 1981

The objectives of the investigation were: (i) to prepare a test of creativity, (ii) to study the relationship between creativity and education and occupation of parents, academic achievement, hobbies, choice of future occupations, birth order and sex of students, and (iii) to examine the pace of learning of creative students.

A sample was selected at random from 10 per cent of the schools of each of the six geographical districts of Saurashtra (Gujarat state). The sample consisted of 1,238 boys and 776 girls drawn from rural (N=560) and urban (N=454) areas. Two parallel forms, A and B, of the test were developed following standard procedures. The two forms were given to 1,008 and 1,006 students, respectively. Two types of scores, Q scores and U scores, were arrived at. Reliability coefficients for inter-scorer reliability was 0.93, for test-retest reliability 0.85 and for parallel form reliability 0.94. Internal consistency (correlation between subtests and total score) ranged from 0.47 to 0.85, while correlation with an available creativity test was 0.52.

The findings of the investigation were: (i) The educational level of the parents of highly creative subjects was of the high order. (ii) Those high in creativity (originality and fluency) were high achievers at the S.S.C. examination. (iii) Those high in creativity scored better in Gujarati. (iv) Highly creative subjects both Q and U scores, were more inclined to scientific occupations. (v) Highly creative subjects, had stamp collection as a hobby, while the low creative had hobbies like collecting coins and photographs of film actors. (vi) The first-borns were more creative (Q scores) than second-, third-, and fourth-born, but in originality (U scores) no difference was observed. (vii) Creative subjects had parents in higher occupations. (viii) Highly creative subjects (fluency and originality) were found to be early bloomers. (ix) Boys outnumbered girls in creativity (fluency and originality). (x) There was no evidence of rural and urban area differences. (xi) Fluency and originality were highly correlated.

681. DESAI, K.G., *Comparative Factorial Structure of Raven's Standard Progressive Matrices, Cattell's Culture Fair Scale 3 and Desai-Bhatt Group Tests of Intelligence on Samples of Various Sub-cultures of Gujarat*, Guj. U., 1980

The main objective of the investigation was to compare the performance of different sub-cultures of Gujarat on Raven's Standard Progressive Matrices, Cattell's Culture Fair Scale 3, Desai-Bhatt Verbal Group Test of Intelligence and Bavasar Non-verbal Group Test of Intelligence. The sub-cultures were 'big urban, small urban, semi urban, rural advanced, rural backward, rural muslim, tribal, tribal institutional'.

Eight schools, one from each sub-culture, were

selected and one division of Standard VIII was selected from each school randomly. The entire division was administered the tests which made it a cluster sample. The sample comprised 338 pupils. The four tests mentioned earlier were the tools used. Product moment coefficient of correlation and factor analysis by the principal factor method along with varimax rotation were the statistical techniques used for data analysis.

The major findings were: (i) Girls' average scores in all sub-cultures were lower than those of boys in the respective sub-cultures but on Cattell's Culture Fair Scale 3, they were not much different. (ii) The mean scores of boys and girls showed progressive decrease from big urban to semi urban, rural and tribal sub-cultures with only one exception that the rural advanced sub-culture showed better averages than the semi-urban group. (iii) Because of low norms on the Cattell's Culture Fair Scale 3, the scope of comparability among various samples was very much reduced. Thus, the Cattell's Culture Fair Scale 3 did not prove more useful than the verbal and non-verbal tests used in the investigation. (iv) The differences in the averge scores of the verbal test of intelligence were found to be more pronounced than those on Raven's and Cattell's tests, supporting the Cattell's finding that crystallized intelligence assessed by verbal tests shows greater cultural difference than fluid intelligence assessed by culture fair tests. (v) Five factors were identified, viz., G Factor, Verbal Factor V, Deeper Reasoning, Perception of Relationship, and Manipulation of Correlates.

682. DESAI, K.G., *Differential Ability Patterns of High School Pupils of Grades VIII to X in Different Areas of Gujarat*, School of Philosophy, Psychology and Education, Guj. U., 1981 (NCERT-financed)

The study aimed at analysing the differences in school achievement and finding out the ability patterns of school pupils in different areas of Gujarat, in different school subjects.

Besides the Desai-Bhatt Group Test of Intelligence for measuring verbal intelligence, special tests for assessing non-verbal intelligence and verbal ability during the first session in Grades VIII, IX and X and also achievement tests in science and on environment in Grades VIII and IX were used. Ten areas were selected to represent different levels of urban/rural and industrial/agricultural nature from which schools representative of normal institutions were selected. Again, from every selected school one section each of Grades VIII, IX and X was selected.

The findings of the study were: (i) There were no sex differences in verbal and non-verbal intelligence, verbal aptitude, achievement in science and knowledge of the environment; however, in adjacent areas, namely, urban vs semi-urban and semi-urban vs rural, significant differences were observed in the abilities tested. (ii) In the two tribal areas tested, the mean scores of the tribal group were not considerably different from those of the rural group; the type of awakening in a particular area appeared to be influencing the achievement of pupils. (iii) Principal axis method of factor analysis yielded three factors, namely, general ability as a common factor along with perception of science in the environment and verbal knowledge of science in Grade VIII, scientific knowledge and non-verbal insight into the environment in Grade IX and non-verbal intelligence and verbal ability in Grade X.

683. DHARMANGADAN, M.A., *Creativity in School Children: an Analytical Study*, Ph.D. Psy., Ker. U., 1976

The study was intended (i) to adapt the Torrance Test of Creative Thinking for use with school children in Kerala, and (ii) to determine the relationships between creativity and intelligence, temperament, motivation and certain selected environmental factors.

The tools used in addition to the Torrance Test of Creative Thinking (TTCT) were the Standard Progressive Matrices, Test of General Mental Ability (Verbal Form A) (George and Mathew), Personality Inventory (George, Mathew and Nair), Inventory of Motivational Traits (George and Mathew) and personal data blank. The Torrance Test of Creative Thinking (TTCT) was first tried out on a small sample of thirty-six and then standardized on a second sample of 300 secondary school pupils. The relationship studies were done on a third sample of 631 secondary school pupils. The statistical techniques used included the calculation of means and SD and testing the significance of difference between means, calculation of product moment coefficients of correlation and partial correlation of three-way analysis of variance and covariance.

The results of the study were: (i) On the basis of the findings of the study the Torrance Test of Creative Thinking was adapted for secondary school pupils of Kerala by making the necessary changes in content and instructions for taking the test. A new scoring guide was also prepared. (ii) The inter-measure correlation values

obtained between the eight measures of the tests justified the use of composite scores but the correlation values obtained between the two forms of the test, figural and verbal, however, did not suggest their reduction to a single score. (iii) Sex, age and location differences were seen in the performance of the sample, but the interactions between the variables had no effect on the performance. (iv) Moderately high reliability coefficients were obtained for the whole test with the reliability of the figural part being higher than the verbal part. (v) The validity of the test, established by correlations of the performance of the sample with three independently chosen highly creative groups, was found to be adequate for the use of the test for research purposes. (vi) Intelligence, both verbal and non-verbal, was found to correlate highly with creativity, and sex differences were significant. Intelligence was, therefore, partialled out in all further analysis, which was done separately for boys and girls. (vii) None of the temperament traits and motivational traits showed any consistent relationship with creativity when intelligence was partialled out. (viii) The relationships between the different components of the socio-economic status index and creativity indicated a differential pattern. (ix) The birth order had significant relationship with verbal creativity only. (x) The family size showed only weak relationship with creativity. (xi) The relationship of the components of study habits and reading habits to creativity indicated a differential pattern. (xii) Extracurricular activities showed no relationship to creativity when quantified in two ways, except for girls who exhibited leadership qualities. (xiii) Economic aspirations and educational aspirations were related to verbal creativity for girls. (xiv) Vocational aspiration was related to figural creativity for girls only. (xv) Girls who chose unconventional vocations were found to be highly creative.

***684.** GAKHAR, S. and SWAYM PRABHA, *Report of the Project: Identification of Selection Criteria for National Talent — an Exploratory Study-1*, Dept. of Edu., Pan. U., 1982 (NCERT-financed)

The objectives of the investigation were: (i) to study the differential pattern of variables related to selected and non-selected groups in the National Talent Search (NTS) examination, (ii) to study the relationship of intellectual, personality, and motivational variables as identified potential for discriminating awardees and non-awardees with performance on NTS procedures, so as to ascertain the validity of these variables, and (iii) to give suggestions as to which of the variables might be taken care of in the NTS examinations so as to increase the reliability and validity of NTS examinations.

The sample of the study consisted of four groups, namely, awardees (N=43), who qualified written test but were rejected in interview (N=43), who could not qualify written test (N=54), and who did not appear for the test (N=45). The tools employed for the collection of data were the Test of General Mental Ability by Jalota, Standard Progressive Matrices by Raven, Torrance Test of Creative Thinking (Verbal Form I and Figural Form II), Test of Attitude Towards Science by Michael, Ford II, NCERT Interest Inventory (first fifty questions of senior form, and first fifty of junior form), Test of Achievement Motivation and Anxiety Inventory by Prayag Mehta, Eysenck Personality Inventory, Jr. Sr. High School Personality Questionnaire of Cattell, and Dev Mohan's Socio-Economic Scale. For the first part of the study, a simple one-way analysis of variance design was used, and for the second part, a correlational design was used.

The major conclusions of the study were: (i) Students of Group I and Group II did not exhibit any difference on the variables of verbal and non-verbal intelligence, creativity, attitude towards science, interest in matters of economic and scientific nature and on traits B,G, and H, except for interest in outdoor physical activities and Trait D and J. Awardees were more reflective, intellectually and physically fastidious, self-assertive and overactive — traits which probably helped them to get through the interview successfully. (ii) Group I performed better than Group III on variables of non- verbal intelligence, flexibility, originality and creativity totals (verbal), while Group III performed significantly better in verbal intelligence and had more interest in economics and outdoor physical activities. The awardees being double talented, outperformed the single talented Group III. (iii) Group I scored higher than Group IV students in all the areas except in interest in outdoor physical activities, economics, and fluency totals on non-verbal creativity. (iv) Comparisons between different groups indicated that, in general, non-verbal intelligence and the four dimensions of verbal creativity, namely, V_{F-T}, V_{X-T}, V_{O-T}, and V_{CY-T}, were the valid variables and attitude towards Science, traits B,G,D, and J and interest in science, economics, outdoor physical activities and secretariat were the potential variables of selection criteria in the NTS examinations. (v) Verbal and non-verbal intelligence had very low positive or negative correlations with GMA (General Mental Ability) and SAT (Scholastic Aptitude Test) scores, but with

interview verbal intelligence was significantly positively correlated (0.251), and non-verbal intelligence significantly negatively correlated (0.245). (vi) Non-verbal creativity was positively or negatively correlated with all the three NTS scores. Some aspects of verbal creativity were negatively correlated with SAT, perhaps due to the fact that SAT being objective type and knowledge-bound, left little scope for expression of new divergent ideas. On the whole, correlations of verbal creativity and the NTS examination scores were low positive or negative. (vii) Attitude towards science had low positive or negative correlations with the NTS scores. (viii) As SAT had high concentration of items related to science, interest in science was significantly correlated with the same; on the other hand, interest in economics, secretariat, and outdoor physical activities had low positive or negative correlation with the NTS examination. (ix) Traits B,D,G,H, and J had low positive or negative correlation with all three NTS scores, except for the positive correlations between Trait D (Self-assertive) and interview; and J (reflective; physically and intellectually fastidious) with interview and SAT. (x) The educational status of the family had significant positive correlation with SAT and interview score. (xi) Creativity being the potent factor in identifying talent, more items on it or a separate test to assess divergent thinking should be incorporated into the NTS examination. (xii) The number of items in the field of economics should be increased. (xiii) Personality traits like B, D, G, H, and J should be measured by including some items related to these and should also be given due consideration in the interview.

685. GANGULY, D., GHOSH, D., CHATTERJI, S. and MUKHERJI, M., *An Investigation into the Validity of a Scientific Knowledge and Aptitude Test,* Psychometric Research and Service Unit, ISI, Calcutta, 1972

The main aim of the study was to find out the validity of a Scientific Knowledge and Aptitude Test. The Scientific Knowledge and Aptitude Test (Form 1064), which was suitable for use at the higher secondary level, was selected. The test was already standardized on the basis of the data collected from the students who had just passed the higher secondary examination. Eight Bengali-medium schools — four boys' and four girls' — were selected from a list of such schools after dividing them area-wise. The test was administered on 476 students studying in Class XI in these selected schools. The test was validated against the school examination marks.

The findings of the study were: (i) The test was quite valid and the test scores were highly related with the academic success for girls' science group. (ii) The scientific aptitude had no relation with the success in the commerce stream. (iii) The relationship of the test scores with the total marks in the humanities group was significantly positive, though the magnitude was quite low. (iv) The correlation between the test scores and the total marks obtained by the boys' science group was significant at 5 per cent level. (v) The correlation of the test scores with the marks obtained in general science by both the humanities groups was negative. (vi) The correlation between the test scores and the higher secondary total marks varied from 0.12 to 0.56 in the case of four girls and one boy school (N=280).

***686.** GILITWALA, P.J., *Standardization of a Test of Creativity for the High School Students of South Gujarat,* Ph.D. Edu., SGU, 1978

The objectives of the investigation were: (i) to construct and standardize a test of creativity, (ii) to establish the reliability and validity and norms of the tests of creativity, (iii) to study the relationship between creativity and sex, intelligence and achievement of the students, and (iv) to study the relationship of creativity with educational, recreational, social and vocational aims of the students.

The samples were drawn at different stages in accordance with their purpose. The preliminary draft of the creativity test was administered to 370 students of various secondary schools of South Gujarat. The final form of the test was administered to 960 students drawn from standards VIII to XI of secondary schools of Surat, Valsad, Bharuch and Dangs districts. Reliability of the test was established by test-retest method, split-half method and validity by internal consistency of the items, factorial validation and validation against teachers' ratings, Passi's and Mehdi's tests of creativity.

The major outcomes and findings of the study were: (i) The investigation resulted in a battery of tests of creativity consisting of two tasks — verbal (12 items), non-verbal (4 items). (ii) Factor-wise test-retest reliability coefficient of correlation ranged between 0.68 and 0.89. (iii) The coefficient of correlation between the test and Passi's test was found to be 0.77 and factor-wise coefficients ranged between 0.621 and 0.871. (iv) Factor-wise validity was also found out. The coefficients of correlation were found to be ranging between 0.72 and 0.91 for the urban sample and between 0.69 and 0.82 for

the rural sample. (v) The coefficients of correlation between creativity and intelligence and achievement were not statistically significant. (vi) The urban boys scored significantly higher mean creativity score than their counterparts in the rural areas and the urban girls scored significantly higher mean creativity score than their counterparts in the rural areas.

***687.** GOSAI, S.P., *Construction and Standardization of a Personality Inventory in Gujarati*, Ph.D. Psy., Guj. U., 1974

The main objectives of the study were: (i) to construct a personality inventory in Gujarati for assessing an individual's general adjustment and specific adjustment, (ii) to determine the reliability of the test constructed, and (iii) to determine its validity.

The sample consisted of 490 students coming from colleges and universities in Gujarat. The psychometric and diagnostic approach was adopted for the development of the inventory. The final form of the inventory consisted of 135 items. The reliability of the test was found out by test-retest, split-half, equivalent form, Hoyt's method and K-R formula on independent samples. The validity of the total test was determined by correlating scores on tests with teachers' estimates of adjustment of students and with interview data. Significance of the difference between the means was studied through t-test.

The major characteristics of the test were: (i) The reliability coefficients were 0.79, 0.88, 0.91, 0.93 and 0.93 by the method of coefficient of equivalence, test-retest method, split-half method, K-R formula and Hoyt's method, respectively. (ii) Items were found to have satisfactory internal consistency, discrimination power and criterion of applicability showing that the test had fairly high content validity. (iii) The test's concurrent validity was found out by correlating the test with other personality inventories and range of coefficient of correlation was found to be 0.61 to 0.75. All these coefficients were statistically significant at 0.001 level. (iv) The test was validated by using contrasted groups like prisoners and psychiatric patients. It was found that there was significant difference between two means between the scores obtained by normal subjects as against the scores obtained by prisoners and psychiatric patients.

688. GUPTA, B.S., *The Effect of Stimulant and Depressant Drugs on the Test Scores of Fluid and Crystallized Intelligence of High School Children*, Ph.D. Psy., Pan. U., 1972

The main objective of the investigation was to study the effect of dexedrine (centrally stimulant drug) and phenobarbitone (centrally depressant drug) on the measures of fluid (Gf) and crystallized (Gc) intelligence.

Three experiments were conducted. In the first experiment the effect of drugs at different age levels, between 13 and 17 years, was examined. In the second and third experiments the drug effect was seen on the homogeneous groups formed on the basis of the subjects' scores on the Eysenckian personality dimensions of extraversion (E) and neuroticism (N), and Factor G of the 16 PF Test, respectively. Different hypotheses were formulated for each of the three experiments in accordance with their objectives. The male students between 13 and 17 years of age, selected from high and higher secondary schools of Ambala and Karnal districts of Haryana formed the sample of the study. In all 1,008 students (First experiment 288; Second experiment 540, Third experiment 180) served as subjects. In the selection of subjects for the second and third experiments the preliminary tests were administered to 2,500 students (Second experiment 1,500, Third experiment 1,000). The tools used were Hindi version of the Group Test of General Mental Ability (Singh), IPTA Culture Fair Intelligence Tests, Scale 2, Form A (Cattell and Cattell), and Scale 3, Form A (Cattell and Cattell) and Hindi version of Maudsley Personality Inventory. The data were analysed using t-test and analysis of variance.

The major findings of the study were: (i) Age was not found to be a significant variable for studying the drug effect on the measures of Gc and Gf. (ii) Dexedrine facilitated and phenobarbitone inhibited performance on the composite test scores of Gf and Gc, to some extent. (iii) Dexedrine significantly increased the mean score on the Gf measures in the extravert (E+), stable (N–) and average on E and N groups and decreased the mean score in the introvert (E–) and labile (N+) groups though the decrease was significant in N+ group only. The results on the Gc measure were in similar direction but not significant. (iv) Phenobarbitone significantly decreased the mean score on the Gf measure at all levels of E and N. Such decreases in Gc were not significant except for the E group where the drug unexpectedly increased the mean score. (v) The effect was greater on Gf than Gc in the case of E–, and average on E and N groups. (vi) The assumption that individuals

differed in their susceptibility to drug effects was supported for the Gf test and refuted for the Gc test. (vii) Dexedrine increased and phenobarbitone decreased the mean score, both on the Gf and Gc tests, at all levels of Factor G (high, average, low). (viii) The effect was greater on Gf than Gc for the G+ group in the case of dexedrine, and the G– group in the case of phenobarbitone.

689. GUPTA, S.M., *Standardization of a Test of Creativity in Physical Sciences*, Ph.D. Edu., Kur. U., 1980

The objectives of the investigation were: (i) to construct a creativity test in physical sciences for secondary school science students of Haryana, (ii) to standardize the test by determining its reliability, validity, and percentile and T-score norms, and (iii) to study the distribution of scientific creativity scores.

The preliminary draft of the test was prepared keeping in view the characteristics of a creative scientist as enunciated by Guilford. Thirty items after a number of pre-tryouts over a small group of ten to fifteen students were retained. These items were based on consequences, unusual uses, completion of figures, inquisitiveness, improvising apparatus, alternative methods, effects, frequency of naming the sources, writing the names starting with a specific letter and naming the articles in a specific category, finding defects, drawing a symbol or figure, making objects, verification, seeing problems, etc. It was tried out on a sample of 170 high school students. All the items in the preliminary draft were retained for the final draft. The test was standardized on 550 secondary school science students. The split-half reliability of the test was 0.91. For validity, the criterion of 'things done on your own' checklist containing thirty scientific activities was developed and the product moment coefficient of correlation between the test and the criterion came out to be 0.72. Percentile and T-score norms were established for fluency, flexibility, originality and total creativity scores.

It was found that the normality of distribution of total creativity scores of the sample with Kolmogrov-Smirnov formula for goodness of the fit came out to have the appearance of fairly normal curve for a much larger sample.

690. HEMALATHA, S., *Measurement of Mental Abilities of Well-nourished and Mal-nourished Children*, Ph.D. Psy., Mad. U., 1979

The major objectives of the study were: (i) to construct and standardize a test of mental abilities, and (ii) to test the hypothesis that there is no difference between the mental abilities of well-nourished and mal-nourished pre-school children belonging to the urban and the rural areas of Coimbatore.

A test of mental abilities was constructed and standardized by following standard procedures followed by a comparison of mental abilities of well-nourished and mal-nourished children. The reliability of the test, as measured by the test-retest method, with a sample of 100 pre-school children, was 0.88. The validity of the test was 0.77 with Stanford – Binet test (Revision III) as the criterion. The sample included 100 well-nourished and 100 mal-nourished (equal number of boys and girls) children from the urban area and thirty-six well-nourished and 100 mal-nourished (equal number of boys and girls) children from the rural area. The children were in the age group 3, 4 and 5 years. The criteria for nourishment were weight for age standards and clinician's diagnosis.

The findings of the study was that there was significant difference between the mental abilities of the well-nourished and the mal-nourished samples who were matched in age, sex, family income and educational attainments of parents, the former scoring higher.

691. INDIAN INSTITUTE OF PSYCHOMETRY, *Effect of Certain Cognitive and Non-cognitive Factors upon the Accuracy of Self-assessment of Performance under a Selection Situation*, Calcutta, 1982

The main aim of the study was to find out the accuracy of self-assessment under selection situation and to identify some important factors which affected the quality of self-assessment. The subjects under the experimental study were divided into two groups, viz., Group I (engineering graduates, N=240) and Group II (undergraduate students, N=225). The subjects were either job-seekers or were interested to take admission to a course which had high job potentiality. To find out the degree to which self-ranking was in agreement with the examiners' ranking, rank correlations were obtained between these two sets of rankings. Correlations between peer rankings

and examiners' rankings and those between peer rankings and self-rankings were computed. The reliability of ratings of the examiners as well as of the peers and the degree of over- or under-estimation were found out. To test the effect of certain biographical factors upon over- or under-estimation, contingency tables were formed. A questionnaire was used and information regarding nine other aspects was also collected. The self-assessment scores of the subjects were collected after they completed the group task and group discussion assignments. The percentage of marks obtained by the subjects in the last university or board examination was noted as academic record. Their aptitudes were also tested through the screening tests. The scores of the screening tests were converted into stanine grades.

The findings of the study were: (i) Self-assessment was usually positively biased. (ii) About 75 per cent overrated themselves with reference to the examiners' assessment. (iii) A high degree of agreement was observed between the peers' rating and the examiners' rating. (iv) Some of the biographical factors and the socio-economic levels of the subjects, etc., had some influence in changing the nature of self-rating. The aged group with higher academic background and better achievement was found to be unaffected by the influence of these factors. But these factors significantly changed the proportion in the case of the younger group. Good education in better schools, high SES, father's occupation, etc., reduced the percentage of over-estimation of self-performance considerably. (v) The subjects who studied in villages thought themselves to be better than what they actually were.

692. INDIAN INSTITUTE OF PSYCHOMETRY, *Effects of Some Socio-economic Factors upon the Performance in Selection Tests*, Calcutta, 1982

The purpose of the study was to assess the effects of socio-economic and environmental factors upon the selection test scores empirically and to investigate the basis of dissatisfaction growing up against the procedure of selection through objective tests. Data on economic status of the family, educational level of the parents, medium of instruction at school and rural/urban background were collected from three groups of candidates (N=180 in Group I, N=116 in Group II, and N=154/143 in Group III), who had applied for admission to different courses or jobs. To each group suitable selection tests were administered. Ratings of the subjects on different traits were obtained from three raters, which were finally converted into a consolidated rating. Group task and group discussion procedure were followed. Biographical and socio-economic information was collected through a questionnaire.

The findings of the study were: (i) Cultured and educationally progressive home environment helped the candidates to achieve success in selection tests significantly, but not uniformly in different tests. (ii) The effects of the socio-economic factors were more pronounced on the development of verbal factors and certain temperamental characteristics than on numerical or allied areas.

693. INDIAN INSTITUTE OF PSYCHOMETRY, *Level of General Knowledge of Young Graduates*, Calcutta, 1982

The main aim of the study was to investigate the level of general knowledge of a group of young graduates. The sample included 600 young graduates who appeared for a selection test in connection with the recruitment of management trainees. They were all first class honours graduates in different disciplines like history, philosophy, economics, English, physics, chemistry, mathematics, etc. Their age range varied from 20 to 25 years and they came from all over India. The selection test was conducted in Bombay, Calcutta, Delhi and Madras. There were 100 marks in the general knowledge paper distributed over eight broad questions. Each question had several sub-questions. The time allotted for the entire test was 90 minutes. In all, sixteen questions were picked up where the responses varied widely. The responses obtained were examined and the critical ratio was calculated to study the significance of the differences.

The findings of the study were: (i) The proportions of correct responses were reasonably high for seven questions while for the nine questions very few could give correct answers. A large proportion of the candidates gave absurd answers, which indicated not only that the respondents had poor general knowledge but also that they were not at all serious. (ii) The applicants from the 'North' had not only less general knowledge but were also less serious in their responses than those from the 'South', because significantly a larger proportion of them answered at random when they did not know the correct answer. (iii) The level of general knowledge was very low especially with reference to their academic background.

694. INDIAN INSTITUTE OF PSYCHOMETRY, *Objectivity of Peer Rating under Selection Situation,* Calcutta, 1982

The main aim of the investigation was to study the objectivity of peer's ratings under selection situation. In all, about 516 subjects were divided into three groups. They were competing with each other for admission to the same course or for getting a particular job or jobs. They were aware of the fact that if others were rated high on the basis of the given exercise their own ranks would be lowered and hence their chance of getting admission to the course or of getting appointment would be reduced. After the group task and group discussions, the subjects were asked to rank the members of their group including self on the basis of observation made during the two operations. Based upon the group members' rankings a final set of ranks was worked out. Another set of ranks was obtained on the basis of the examiner's judgement. The rank order correlation was computed to test the relation between these two sets of judgement.

The findings of the study were: (i) The ratings or rankings obtained from the group members were objective. (ii) There was a very close agreement between the rankings of two groups in general, which proved the efficiency of the entire procedure.

695. JOSHI, M.L., *Gujarati Adaptation of Wechsler Preschool and Primary Scale of Intelligence for the Children of Ahmedabad City,* Ph.D. Edu., Guj. U., 1982

The original Wechsler scale consists of six verbal subtests, namely, information, vocabulary, arithmetic, similarities, comprehension and sentences, and five performance subtests, namely, animal house, picture completion, mazes, geometric design and block design. In the adaptation, some changes were made to suit the tests to Gujarati children. The tests were administered to thirty-seven children of age group four through six and a half years for item analysis, fixation of time limit and development of the scoring scheme. The sample for determining the final norms was selected according to the 1971 Census distribution of vocation of parents and consisted of 360 children (sixty from each six-month age group) from nine Kindergarten schools of Ahmedabad City. One hundred and eighty boys and 180 girls were tested with the Gujarati adaptations of WPPSI and their verbal performance and total scale IQs were calculated for which deviation the IQ method as used in the original scale was used after converting the raw scores into scaled scores. Conversion tables for all these were prepared.

The Reliability of the scale was determined by split-half technique for all different age groups and also for individual tests which ranged from 0.28 to 0.94. By the test-retest method, the reliability ranged from 0.63 to 0.93. The validity of the scale was determined by correlating the WPPSI IQs with the Stanford-Binet IQs, Draw-a-Man Test IQs, school marks and teachers' ratings which ranged from 0.26 to 0.96. The scoring key and the tables of conversion of raw scores into scaled scores and then to IQs were presented in the manual.

*696. KESKAR, P.U., *Development of a Test of Problem-solving Ability. for Gujarati Children of Grades III to VII,* Ph.D. Psy., Guj. U., 1980

The major objectives of the study were: (i) to develop a problem-solving ability test for students of Grades III to VII, (ii) to determine the reliability of the test, and (iii) to determine face validity, construct validity and concurrent validity of the test.

The first preliminary form consisting of 93 items was administered to sixty students of both the sexes. Items were analysed for their difficulty, discrimination, internal consistency and sex bias. The final form of the test was administered to 1,010 students of both the sexes and from urban and rural background. The reliability coefficients were found out by the split-half method, Kuder-Richardson formula, Hoyt's method and test-retest method. The validity of the test was determined in terms of face validity, construct validity and concurrent validity. The test was also validated against examination marks of the students.

The major findings of the study were: (i) The reliability indices of the test were 0.97, 0.30, 0.72 and 0.96 by the split-half method, test-retest method, Kuder-Richardson formula, and Hoyt's method, respectively. (ii) All the reliability coefficients were statistically significant at 0.01 level. (iii) The coefficients of correlation between the scores on the test and the examination marks of the students were found to vary between 0.25 and 0.95 for Grades III to VII. (iv) The coefficient of correlation between the scores on the test and the intelligence test was found to be 0.82. (v) Factor analysis of the data showed that all the variables had a good deal of general intellectual factor G.

697. MAJAGI, I.M., *Developing Battery of Tests for*

Selecting Candidates to Teacher Education Course, Ph.D. Edu., Kar. U., 1980

The study was designed with a view to developing a battery of tests for selecting candidates to the teacher education course at the secondary education level. The specific objectives of the study were: (i) to determine the specific factors for success in the teacher education course, (ii) to construct tools to assess the specific factors, (iii) to fix criteria of success in the teacher education course, (iv) to find out relationships of each factor with the criterion, (v) to investigate the predictive validities of factors taken together in terms of the criterion, and (vi) to determine the relative efficiency of the factors in predicting the criterion.

The sample consisted of 343 student-teachers who had opted Kannada as the medium of instruction in the B.Ed. course in seven colleges of education affiliated to Karnataka University. The tools used were Interest in Teaching Inventory, Attitude towards Pupils Scale, Verbal Ability Test, Abstract Reasoning Test—all developed by the investigator. The criterion of success in the teacher education course was the marks obtained by the candidates at the external examination in theory and teaching taken together in the B.Ed. course. Correlation and regression analysis techniques were used for the statistical analysis of the data.

The major findings of the study were: (i) All the six factors, namely, interest in teaching, attitude towards pupils, verbal ability, abstract reasoning, personality factors G and O emerged as correlates of the criterion. (ii) All factors, except attitude towards pupils, taken together were potent in predicting success in the teacher education course. (iii) Abstract reasoning made the highest contribution. (iv) The predictive validity of the battery with the criterion was 0.5344 (N=343). (v) A regression equation predicting the criterion was developed.

698. MALIK, A.K., *Construction and Standardization of a Multiphasic Personality Inventory*, Ph.D. Psy., Jodh. U., 1981

The main aim of the study was to develop an exhaustive multiphasic personality inventory in Hindi which could serve the need of psychiatrists, clinical psychologists, and counsellers. In the original pool of items written in Hindi, there were 193 items for seven clinical scales of psychoneurosis and 286 items for six clinical scales of psychosomatic disorders. The preliminary draft was sent to practising psychiatrists and clinical psychologists. On the basis of their comments inappropriate items were eliminated and as per their recommendations some new items were constructed. Thus an experimental form of Jodhpur Multiphasic Personality Inventory (JMPI) was prepared. For the purpose of item analysis a total number of 400 subjects — 280 males and 120 females — were selected through the purposive sampling method. The age of the subjects ranged from 17 to 19 years. The questionnaire was administered on a group of 15 to 20 subjects at a time and sex differences for the three major psychological disorders were analysed. For the final selection of the items both internal consistency and discrimination power were used. Internal consistency was worked out by correlating the item scores with the total score and discrimination power was worked out by mean differences between 25 per cent top and bottom cases using t-ratios.

Three different types of validity, viz., criterion related, construct and content validity, were worked out. It was found that the inventory had adequate criterion-related validity. The construct validity was worked out by correlating the scores on the JMPI scales with those obtained on the Hindi version of 16 P.F. Five types of reliability, viz., total score, standard error of measurement, index of determination, homogeneity coefficient and stability coefficients, were worked out. In working out reliability, the Flanagen formula was used. The reliability for psychoneourotic scales ranged from 0.7724 to 0.8376; for psychotic scales, it ranged from 0.6376 to 0.7844 and it varied for psychosomatic scale from 0.7096 to 0.9895. The coefficient of determination as a measure of reliability varied from 0.8034 to 0.9152 for psychoneurosis and from 0.8424 to 0.9946 for psychosomatic scales. For the purpose of development of norms for JMPI a normative sample of 5,205 normal subjects with age range 15 to 33 years was taken. More or less equal number of subjects of both the sexes was kept in all the three groups of scales. The norms reported were in terms of normalized T-scores. Combined norms for both the sexes were reported for those scales where no sex differences were found at the time of item analysis. For the scales where sex differences were found separate norms for male and female subjects were worked out.

699. MENON, P., *A Study of Creativity in English Language of Students of the Higher Secondary Level in Some English Medium Schools in Delhi in relation to Their Intelligence, Achievement and Language*

Abilities, Ph.D. Edu., Del. U., 1980

The main objectives of the study were: (i) to understand the concept of creativity, (ii) to know how to locate and identify talent, (iii) to analyse the creative process or the stages of creation in students, (iv) to help nurture, the creative talent, (v) to understand the relationship between creativity and basic intellectual potential, (vi) to understand the relationship between creativity and achievement, and (vii) to know to what extent creative ability in language affected language ability.

The sample consisted of 301 students from six English-medium schools of Delhi. For data collection, two self-prepared creative ability language tests were used. Statistical techniques like mean, significance of difference between means, standard deviation, correlations, multiple regression, and analysis of variance were used in analysing the data.

The major findings of the study were: (i) The scrutiny of children's writing confirmed that imaginative activity when synthesized with certain elements of thought was capable of raising itself to the category of creative writing. (ii) Experience was valuable in building up a creative mind, but the direction such a mind took in expression was singularly determined by the position of the individual. Hence the stimulus might be common but the searching mind took innumerable directions while expressing. (iii) Creativity correlated with language, the next was with achievement (0.45) and then with intelligence (0.29). (iv) The correlation coefficient between language and achievement was higher (0.56) than that between language and intelligence (0.32). (v) Intelligence correlated highest with language (0.32), the next was with creativity (0.29) and then with achievement (0.24).

700. MISHRA, A., *Construction and Standardization of a Test of Creativity*, Ph.D. Psy., Jod. U., 1981

The study attempted to develop an accurate test of creativity both in verbal and non-verbal forms and standardize it on the students of Grades VIII and IX. The test was constructed on the lines of Guilford's scheme of classification of cognitive abilities and measure factors, viz., fluency, flexibility, originality and elaboration. An attempt was also made to validate the test with intelligence in order to see whether any relationship existed between them. The hypotheses formulated were: (i) The distribution of the scores of creativity based on the creativity measures was normal for the total sample of the study. (ii) Low relationship existed between creativity and intelligence. (iii) There existed a significant difference between the high and low individuals in the degree of extroversion measured through E scale of MPI. (vi) The high creative individuals had a higher score on introversion and a low score on extroversion.

The verbal test of creativity was planned to include four subtests, viz., unusual uses, consequences test, product improvement and the similarity test. Non-verbal activities as picture construction, picture object synthesis and picture completion were included and were measured for factors like fluency, flexibility, originality and elaboration. For the tryout, 100 subjects of both the sexes studying in Standards VIII and IX were chosen from the government schools of Jodhpur in order to accomplish the objective of finding out discrimination power and internal consistency of each of the items of both the verbal and the non-verbal tests. However, for the entire study, a sample of 496 students of Standards VIII and IX of both the sexes studying in government schools of Jodhpur was taken. The age of the subjects ranged from 12.5. to 15.6 years. The average age of the subjects was 14.4 years. The extent of accuracy and the appropriateness of items to the behaviour domain were determined on the basis of the judgement of the experts having conceptual clarifications of the trait components to be measured. The discrimination power and internal consistency of each item in the test were found out. Test-retest reliability coefficients of the factor scores and total creativity scores for both the verbal and the non-verbal tests were found to be considerably high ranging from 0.64 to 0.92, which were significant at 0.01 level. Interscorer reliability coefficients for both the verbal and the non-verbal tests were found to be ranging from 0.63 to 0.92, which were significant at 0.01 level. The validity coefficients between both the verbal and the non-verbal tests and the Test of Creative Thinking developed by Baqer Mehdi were found to range from 0.32 to 0.77. The factorial validity coefficients for the verbal and the non-verbal tests were found to be ranging from 0.30 to 0.89. Norms, percentile rank values and T-scores were also established.

701. MISHRA, A.B., *Assessment of Factor-structure Invariance of the Wechsler Adult Intelligence Scales across Two Age Groups*, Ph.D. Psy., Utkal U., 1978

The purpose of the study was to assess factor-structure invariance of the Wechsler Adult Intelligence Scales

(WAIS) across two developmental age groups, i.e. 18-19 and 25-34, in an ideal factor analytic condition. Such a factor analytically vital condition was designed by factor analysing WAIS subscales along with several marker variables.

The WAIS, Differential Aptitude Tests, Culture Fair Intelligence Test, and Advanced Progressive Matrices were administered to 200 subjects (100 subjects in each group). Intercorrelation matrices of the twenty-four variables of both the age groups were subjected to principal component analysis and varimax rotations.

The study revealed: (i) Eight factors in each age group were retained following the criterion of positive generalizability. (ii) The retained factors in the 18-19 age group were identified as perceptual organization, perceptual inductive reasoning, language usage, associative thinking, conceptual verbalization, verbal reasoning, memory and speed of perceptual thinking. (iii) The factors in 25 34 age group were interpreted as language usage, associative thinking, perceptual inductive reasoning, memory, perceptual organization, speed and verbal comprehension. Identical or similar factors were matched across the age groups. (iv) Horn's corrected version of pattern correlation was computed between the factor loadings of each matched factor pair for an invariance analysis. Seven of the eight factors could be matched and the one unmatched factor pair considered the most dissimilar was excluded from the invariance analysis. (v) Marker variables helped for the emergence of certain new factors and raised the magnitudes of WAIS communalities. (vi) The invariance analysis revealed that structural invariance could be established for a verbal factor pair (i.e. conceptual verbalization of 18-19 age group and verbal comprehension of 25-34 age group). A complete non-invariance was evident for the memory factor; lack of structural invariance was found for the remaining six factors.

702. MUKHERJEE, B.N., *A Forced-choice Test of Achievement Motivation,* ISI, Calcutta, 1965.

The major objective of the study was to develop a reliable measure of achievement motivation in the form of Sentence Completion Test (SCT). In developing this test a modified form of Wherry's forced choice technique was followed. Items were matched on the basis of subjectively determined differential validity and objectively determined social desirability. A systematic method was followed to obtain a satisfactory matching of the triads. Four different samples, viz., Sample 1 (N=263), Sample 2 (N=87), Sample 3 (N=58) and Sample 4 (N=71), were derived from the students of Indiana University to conduct different phases of the study. A large number of tests, viz., Thurstone's Primary Mental Abilities, Taylor's MAS, Word Endings and Word Beginnings Tests, Hidden Figures and Hidden Patterns Test, a 40-item questionnaire borrowed from Murray (Murray Personality Inventory), etc., and the SCT were used. The suitability of SCT under Indian conditions was also investigated.

The major findings of the study were: (i) The test-retest reliability of SCT for Sample 2 and Sample 3 turned out to be 0.71 and 0.83, respectively. The test-retest correlation was 0.75 for Sample 4. The reliability coefficient obtained by K-R 20 formula based on sample 1, was found to be 0.72. (ii) The SCT proved to be a valid measure of n-Ach. (iii) The scores for high n-Ach. group were found significantly higher than those of the low n-Ach. group with regard to various tests of PMA. (iv) Factor analysis of SCT revealed that the test covered some of the important dimensions of achievement motivation. (v) SCT could be profitably used, without any major change, in India.

703. MUKHOPADHYAY, M. and Others, *A Study on Impact of Introducing Corrections for Guessing Factor in the Performance of Polytechnic Students in Subjective-type Tests,* TTTI, Bhopal, 1982

The objectives of the study were: (i) to compare the differences in the marks obtained by a student before and after introducing the correction for guessing factor, (ii) to find out the effect of introducing the correction for guessing factor on the results of students with first division and above and second division students, (iii) to find out the relationships between the corrected and the uncorrected set of scores, and (iv) to make an estimate of percentage of students who guess at various levels. It was hypothesized that (i) the scores before the introduction of the correction for guessing factor would be significantly higher than the scores after the correction, (ii) there would be a significant change in the percentage of students occurring in various grades (first class, second class, failures) after introducing the correction for guessing and (iii) there would be a significant and positive relationship between the sets of scores before and after the correction.

The study was conducted on 1,145 students' answersheets spread over fourteen subjects in three years of the polytechnic education of Gujarat and Madhya Pradesh.

Eight of the fourteen subjects were actually the Board examination papers, the other six were the pretest papers designed for developing item bank. All the pretest papers were sixty-item tests, whereas, the Board papers were thirty-six item, thirty item, twenty-four item, twenty item and eighteen item tests. However, all the test papers were developed using similar specification tables. Data were collected from records. The data were recorded in the form of number of items responded and the number of items correctly responded. The number of wrong responses (W) was also counted and corrected score was calculated. The data were analysed by computing mean, SD and range for the corrected and uncorrected scores; t-test was used to test the significance of difference between the two means; coefficients of correlation were also calculated. The contingency tables were drawn for each subject to examine the change in the frequency in each grade after the introduction of the correction factor. Chi-square test was carried out for all the subjects taken together.

The findings of the study were: (i) In all the fourteen subjects the means were considerably reduced after the introduction of the correction factor and t values were significant in all the fourteen cases at 0.01 level. (ii) The coefficients of correlation between the corrected and uncorrected scores ranged between 0.59 and 1.00 and all were positively and significantly related. (iii) When the correction was introduced forty students could get negative score and another fifteen a zero score. (iv) The introduction of the correction factor affected a considerable number in the failure category; the percentage of the students who secured first class or first class honours marks before the correction was comparatively less affected. (v) On putting the scores of all the subjects together, the percentage of first grades dropped from about 14 to 4.49 whereas the percentage of second graders was reduced from 55.55 to 28.19, increasing the percentage of the failures from 30.92 before the correction to 66.99 after the correction; the chi-square was found significant.

704. NAIR, K.S., *An Analytical Study of the Factor Pattern of Verbal and Non-verbal Tests of Intelligence*, Ph.D. Psy., Ker. U., 1972

The aims of the study were: (i) to obtain the factor patterns of the traits measured by the verbal and the non-verbal tests of intelligence, and (ii) to find out whether the interchangeable use of the two types of tests was justified when making important decisions concerning individuals. The hypotheses of the study were: (i) The content of the tests, verbal and non-verbal, would determine their factor structure. (ii) There would be factors in which the verbal and the non-verbal tests could be grouped on the basis of similarity in the process or mode of answering the items, not defined primarily in terms of content.

The tests used were the Kerala Non-verbal Test of Intelligence and General Mental Ability Test. The sample for item analysis was made up of 370 pupils and for the final analysis 420 pupils were chosen from the secondary schools of Trivandrum educational district. Correlations among the sixteen variables studied were computed using the Pearson product moment method.

The main conclusions of the study were: (i) Verbal and non-verbal tests were formed mainly on the basis of content. (ii) A third factor, identified as numerical ability, was the same as the one identified by others. (iii) A fourth factor which showed possibilities for tests to be grouped on its basis, would have emerged if more tests had been used. (iv) Factor I which had high loadings on the tests of analogies, series, spatial relations, classifications, water-reflection and arithmetic reasoning, could be identified as a non-verbal factor. (v) Factor II which had high loadings on vocabulary tests as well as water reflection which was classified as a non-verbal item (requiring a high level of internal verbalization to solve), could be termed as a verbal factor. (vi) Factor III which had high loadings on arithmetic reasoning tests, number series and number classification, could be termed a numerical reasoning factor.

*705. NARAYANAN, S., *Holland Personality Inventory*, Dept. of Psy., Autonomous P.G. Centre, Madras Uni., Coimbatore, 1981

The aim of the study was to evolve an inventory to identify six dimensions of personality described by Holland, viz., Realistic, Investigative, Artistic, Social, Enterprising and Conventional.

To obtain standard items which could form the pool for selecting items, MMPI was considered. All the 550 items of MMPI were checked and screened by a panel of three psychologists. Sixty items were approved. A pilot study was conducted to ascertain the reliability of the items selected on a sample of thirty adults. Split-half reliability was found for items belonging to six personality dimensions. A second study was done on a sample of 100 adults to undertake item-analysis. Based on item-analysis, fifty-five items were found to have adequate

discriminating index. From these fifty-five items, forty-two items were finally selected with seven items in each personality dimension.

The major conclusions of the study were: (i) The coefficients of reliability of Realistic, Investigative, Artistic, Social, Enterprising and Conventional Scales were found to be 0.65, 0.65, 0.80, 0.68, 0.61 and 0.67, respectively. (ii) The Holland Personality Inventory was found to possess moderate level of validity when cross-checked with Balakrishnan's PSG Vocational Preference Inventory. (iii) Inter-correlations among the scales of the Holland Personality Inventory were found to provide support to the construct validity of the Inventory.

706. NAYANATARA, B., *A Study of the Relationship between Creativity, Tolerance of Ambiguity and Perceptual Simplicity-Complexity of Students Studying in VIII and IX Standards of Secondary Schools in Bangalore City*, Ph.D. Edu., Ban. U., 1979

The objectives of the study were: (i) to find out the relationship between creativity and, perceptual simplicity-complexity, (ii) to find out the relationship between creativity and tolerance of ambiguity, (iii) to find out the relationship between high, middle and low levels of creativity and simplicity and complexity, (iv) to find out the relationship between high, middle and low levels of creativity and tolerance of ambiguity, (v) to find out sex differences in creativity, (vi) to find out whether boys and girls belonging to high, middle and low levels of creativity differ in the extent of manifestation of personality traits, and (vii) to find out the differences between students studying in Standards VIII sand IX in various relationships between creativity and personality. Creativity included four factors, namely, fluency, flexibility, originality and elaboration.

The study had a sample of 1,250 (Standard VIII: boys 232, girls 297; Standard IX: boys 389, girls 332) drawn from fifteen high schools of Bangalore. The tools used were Verbal and Non-verbal Tests of Creative Thinking (Mehdi), Perceptual Simplicity-Complexity Scale (Chawla) and Tolerance of Ambiguity Scale (Budner). The first tool was translated into Kannada and percentile norms for Standards VIII and IX were developed. Mean, SD, product moment coefficient of correlation, t-test, and analysis of variance were used in the analysis of the data.

The major findings of the study were: (i) Fluency, flexibility, elaboration, and non-verbal creativity were unrelated to simplicity, complexity, and simplicity-complexity, but were negatively and significantly related to tolerance of ambiguity. (ii) Verbal originality was unrelated to complexity and tolerance of ambiguity, positively and significantly related to simplicity, and negatively but significantly related to simplicity-complexity. (iii) Non-verbal originality was unrelated to simplicity, complexity, simplicity-complexity and tolerance of ambiguity. (iv) Verbal creativity was unrelated to simplicity and complexity, but negatively and significantly related to simplicity-complexity and tolerance of ambiguity. (v) Boys and girls differed significantly in fluency, flexibility, non-verbal originality, and elaboration. (vi) Boys and girls of Standard VIII differed significantly in fluency, flexibility, non-verbal originality, and elaboration, while those of Standard IX did so in fluency and non-verbal originality only. (vii) High, middle and low level differences in fluency, flexibility, verbal originality, non-verbal originality and elaboration were found to be significant in boys and girls of Standard VIII. (viii) The interaction between sex and levels of creativity factors was found to be significant in boys and girls of Standard IX.

707. NAYAR, P.R., *Mysore Social Intelligence Test (MYSIT) Forms M and N*, Dept. of Edu., Mys. U., 1980 (Mys. U-financed)

The study was undertaken to construct and standardize a test for assessing the social intelligence of adults.

Starting with more than 150 situations representing a wide variety of contexts and content collected from a number of persons belonging to different age groups and walks of life, test items were constructed in multiple choice form with four to six responses likely to be made by the central figure in the situations. After considerable scrutiny, editing and discussion by a team, 120 items were included in the preliminary form, which was administered to a representative sample of about 200 graduates. Item analysis yielded forty-five items that satisfied the criteria of good discriminative power and appropriate difficulty, with a balanced distribution. The tentative form was administered to a still more representative sample of about 400. Forty items that satisfied the selection criteria were selected for the final form, which was named Form M.

Another set of forty-five items that did not quite satisfy the selection criteria, especially of discriminative power, in the preliminary tryout but came fairly close, was compiled with a minimum of five responses (choices) for each, and administered to a representative

group of about 200, with instruction to mark the best and the second best responses in each case, to see if this would raise their discriminative power. Though the scoring and estimation of item difficulty and discrimination were a little complex and unusual, thirty-four items satisfied the selection criteria. Of them, thirty were selected for inclusion in a second form of the test, Form N.

Each item presented a social situation, suggesting four or five probable responses the key figure might make and require the respondent to choose the best of them in the case of Form M and the best and the second best in the case of Form N. The time required to answer the test was 40 minutes. The final forms, M and N, were administered to a representative sample of 1,200 and 600, respectively, belonging to different age groups ranging from 20- 40 years and above for purposes of validation.

The study revealed: (i) The coefficients of reliability calculated by the split-half method and the Spearman-Brown prophecy formula for Forms M and N were 0.82 and 0.74, 0.90 and 0.85, respectively. Between the forms M and N the reliability coefficient was 0.73. (ii) The criterion for validation was judgement by a knowledgeable and familiar boss, colleague or friend, as contained in ratings on a five aspect five-point scale. The chi-square value of discrimination between the top 27 per cent and the bottom 27 per cent was calculated and found to be significant. (iii) Mean scores and standard deviation for different sub-groups (by occupation) were calculated to facilitate the conversion of raw scores on either form into standard scores. (iv) Deciles for the two forms were also found out to serve as a framework for the calculation of percentiles.

708. NAYAR, P.R., *Mysore Teacher Attitude Scales,* Dept. of Edu., Mys. U., 1977

The purpose of the study was to construct and standardize attitude scales to measure four important teacher attitudes, namely, (i) attitude to teaching as a profession (ATP Scale), (ii) attitude to students in general (ASG Scale), (iii) attitude to school work as a whole (ASW Scale), and (iv) attitude to professional growth (APG Scale).

The Likert technique was used in the construction of the scales. On the basis of opinions of a team of selected teacher-educators thirty items on each attitude, more or less balancing the positive and negative categories, were selected. The consolidated preliminary form was administered to nearly 400 teachers of varied experience drawn, more or less evenly, from different parts of the four states in the southern region. Chi-square test was used for selecting discriminating items.

The final form which consisted of 110 statements (ATP 25, ASG 30, ASW 30, APG 25) was administered to a representative sample of 400 teachers.

The split-half coefficients of reliability were 0.78, 0.83, 0.78 and 0.98 for the ATP, ASG, ASW and APG scales, respectively. For the empirical validation of each scale taken as a whole, the scores of 100 teachers identified by their headmasters and colleagues as having very good professional attitudes were compared with those of 100 teachers identified as having poor professional attitudes. The scales were grouped into seven classes and the chi-square values of discrimination which were significant at one per cent level of significance were computed for all the four scales.

Percentile norms and the upper and lower limits of the stanine classes were calculated with reference to the validation sample.

709. NEPAL, M., *Construction and Standardization of a Non-verbal Group Test of Intelligence for Nepalese Adolescents,* Ph.D. Psy., BHU, 1977

The investigation aimed at (i) construction and standardization of a non-verbal group test of intelligence for Nepalese adolescents, and (ii) finding out sex, age, grade, caste, spoken dialects, parental occupations, rural-urban background and regional variations in intelligence.

On the basis of the random sampling technique 539 boys and girls in the age range of 13 to 17 years were taken for pilot study. A fresh random sample of 1,650 boys and girls in the same age range had been drawn from eight districts of Nepal. In addition to descriptive statistics, t-test, product moment coefficient of correlation, phi-coefficients were used for analysing the data. A tryout form consisting of 160 items, printed in two parts, presented multiple choice format with five alternatives. The item analysis was conducted by finding out the item difficulty and item discrimination value of each item in terms of phi-coefficient against the criterion of the total test score. The maximum, the minimum and the mean difficulty values for items selected for the final draft were 79.03 per cent, 34.88 per cent and 58.90 per cent, respectively. The maximum, the minimum and the mean discriminating values for items selected for the final draft were 0.83 per cent, 0.58 per cent and 0.66 per cent, respectively. The final draft consisted of only eighty valid items. Standardization had been carried out

on a representative sample of 1,650 boys and girls in the age range of 13 to 17 years drawn from eight districts of Nepal. Age-wise and grade-wise percentile and stanine norms were developed. Test reliability was computed in terms of test-retest reliability, split-half reliability and rational-equivalence. It ranged from 0.759 to 0.933. Content validity was estimated in terms of phi-coefficients of each item against the criterion of total scores which ranged from 0.58 to 0.83. Intrinsic validity of the test was 0.966. Concurrent validity was estimated against the criteria of Koh's Block Design Test (0.635), Alexander's Pass-along Test (0.625) and examination marks (0.635).

The results related to differential studies were: (i) No sex difference in intelligence was observed at any age. (ii) Average scores on intelligence tests increased with increase in age and grade. (iii) Urban children scored significantly higher than the rural children. (iv) Nepalee-speaking pupils obtained significantly higher mean score on this test than Hindi-speaking pupils. (v) There was no significant difference between the mean scores of the higher and the middle caste groups and those of the middle and the lower caste groups. (vi) The higher caste group significantly scored higher than the lower caste group on the test. (vii) The wards of professional parents obtained higher scores than the wards of skilled workers.

710. NIGAM, S.K., *Preparation of a Psychodiagnostic Test of Personality,* Ph.D. Psy., Jodh. U., 1982

The study aimed at the preparation and standardization of a new TAT type of test covering all the wider areas of needs and presses. In all, fifty semi-structured pictures were selected to get maximum identifications and projection. The pictures selected from popular Indian magazines of common public interest were of common experiential backgrounds requiring no special ability, knowledge or memory to perceive, comprehend and respond to them. The fifty cards were administered individually on ten male and ten female college-going adults of an average age of 21 years. They all belonged to the middle socio-economic class. In all, 1,000 stories were collected from the twenty subjects. They were analysed as per Stein's Scheme. The rho values between the needs of the male and the female subjects were 0.93 for self-initiated, 0.90 for interpersonal and 0.92 for counteraction needs. The rho coefficient between the presses of the male and the female subjects was found to be 0.84. A preliminary tryout was undertaken to check upon the intuitive and subjective basis for the selection of the cards. To obtain clearer indices of the stimulus value or productivity or projective strength of each card a second tryout was conducted. In this tryout, the fifty semi-structured pictures were administered on a sample of one hundred (fifty male and fifty female) subjects. All subjects were young college-going adults of average age of 21 years and all belonged to Hindu middle socio-economic class. Thus, 5,000 stories were obtained, which were analysed as per Stein's scheme for needs and presses. The rank order correlation coefficient (rho) between the needs projected by the subjects of both the sexes ranged from 0.43 to 0.82. A high degree of correlation was found between the male and the female subjects for n-achievement, n-succorance, n-harm avoidance, n-autonomy (social), n-blame avoidance, n-deference (compliance), n-cognizance, n-counteraction, n-passivity and n-exposition. The rho coefficient values calculated between the presses of the male and the female subjects ranged between 0.31 and 0.84, all being significant at 0.01 level of confidence. After eliciting the item properties in terms of productivity, variety, commonality as well as uniqueness of needs and presses of the fifty stimulus cards, a set of twenty-five cards was selected. Out of these, eleven cards were found useful for the subjects of either sex. Six cards were found most useful for the male subjects and eight cards were found more appropriate for the female subjects. Thus, the set of cards for the male subjects comprised seventeen cards and that for the female subjects nineteen cards.

The coefficient of stability was calculated using a sample of twenty-eight young adults after an interval of six months. The stability coefficients for n-cognizance, n-passivity, n-succorance, n-autonomy (freedom) were found to be significant at 0.05 level and those of n-affiliation (emotional), n-intraggression, n-counteraction and n-aggression (emotional verbal) were found to be significant at 0.01 level. The coefficients varied between 0.04 and 0.61. Similarly, t-values for presses were calculated and it was found that p-deference (respect), p-nurturance, and p-lack were significant at 0.05 level and p-affiliation (emotional) and p-loss were significant at 0.01 level. The rest of the coefficients for the various needs and presses were not significant at 0.05 level. The significant coefficients ranged between 0.41 and 0.62.

Construct validity of some of the needs and presses of the Dynamic Misperception Test developed under the study was calculated by comparing the relevant needs and presses with some of the corresponding reactions to frustration as measured by the Picture Frustration Study of Rozenzweig. Coefficients of correlation were calculated between some of the needs and presses and the reactions of frustrations on PF Study.

***711.** PANDEY, P.N., *Development of an Emotional Maturity Scale*, Ph.D. Psy., BHU, 1982

The study was an attempt for the development of an emotional maturity scale within the framework of fundamental emotions put forward by C.E. Izard. The verbal emotional maturity scale taking clue from Izard's paradigm of fundamental emotions and modifying it slightly measured emotional maturity in nine fundamental emotional dimensions, viz., curiosity, pleasure, sorrow, disgust, aggression, shame, fear, contempt, and ego-strength. Each item provided a critical incident with four alternative expressions showing different degree of emotional maturity. The final form of the test consisted of 65 items which were finalized through item analysis of the scale on the basis of a pilot study. The pilot study was conducted on a sample of 200 boys and 200 girls drawn from Banaras Hindu University and D.A.V. College, Varanasi. The normative sample consisted of 840 male and 460 female students drawn from the universities of Magadh, Patna and Gorakhpur and Banaras Hindu University.

The characteristics of the scale were: (i) All the sixty-five items had fairly high degree of internal consistency as calculated by point biserial co-efficients. (ii) Reliability of the test determined through formula KR-20 was 0.914. (iii) Test-retest reliability at an interval of one month was found to be 0.929. (iv) Convergent validity against Tripathi's Adjustment Scale and Tripathi's Trait Rating Schedule was found to be 0.787 and 0.880, respectively. (v) Discriminant validity of the scale against Tripathi-Rastogi's Anxiety Scale and TPPS was established. (vi) The factorial validity was determined by factor analysing the scores on Tripathi's Adjustment Scale, Tripathi's Trait Rating Schedule and Tripathi-Rastogi's Anxiety Scale by the method of principal component and Kaiser's varimax rotation method. (vii) T-score and percentile norms separately for the college male and female students were provided. (viii) The scale was capable of discriminating different levels of emotional maturity and in turn also suggested that emotional maturity was a growing process along with age and experience as there was significant difference between the mean scores of 150 male and 150 female teachers in comparison to the students' standardization sample mean. The teachers were found to be significantly higher on the emotional maturity scale than the students.

712. PANDEY, R. C., *A Study of Creativity as related to Rural-Urban Background, Sex, Socio-economic Status and Formal Education (with special reference to the High School Students of Kumaun Division)*, Ph.D. Psy., Kum. U., 1981

The objectives of the investigation were: (i) to study the relationship between the creativity factors (fluency, flexibility, originality and elaboration) and the socio-economic status of students, (ii) to study the incidence of creativity and compare its pattern among the male and the female students, (iii) to study the incidence of creativity and compare its pattern among the rural and the urban students, and (iv) to make a longitudinal study of creativity and find out its relationship with the various levels of formal education.

The population of the investigation constituted students of both sexes from Classes VIII and X of government high schools and from intermediate colleges of Kumaun division. The sample was selected from twenty-five institutions on the basis of the stratified random sampling technique, comprising 400 students of Class VIII rural boys (RB) = 60, rural girls (RG) = 30, urban boys (UB) = 46, urban girls (UG) = 50 and Class X (RB = 75, RG = 50, UB = 39, UG =50). Students were classified into high SES and low SES groups with the help of median point of their income distribution. The data were analysed by calculating mean, standard deviation, critical ratio test and correlation. A socio-economic scale and a creativity test were used to collect data.

The main findings of the study were: (i) Though creativity and socio-economic status were not related, a positive trend was noted in the case of the upper socio-economic status groups with creativity while a negative trend appeared in groups with the lower SES. The various factors of creativity were also not related with SES. (ii) There was no significant difference between the mean creativity scores of the boys and the girls. (iii) In Class VIII students there was no significant sex difference in respect of creativity scores. Similarly, among Class X students no sex difference appeared in respect of the various factors of creativity except elaboration. (iv) There was evidence of significant diffference between the mean creativity scrores of the samples of rural and urban students (except fluency and flexibility). (v) Significant difference was also identified between UB and RB as well as between UG and RG students of classes VIII and X when compared on their mean creativity scores. (vi) In general, the urban students scored higher than their rural counterparts. (vii) Creativity had a positive and significant relationship with the various levels of formal education.

713. PANDEY, S. S., *Classificatory Ability of Six to Ten-Year-Old Children*, Ph.D. Edu., MSU, 1980

The objectives of the investigation were: (i) to explore the classificatory ability of six- to ten-year-old Rajasthani rural children, (ii) to find out the effects of sex, socio-economic status (SES), intelligence, age and grade on classificatory ability, (iii) to study the invariant stage sequence in the development of classificatory skills, and (iv) to factor analyse the test of classificatory ability.

The sample consisted of 400 children (200 boys and 200 girls) in the age group 6 to 10 (80 of each age level) selected at random from the schools located in six districts representing the entire State. The tools of research were Draw-a-Man Test of Phatak, SES scale of Pareek and Trivedi and Classificatory Ability Test (based on Piaget's theory) developed by the investigator. The test covered tasks required to demonstrate their understanding of each of the classificatory operators by correctly manipulating a set of geometrical blocks. The statistical analysis included a univariate frequency distribution of all variables, t-test, inter-correlation matrix for the thirty-two dependent variables and factor analysis by principal component method.

The major findings of the investigation were: (i) Classificatory ability was independent of sex and SES. (ii) Classificatory ability was dependent on intellectual level of children. Children of higher intellectual level were found to be significantly better than those of lower intellectual level in their classificatory ability. (iii) Children of higher age did better on classification tasks than those of lower age. (iv) Children of higher grade did better than those of lower grades on classification tests. (v) The classification ability scores were positively related with the achievement scores in Hindi, science and mathematics and in overall achievement. (vi) Invariant stage sequence contended by Piaget was partially sustained because the chidren who failed in simple tasks, frequently passed in logically complex tasks. (vii) The predicted difficulty level of the tasks was different from that found by Piaget and Kofsky as only 7.00 per cent subjects passed class inclusion task, 8.04 per cent passed the whole task and 10.29 per cent passed the multiple class membership task. (viii) The majority of the children sorted the objects on the basis of colour (254 subjects out of 311). Only thirteen out of 311 sorted on the basis of size. (ix) A large number of children preferred red and blue colours instead of green and yellow. (x) Factor analysis yielded three factors. They were named as Multiple Class Membership, Some and All Sorting, and Inclusion factors.

714. PATEL, D. P., *Construction and Standardization of an Aptitude Test for Primary School Teachers in Gujarat State*, Ph.D. Edu., SGU, 1980

The investigation was undertaken with two main objectives: (i) to construct an aptitude test for primary school teachers of Gujarat State, and (ii) to standardize the same.

The test was in Gujarati and covered ten teacher traits, viz., interest in the profession, attitude towards community, mental ability, professional information, attitude towards children, skill in teaching, ability to maintain discipline, health and interest in reading. These traits were grouped and the test consisted of four subtests. The split-half reliability was found to be 0.70 and validity 7.74. Standard scores, T-scores, Percentiles and grade norms were calculated.

The major characteristics of the test were: (i) The final test form contained 125 test items which had been drawn from the pilot test form. (ii) Items with 0.20 or more discriminating value in the pilot form were selected for the final form. (iii) The test was standardized on the sample of 1,700 trainees (850 male and 850 female) of the first year class of various PTCs of Gujarat State. (iv) The mean score was 78.85 and the medium 80·59. (v) The distribution of the scores was negatively skewed and platykurtic.

715. PATEL, R.P., *Construction and Standardization of General Ability Test for Standards XI and XII*, Ph.D. Edu., SPU, 1981

The main objective of the investigation was to develop a non-reading test of general mental ability for Gujarati-speaking students of the higher secondary schools of Gujarat State.

The test consisted of two parts. Part One tested the student's familiarity with the world around him through his experiences in home, school and community. There were test questions in various fields of Indian culture, science, social science, community affairs and arts. Part Two avoided any cultural content. It presented geometric drawings designed to test the student's power of abstract reasoning. This part of the test presented an equal challenge to all students regardless of their cultural background. The standardization sample consisted of 5,725 students studying in the higher secondary

schools of Gujarat State.

The coefficient of reliability ranged between 0.71 and 0.87 by different methods. The test gave coefficients of validity against teachers' ratings as 0.59, against examination marks as 0.52, against other tests of intelligence as 0.68 and 0.79. Factor loadings revealed that the test was heavily loaded with 'g' factor. Age norms and grade norms were established and deviation-IQs and percentiles for the test were computed.

***716.** PATHAK, M., *Influence of Supplied Cues in Human Figure Drawings of Pre-school Children*, MSU, 1977 (UGC-financed)

The study was undertaken to see if cues helped to draw a human figure better and more complete, symmetrical and elaborate Preschool children's drawings on both Draw-a-Man Test and Incomplete Man Drawing were taken for study.

Pathak's Draw-a-Man Test was used for testing the children's drawings of the figure of man without any cues. Gesell's Incomplete Man Test was used to test the drawings with cues present. The sample comprised seventeen cases available with the Department of Child Development with complete data of performance on both Draw-a-Man Test and Incomplete Man Test at six months' interval from the age of three through five years for the purpose of longitudinal studies. For the cross-sectional study, the sample included 172 children's drawings at the ages of 3, 3.5, 4, 4.5 and 5 years.

The major findings of the study were: (i) Cues helped to improve the performance in Incomplete Figures (IF) Test at later stages. (ii) At the age of three, there was no difference in the performance, with or without cues. (iii) The percentages of final scores shifted more towards higher positive scores at the ages of 4, 4.5 and 5, which signified a better performance in IF than in Draw-a-Man (DM) Test. (iv) The means of the final scores increased with increase in age, which also suggested a better performance with the supply of cues. (v) There was significant and consistent improvement over the ages in the case of ears, arms and legs, whereas the cues caused a detrimental effect in drawing eyes at four and eight years and hair at 4.5 years. The facilitating effect of cues started early for ears, arms and legs but only at late stage for eyes, trunk, feet and hair. (vi) In the case of longitudinal analysis, in ten out of the seventeen cases, the body part once drawn either in DM or IF usually showed at the subsequent ages either at the same level of completeness or with some improvement indicating that developmental items were carried over the ages.

***717.** PATIL, H.G., *Construction and Standardization of a Group Performance Test of Intelligence*, Ph.D. Edu., Nag. U., 1979

Construction and standardization of a Group Performance Test of Intelligence (G.P.T.I.) were the chief objectives of the study.

Three types of material were devised for the construction of the test, viz., cubes with six designs on six faces, triangular pieces having different designs and flat triangular pieces with six different designs. Try-out was carried out three times. Each time shortcomings revealed by item analysis were eliminated and the fourth and final draft evolved. The final test consisted of forty problems to be solved in forty-five minutes. For standardization, a sample of 1,920 boys and girls (in equal number), studying in Classes VIII, IX, X of rural and urban secondary schools in the eight districts of Vidarbha region, was selected on a representative basis. Factorial analysis indicated that the test was a uni-factor one. Grade-wise percentile norms, T-score norms and stanine norms were fixed.

Test-retest reliability was found to be 0.73, 0.77, 0.76 and 0.71 for retesting after a period of twenty-four hours, one week, four weeks and three months, respectively. Reliability coefficients by Kuder-Richardson formula, in respect of five samples, ranged from 0.80 to 0.90 with an average of 0.85. Validity coefficients with other standardized tests of intelligence and with school marks in different subjects ranged between 0.36 and 0.61.

718. PERSHAD, D., *Construction and Standardization of Clinical Test of Memory in Simple Hindi*, Ph.D.Psy., Postgraduate Institute of Medical Education and Research, Chandigarh, 1976

The major objective of the investigation was to construct a comprehensive memory test in Hindi for knowing the clinical population, majority of whom were illiterate or low literate and unsophisticated. The test was to be free from a high loading with general intelligence.

Ten subjects based on theoretical model of testing recall in the psychological laboratory coupled with the procedure used by clinicians to examine the functioning of mental and neurological patients were selected for inclusion in the battery. Instructions and administration pro-

cedure were kept as simple as possible. The try-out was conducted on a sample of sixty-three psychiatric patients. The final sample for standardization comprised 360 adult subjects in the age range of 20 to 45 years, having average intelligence prior to the onset of illness. A three-way factorial design was followed to study the effect of three relevant variables simultaneously. The first factor consisted of four diagnostic categories, namely, normal, neurotic, psychotic and organic. The second factor of educational stage comprised three groups namely, up to 5, 6 to 9, and 10 and above years of schooling. The third factor contained two groups, male and female.

The major findings of the investigation were: (i) Each of the items in their order of placement in the test was performed significantly poorer by the organic group of subjects. On each of the subtests, organics were the poorest, psychotics were significantly better but poorer than neurotics and normals. The neurotics and the normals did not differ significantly. (ii) Inter-correlations of the ten subtests were moderate to negligible for the normal neurotic group. However, all the subtests belonged to one type as evaluated through elementary linkage analysis. The test was found to have good construct, concurrent and cross validities. (iii) Both the hypotheses — organic and older subjects would obtain low scores — were not rejected. (iv) Performance on the test was not affected by the scores on general intelligence test in the normal and the neurotic groups and had only moderate correlation in the psychotic organic group. Sex factor affected scores on four subtests only but education had positive effect on the test performance consistently.

719. PILLAI, K.K., *The Construction and Standardization of a Verbal Test of Intelligence in Tamil (for the age group 10+ to 15+)*, D.Litt. Edu., Anna. U., 1978

The main purpose of the study was to construct and standardize a test in Tamil to measure the intelligence of children in the age group 10+ to 15+. The study was also designed to relate intelligence to age, sex, grade, residence and the socio-economic status of pupils.

The standardization of the test was carried out by selecting 100 pupils for a pre-tryout. From three schools in Chidambaram, 750 pupils were selected for try-out. For the final administration, 5,000 pupils were selected from thirty-four schools of one of the fourteen districts of Tamil Nadu, using stratified proportionate sampling. The test included seven subtests: synonym, antonym. analogy, classification, mixed words, reasoning (verbal), and reasoning (numerical). There were, on the whole, 110 test items. The test-retest reliability was found to be 0.84 and the split-half reliability was 0.88. The content validity was considered on the basis of the various types of behaviours assessed by the subtests. Norms were determined in respect of the total sample, grades and age groups.

The study revealed that the differences in the means in respect of the following combinations were significant: (i) Differences in the means for pupils in respect of combinations of different grades. (ii) Differences in the means for pupils in respect of combinations of different age groups (10+ to 15+). (iii) Differences in the means for pupils in respect of combinations of different managements. (iv) Differences in the means for rural and urban pupils. (v) Differences in the means for rural pupils in respect of combinations of different socio-economic sub-groups. (vi) Differences in the means for urban pupils in respect of combinations of different socio-economic sub-groups.

***720.** RASTOGI, A., *The Development of an Anxiety Scale: State, Trait and Free-floating*, Ph.D. Psy., BHU, 1982

The study was an attempt at developing an anxiety scale consisting of measures of state, trait and free-floating or neurotic anxiety. The test included three subscales, viz., measures of state anxiety, measures of trait anxiety and measures of free-floating anxiety. The pilot study was conducted on a criterion group consisting of 100 anxiety patients taken from the Out-Patient Department of Psychiatry, S.S. Hospital, Banaras Hindu University, and on a control group consisting of 100 normal adults of the same age range who were free from any mental maladjustment. The items were analysed by calculating Edwards standard normal deviates, point biserial correlations and phi-coefficients. After item analysis the final form of the test was administered on a normative sample of 1,600 students (800 male and 800 female) drawn from the universities of Allahabad, Varanasi and Patna. Factorial validity of the test was established by varimax rotated factor loadings. Other tests used for validational purpose were IPAT Anxiety Scale and Sinha's Anxiety Scale.

The characteristics of the scale were: (i) Each item of the test had a fairly high degree of internal consistency. (ii) Reliability of the subscales by calculating alfa-coefficients was found to be 0.931 for state scale, 0.892 for trait

scale and 0.869 for free-floating scale. (iii) Stability coefficients of the scales after four to five weeks of interval were found to be ranging from 0.798 to 0.901 for the three scales. (iv) Convergent validity against the Hindi version of IPAT Anxiety Scale was found to be 0.693, 0.799 and 0.528 for the three scales, respectively. (v) The discriminant validity was established through non-agreement of the scale scores with TPPS measuring some other variables. It was found that the three subscales of anxiety had near about zero correlation with 15 subscales of TPPS. (vi) The predictive validity of the test had been empirically found out through pre-and post-administration of the scales on a sample of 500 graduate students of Banaras Hindu University. (vii) The factorial validity of the test had been established through factor analysing the scores of state scale, trait scale, free-floating scale, IPAT scale and Sinha's Anxiety Scale. The independent factorial identities of the three scales had been established firmly. (viii) Separate percentile and T-score norms for college males and females had been established.

***721.** SARIWAT, L., *An Investigation into the Mechanical Aptitude of the Students Studying in Mathayom 3 of Educational Region No. 1 of Thailand*, Ph.D. Edu., SPU, 1981

The specific objectives of the investigation were: (i) to construct and standardize a mechanical aptitude test, (ii) to study the mechanical aptitude of the students studying in Mathayom 3 of Educational Region No. 1 of Thailand, (iii) to study the sex differences in the mechanical aptitude of these students, (iv) to study the differences in mechanical aptitude of the students belonging to urban and rural areas, (v) to study the influence of parents' occupation on the mechanical aptitude of these students, (vi) to study mechanical aptitude of the students in relation to their parents' education categories, and (vii) to study the relation between the academic achievement and the mechanical aptitude of these students.

For this study, the test items were prepared to test the mechanical aptitude. These items were edited and assembled in the form of a test. The test was administered to a sample of the population, for which the test was standardized. Difficulty and discriminating indices were calculated. The final form was administered to a large sample of 1,000 students taken at random from the population. The reliability of the test was established by K-R Formula 21, split-half method and test-retest method. Reliability of the test ranged from 0.81 to 0.91. Validity was also established by studying the internal consistency of the item. T-scores for boys and girls were computed.

The conclusions of the study were: (i) The male students were better than the female students on mechanical aptitude. (ii) The urban students were better than the rural students on mechanical aptitude. (iii) The students of graduate parents were better than the students of undergraduate parents on mechanical aptitude. (iv) The students of parents belonging to high status occupation were better than the students of parents belonging to low status occupation. (v) Area did influence the mechanical aptitude of male and female students. (vi) Parents' level of education did not influence the mechanical aptitude of male or female students. (vii) Parents' level of occupation did not influence the mechanical aptitude of male and female students. (viii) Parents' level of education did not influence the mechanical aptitude of students belonging to parents staying in urban area and parents staying in rural area. (ix) Parents' level of occupation did not influence the mechanical aptitude of the students belonging to parents staying in urban area and parents staying in rural area. (x) Parents' level of education did not influence the mechanical aptitude of students whose parents belonged to high or low status occupation. (xi) Sex, area and parents' level of education had positive significant impact on the mean scores of the mechanical aptitude of the students. (xii) Sex, area, and parents' level of education had positive significant impact on the mean scores of the mechanical aptitude of the students. (xiii) Sex, parents' level of education and parents' level of occupation had positive significant impact on the mean scores of the mechanical aptitude of the students. (xiv) Area, parents' level of education and parents' level of occupation had no effect on the mean scores of the mechanical aptitude of the students.

***722.** SEKHAR, M., *A Study of Creativity in relation to Home Environmental Factors*, Ph.D. Edu., Bom. U., 1980

The objectives of the investigation were : (i) to develop a paper-pencil test of creativity suitable for Indian conditions, (ii) to find out the relationship between creativity and home environmental factors, (iii) to study the difference in relationship between creativity and home environmental factors arising out of sex differences and joint and nuclear family patterns, (iv) to study the home environmental factors in terms of differential

groups, namely high creative-high IQ vs. high creative-low IQ, high creative-high IQ vs. low creative-low IQ and high creative-high IQ vs. low creative-high IQ, (v) to identify factors in the home environment conducive to creativity, and (vi) to find an equation for predicting creativity scores on the basis of home environmental factors.

The method of stratified random sampling was used for the selection of the sample which comprised subjects 13 to 26 years of age. The tools employed for data collection were tests of creativity prepared for the purpose, measures of home environment, SES inventory and tests of verbal and non-verbal intelligence. Personal data were collected through response sheets. The data were analysed by using statistical techniques. Linear graphs, analysis of variance and t-ratios were computed. Regression equations were computed to predict creativity scores and factor analysis was done to identify the factors in the home environment conducive to creativity.

The major findings of the investigation were: (i) Factors of cordial parental relationship, democratic attitude of the parents, acceptance of the child by the parents, encouragement given by the parents and relationship with younger siblings in the family showed a direct positive relationship with creativity. (ii) The factor of acceptance of the parents by the child did not show any relationship with creativity. (iii) The total number of siblings in the family showed a negative relationship. (iv) The relationship of creativity with socio-economic status was found to be positive and curvilinear in nature. (v) Factor analysis indicated that there were at least three factors in the home environment which affected creativity. (vi) There was a difference in the home environment of single-talented and double-talented subjects. (vii) Sex-wise and family-wise analysis indicated a difference in the home environment of the two sexes and also in subjects belonging to different family patterns.

723. SHAH, P.C., *Construction and Standardization of a Verbal Reasoning Test for Students of Standard VI and Standard VII in Saurashtra,* Ph.D. Edu., Sau. U., 1981

The main objective of the study was to plan, construct and standardize a verbal reasoning test. Eighteen types of series were prepared and nearly 220 items were administered on 111 students for pre-tryout. Selected items were administered to a stratified cluster sample of 370 students of ten different schools of Amreli, Bhavnagar and Surendranagar districts. Item analysis and distractor analysis were carried out for the preparation of the final test form. A very thorough cross-sectional sampling of students was done. Seventy-two strata, according to sex, grade, area and district, were decided for the sampling procedure. The final test was administered to 9,382 students of 200 different schools of 118 different places in Saurashtra.

Reusable printed test booklets of the final form were prepared along with separate answersheets. A manual of instructions was also prepared. The data were analysed by applying some important statistics like mean, median, SD, t-test, and skewness. Raliability of the test was established by test-retest method (0.88), split-half method (0 89), Rulon formula (0.86), Kuder-Richardson formula (0.92), and Flanagan formula (0.84). The three types of validity established were congruent validity (0.72 and 0.52), concurrent validity (0.88 and 0.80) and predictive validity (range from 0.72 to 0.36).

Three hypotheses were proposed relating to sex, grade and area differences.

The findings of the study were: (i) Sex, grade and area (rural vs. urban) differences were significant. (ii) Standard VII students excelled Standard VI students, boys excelled girls and urban children excelled rural children in verbal reasoning. (iii) Separate sex, grade and area norms were established in the form of PR, standard scores, T-scores, stanines and letter grades.

724. SHAH, T.M., *The Construction and Standardization of a Spiral Omnibus Type Group Non verbal Test of Intelligence for Grades VIII to XII,* Ph.D. Edu., Guj.U., 1981

The test was meant for the age group 13 to 17 studying in Grades VIII to XII. It was a spiral omnibus type non-verbal test of intelligence. It included six types of non-verbal intelligence tests, namely, similarities, classification, analogies, series, conditions and matrices. After a preliminary tryout of the subtests on a very small group of thirty pupils drawn equally from the five grades and in an equal sex ratio, the items were revised to remove the inadequacies felt. The second tryout was made on a sample of 370 pupils drawn from all the five grades, VIII to XII, and item analysis was carried out. Time limit was also estimated during this tryout. In view of the item validity and facility value (difficulty value) of the items, good items were selected and rearranged in the order of their facility values. They were then mixed so that the first item of the first subtest came first, then the first item

of the second subtest, then the first item of the third subtest, and so on. After all first items were arranged, the second items of the six tests were placed, then the third items, and so on. In this way, a spiral omnibus pattern was obtained.

The sample of the population of Gujarat was selected by including in it one school from an urban area and one school from a semi urban area from each district of Gujarat except the Dangs. A few rural schools were included in place of semi-urban ones from some districts. In fact, most of the rural areas did not have high or higher secondary schools, so their sample was very small. From the schools 3,612 pupils were selected by the method of random sampling.

The reliability of the test estimated by test-retest method for different age groups ranged from 0.80 to 0.95. The test retest reliability for separate tests ranged from 0.60 to 0.80. The split-half reliablility for different age groups ranged between 0.80 and 0.87. The validity of the test was obtained by correlating the test with Bhavsar Non-verbal Test, Desai-Bhatt Verbal Test, school examination marks and teachers' opinions, which were 0.88, 0.90, 0.57 and 0.78, respectively. Factor analysis of the test was carried out by Hottelling's principal axis method and seven factors were obtained, the first factor being common to all the six tests and hence was thought to be the G factor.

725. SHARMA, K.D., *Construction and Standardization of a Vocational Interest Inventory in Hindi for the Secondary School Pupils of Haryana*, Ph.D. Edu., Kur.U., 1982

The main objective of the study was to construct and standardize a vocational interest inventory for Class X students of Haryana. The first form of the inventory was prepared with the help of interest inventories of Kuder and Strong as well as keeping in view the job requirements in Haryana. For the purpose of selection of items, the opinions of students, of school teachers and of experts and the inventories already in the field were taken into consideration. The items belonged to ten interest areas, viz., outdoor, mechanical, scientific, literary, artistic, musical, social service, clerical, business and management and household. The first draft of the inventory was administered to 100 students of Class X of a school in Haryana. The items were scored by alotting 2, 1 and 0 for 'like', 'indifferent' and 'dislike' responses, respectively. The analysis of items was done on twenty-seven per cent upper and lower group basis. Those items for which the mean differences between the two extreme groups were significant were retained. In all, two hundred items formed the final draft of the inventory. Norms were established by administering the final form of the inventory to 800 students (400 boys and 400 girls) drawn from rural and urban and government/private schools of Haryana. The norms for the inventory were found in the form of percentiles, standard scores and T-scores. Reliability of the inventory was found out by using split-half and test-retest methods.

The Split-half reliability for the different interest areas of the inventory varied from 0.90 to 0.94 and test-retest reliability from 0.87 to 0.97. Criterion validity of the inventory was established by finding t-ratio for difference between the means of criterion group (persons who were already in service) and normal group (students), which was significant. The coefficient of correlation between the scores of criterion and normal groups was found to vary between 0.70 and 0.90 for different interest areas. The final form of the interest inventory was found to be a reliable and valid tool for knowing the interests of secondary school students of Haryana.

726. SHARMA, N., *A Study of Mental Organization in School-going Children*, Ph.D. Psy., Agra U., 1980

The objectives of the investigation were: (i) to study the trends in developmental changes in various abilities with the increase in children's age, (ii) to explore the relationship of certain selected abilities with increase in age, and (iii) to present an account of the process of differentiation, crystallization and stabilization of abilities as the child grew older.

The study used a cross-sectional approach. Four groups were formed of boys and girls in approximately equal numbers, in the age level 10+ to 13+ years and from Classes VII to X, respectively. Five schools were chosen from Firozabad and Agra and in both the cases selective factors were avoided (educational background and SES). Each of the four groups of boys and girls randomly selected from the above schools contained 125 boys and 125 girls for the study. The groups of boys and girls chosen for the study were given six ability tests, namely, verbal reasoning, abstract reasoning, numerical ability, space-relations, speed accuracy and mechanical reasoning.

The investigation showed : (i) With increase in age three abilities, verbal, abstract and mechanical reasoning, grew more rapidly in both the groups of boys and girls. (ii) There was a steep rise in abilities in the first

year, which slowed down in the second year and in the third year there was again a steep rise in the growth of abilities. (iii) Sex differences in mental organization appeared significant in numerical, space relations and mechanical abilities at some stages; in all cases boys were superior to girls. (iv) The phenomena of differentiation and stabilization of mental abilities were noted with increase in age. (v) Crystallization of the amorphous type of ability in young children into specific ability with increase in age was noticed. (vi) Disparity among the abilities increased with the advance of age; the increasing disparity confirmed the phenomena of differentiation and stabilization of the abilities with advancing age. (vii) Intellectual abilities changed their organization from a fairly unified general ability to loosely organized group of abilities.

727. SHETH, P.H., *A Gujarati Adaptation of the Wechsler Adult Intelligence Scale for Gujarati Population*, Ph. D. Edu., Guj.U., 1979

This individual test of intelligence for adults was adapted to the needs of Gujarati population by making changes in the items of WAIS, wherever necessary, and standardized on the population of Ahmedabad city. Six subtests were verbal and five subtests were performance tests. The various subtests were general information, general comprehension, arithmetical reasoning, similarities, digit span, vocabulary, digit symbol, picture completion, block design, picture arrangement and object assembly.

The first test of general information and the sixth test of vocabulary had to be changed completely. Others needed only a few changes. Main changes were made before the first pilot tryout and only a few changes had to be made thereafter. The sample of population selected from Ahmedabad city was based on the 1971 Census classification. All illiterate persons had to be kept out of the sample, as they could not follow the test items. The sample comprised 400 adults including women. The raw scores of each test were converted into scaled scores using M=10 and SD-3. Then, verbal, performance and full scale IQs were calculated by superimposing a normal probability curve of M=100 and SD-15 over the distribution of total scaled scores of groups of subtests. Norms were then fixed for different age groups.

Reliability of the test was checked by test-retest and split-half methods and were found to be very high. Validity of the test was determined by comparing its IQs with IQs on Desai-Bhatt, CattellCulture-Fair tests and Raven's Standard Progressive Matrices, and the correlations ranged from 0.37 to 0.90. The correlations of the subtests were factor analysed by Hottelling's principal axis method and centroid method and eight factors were extracted, the first of them being G.

728. SINGH, A., *A Study of the Effect of Age and School Environment on Fluid and Crystallized Intelligence of High School Children*, Ph.D.Psy., Pan. U., 1973

There were two sections of this study. The objective of the first section was to study the effect of stimulating and non-stimulating environment on the level and pattern of fluid (Gf) and crystallized intelligence (Gc). The objective of the second part of the study was to assess the growth of fluid and crystallized intelligence over 14 to 54 years of age.

The sample for the first part of the study comprised 906 students. Out of this, 307 were of the age group 13 to 14, taken from six 'Model Schools' of Haryana, designated as stimulating environment group (SEG). Two samples of 397 (N_1) and 202 (N_2) students of the age range N_1: 13 to 14 years and N_2: 17 to 18 years were taken from 'Gurukulas' (Haryana State), designated as non-stimulating environment group (NSEG). For the second part of the study 566 subjects (students and teachers), in the age range of 14+ to 54 years, were drawn from different schools of Haryana, and were divided into eight age groups 14 to 15, 16 to 17, 18 to 19, 20 to 21, 22 to 23, 24 to 29, 30 to 39, 40 to 54 years. The tools used in the study were Cattell's Culture-Fair Intelligence Test, Scale 2, Form A and Scale 3, Form A, Hindi version of Cattell's High School Personality Questionnaire, Amir Singh's Hindi version of the Hundal Verbal Group Test of General Mental Ability, and Jalota's Group Test of General Mental Ability. The data were analysed with the help of statistical techniques of mean, standard deviation, skewness, kurtosis, split-half reliability coefficients, product moment correlation and intercorrelation matrix and factor analysis by principal axis method, and varimax rotation.

The major findings of the study were: (i) The stimulating environment group (SEG) scored significantly higher, both on Gf and Gc tests. (ii) The mean scores on the personality variables of factors A, C, G, H, and G3 were higher for the SEG, whereas the NSEG scored higher on factors D,E,I,O, and O2. (iii) The differentiation of Gf and Gc abilities was delayed under the non-stimulating environment conditions. (iv) The structure

of the second order factor of neuroticism seemed to have been influenced by the environmental conditions, but its influence was much less in the case of the factors of anxiety and extraversion. (v) The fluid abilities had a pattern of association with age different from the crystallized abilities. (vi) The fluid abilities reached full development at 21 to 22 years of age and a steady decline began thereafter. (vii) The crystallized abilities improved up to the age of 30 to 39 years and after that it started declining. (viii) The rate of growth or decline among the subjects of Gf as well as Gc differed somewhat.

729. SINGH, A.K. and SINHA, L.N.K., *Development of Differential Personality Scale in Hindi,* Pat.U.

The purpose of the work was to construct a multidimensional scale to measure personality which would include some of the socially and clinically desirable personality traits.

Out of a list of twenty socially and clinically relevant and meaningful dimensions of personality, nine dimensions were selected on the basis of the unanimous opinion of fifteen experts. These dimensions were decisiveness, responsibility, emotional stability, masculinity, friendliness, heterosexuality, ego-strength, curiosity and dominance. Each of these dimensions was defined on the basis of eight activities which were presumed to provide a wide coverage of that dimension. Five items on each of the eight activities covered by each personality dimension were written. The items were further edited on the basis of experts' opinions. On the basis of tryout on a group of twenty-four randomly selected subjects, fifty out of the 360 items were found to be vague and unsuitable and, therefore, dropped. Eighty-nine items were further dropped on the criterion of social desirability values. Two hundred and twenty-one were included in the list for item analysis. Item analysis was carried out by finding out item total test correlation. The final form contained 165 items. Orthogonality of the dimensions covered by the personality scale was tested.

The results were: (i) The stability coefficients for various dimensions as calculated by test-retest method ranged from 0.73 for dominance to 0.86 for masculinity. The split-half reliability coefficients (odd-even) ranged from 0.82 for decisiveness to 0 90 for friendliness. (ii) Validity coefficients with the scores on Bell Adjustment Inventory adapted by Hussain were calculated for each dimension. Correlation coefficients with the dimensions of decisiveness and emotional stability only were found significant. (iii) Product moment coefficients of correlation between the scores on each dimension and self-ratings (N=200) yielded significant values. (iv) Percentile norms were developed on a sample of 1,000 subjects.

730. SINGH, R., *Construction and Standardization of a Mechanical Aptitude Test for 10th Class Students of Haryana,* Ph.D. Edu., Kur. U., 1981

The main objective of the study was to construct and standardize a mechanical aptitude test battery for the Class 10 students and to establish reliability, validity and norms for the different tests in the battery. The components of mechanical aptitude were general intelligence, spatial ability, perceptual ability, mechanical adaptability, mechanical comprehension, mechanical information and manual dexterity. After constructing items for each component, time limit was fixed for each test by administering the test to ten students individually. The final forms of the tests were administered to 1,020 students selected from government and private schools of eleven districts of Haryana.

The characteristics of the test were: (i) The time limit for different tests ranged from two minutes to fifteen minutes. (ii) The norms for each test in the form of linear derived standard scores were having mean of fifty and standard deviation of ten. (iii) The reliability of different tests was 0.74 for general intelligence, 0.92 for spatial ability, 0.83 for perceptual ability, 0.80 for mechanical adaptability, 0.82 for mechanical comprehension, 0.82 for mechanical information and 0.78 for manual dexterity. (iv) Validity was established against the supervisor's rating of students of five trades, viz., pattern maker, mechanical draftsman, tool and die maker, mechanist and wireman. The validity coefficient ranged from 0.80 to 0.88. (v) Different tests in the battery were also correlated with the school subjects particularly science, mathematics and drawing.

731. SINHA, J.K., *Development of a Measure of Aggression and Study of Some of Its Correlates,* Ph.D. Psy., All. U., 1976

The objectives of the investigation were: (i) to develop a culturally appropriate aggression inventory, and (ii) to study the relationship of aggression with socio-economic status, self-concept, level of aspiration and extraversion-neuroticism.

For the development of aggression inventory, 200 students (100 male and 100 female) were selected. Out of 200 students, 100 students were used for item analysis and the remaining one hundred for calculating the reliability and validity. For studying the correlates, the sample comprised 150 male subjects. For the development of aggression inventory, Indian mass media (e.g., comics, photographs of newspapers and magazines) were analysed to study the various forms of expression of aggression and the kinds of situations associated with aggression which revealed a number of personal and social situations. It was also found that the aggressive responses were expressed at thinking, verbal and action levels. In the inventory, fifteen cartoon pictures similar to the Rosenzweig P-F study were developed. The pictures depicted the situations which were often found associated with aggression in mass media. To minimize the variable of social desirability two strategies were adopted; first items were written following Buss' item writing techniques, which minimized the social desirability effect after which items were rated by students on a five-point scale of social desirability. Test-retest method was used for establishing the reliability; the developed inventory was administered on a large sample of mental patients and prisoners. They were compared with a sample of normal subjects. The t-test was used for analysing the data.

The findings of the investigation were : (i) The developed inventory, named Indian Aggression Inventory, was reliable and valid. (ii) In overall aggression, the high SES subjects were least aggressive and the middle SES subjects were most aggressive. The high SES subjects were significantly higher than the low SES subjects when compared at the thinking level; at the verbal and action levels, the high SES group was found to be significantly lower than the low SES group. The middle SES subjects were significantly higher than the low SES at all the three levels, i.e., thinking, verbal and action levels. The middle SES subjects were significantly higher at the verbal and action levels but there was no difference in the thinking level of aggression. (iii) The high SES subjects were significantly high on the thinking level of aggression as compared with the action and verbal levels. When the action and verbal levels were compared, the verbal level was significantly higher than the action level of aggression. The thinking level of aggression was found to be lower than the action and verbal levels in the middle SES. No significant difference was observed between the action and verbal levels of aggression in the same group. (iv) In the low SES group, the action and verbal levels of aggression were significantly higher than the thinking level but no significant difference was obtained between the action and the verbal levels of aggression. (v) No significant difference was obtained between the high and the low aggression groups as regards the neuroticism scores. A significant difference was obtained between the high aggression and the low aggression groups regarding the extraversion scores, the low aggression group was higher than the high aggression group. (vi) The high aggression subjects were found to be significantly lower on the private self and social self scores than the low aggression group subjects. The private self dominated the self-concept of the high aggression group subjects as against the dominance of social self of the low aggression group subjects. There was no significant difference between the high aggression and the low aggression groups as regards discrepancy between private self and social self, without algebraic signs. (vii) No significant difference was obtained between the high and the low aggression groups regarding favourable and unfavourable traits of private self dimension of the self-concept. The low aggressive group was found to be significantly higher on social traits against the high aggression group subjects. The low aggressive subjects were found to be significantly higher on favourable and social traits of social self dimension than the high aggressive subjects.No significant difference was obtained regarding unfavourable traits of the social self dimension. (viii) The high aggressive subjects were significantly higher, i.e., with plus scores, than the low aggressive subjects who scored negative signs with respect to the goal discrepancy scores. (ix) The attainment of the high aggressive subjects was poor as compared to aspiration on the same trial while the aspiration of the low aggressive group was lower than their attainment on the same trial.

732. SRIVASTAVA, A.K. and SIMHADRI, R., *A Test of Reading Readiness and Mental Ability in First Generation Learners*, CIIL, Mys. U., 1979

The investigation was conducted with the following objectives: (i) to study the difference in the performance of first generation learners (Group I) and that of second generation learners (Group II) on reading readiness scores, and (ii) to study the relationship between reading readiness and age, sex and intelligence.

Forty-six boys and fifty-six girls in the age range 3.6 to 6.6 years, who spoke Kannada at home and belonged to lower socio-economic-status population and whose parents were either illiterate or had hardly completed their

primary education, formed Group I for the study. Group II included forty-eight boys and fifty-four girls who spoke Kannada at home and were in the same age range as Group I but whose parents belonged to middle class and were literate and had at least entered college. A test of reading readiness in Kannada comprising three reading measures, namely, vocabulary, auditory discrimination and visual discrimination skills along with Binet-Kamat Test for measuring intelligence of Indian children in Kannada was administered to both the groups. Indirect observations were made of left to right orientation.

The findings of the investigation were: (i) The children belonging to Group II were significantly better than those of Group I on reading readiness measures, in all age groups. (ii) The Boys and the girls of Group II taken separately were better on reading readiness than their counterparts in Group I. (iii) Age was positively related to reading readiness in both the groups. (iv) The girls were better than the boys in reading readiness in both the groups. (v) Vocabulary scores were the highest in the age group 4.6 to 5.6 years in both the groups; however, the performance of Group II was significantly better than that of Group I. (vi) The performance of Group II on auditory and visual discrimination tests was better than that of Group I. Although the girls were better than the boys on auditory discrimination tests, no such differences existed on the visual discrimination test.(vii) Intelligence was positively related to reading readiness in both the groups.

733. SRIVASTAVA, N.N., *A Study of the Scientific Attitude and Its Measurement*, Ph. D. Edu., Pat. U., 1980

The objectives of the study were: (i) to develop an instrument to measure scientific attitude,(ii) to compare science teachers and non-science teachers in respect of scientific attitude, and (iii) to compare science students and non-science students in respect of scientific attitude.

The thirty-six item attitude scale in Hindi included six variables — rationality, curiosity, open-mindedness, aversion to superstition, objectivity-intellectual honesty, and suspended judgement. Items were selected by the method of Thurstone's equal appearing interval and they were modified by the Likert method of summated ratings. The Reliability and the Validity of the scale were 0.90 and 0.94, respectively.The factor loadings after factor analysis confirmed the dominance of only two factors out of the six. The test was administered on a random sample of fifty science teachers, fifty non-science teachers, 100 science students and 100 non-science students from the population of Madhya Pradesh.

The main findings of the study were: (i) The amount of scientific knowledge or general exposure to science courses made impact on scientific attitude positively. (ii) Scientific knowledge helped in the formation of scientific attitude. (iii) Boys and girls differed in respect of scientific attitude. (iv) Male teachers and female teachers did not differ in respect of scientific attitude.

734. SRIVASTAVA, S.S., *Construction and Standardization of an Extroversion-Introversion Test on the Basis of Cattell's Contact Personality Factor and Allied Studies*, Ph. D. Psy., BHU, 1970

The objectives of the investigation were: (i) to construct, adapt and standardize an extroversion-introversion test with a multidimensional measuring device, on the basis of Cattell's contact personality factor (CPF), (ii) to study the effects of some socio-psychological variables such as age, sex, academic background, rural-urban background and economic status on the extroversion dimension and its various components of the personality among college students, and (iii) to prepare CPF profiles for different professional occupational groups.

A sample of 6,288 subjects was drawn from a varied and massive population covering male and female students studying in science, agriculture, technology, arts, commerce and education streams, and mature adult groups and several professional and occupational groups such as salesmen, L.I.C.agents, school teachers, university readers and professors, secretarial assistants, clerks and stenographers, administrators,secretaries, nurses, policemen, housewives, lawyers, doctors, engineers and craftsmen, from the Hindi-speaking belt of India. The test had been developed on the basis of Cattell's Contact Personality Factor (CPF) test which consisted of 34 factor items and six distortion score items. From Cattell's 16 personality factors, the five personality factors included in the test were Factor A: Cyclothymia vs. Schizothymia, Factor E: dominance vs. submission, Factor F: surgency vs. desurgency, Factor H: adventurous vs. withdrawal and Factor Q_2: group-identification vs. self-sufficiency. The test could be scored separately for each factor distortion and the total extroversion or contact score. The validity and reliability were reported to be fairly high.

The findings of the investigation were: (i) There was no impact of age difference on extroversion scores

within the age range of 16 to 35 years. (ii) The male college students scored significantly higher on factors A, E, F and the total extroversion scores than the female college students. (iii) The male humanities students exhibited significantly higher motivational distortion than the female humanities students and the male science students. (iv) The female humanities students scored significantly higher than the male science students on the motivational distortion scale. (v) The male humanities students scored significantly higher on factors A, E, F and the total extroversion than the male science students.(vi) There was no significant difference between the rural and the urban students on the total extroversion score. (vii) There was no income group difference on extroversion. (viii) Salesmen were significantly higher on all the factors of CPF and the total extroversion. (ix) The LIC agents were significantly higher on A, E, F, H and the total extroversion. (x) The high school teachers were significantly higher on A and H only. (xi) Professors of science and technology were significantly lower on A, F and Q_2 but significantly higher on factor E. (xii) The male secretarial assistants were significantly lower on factor E. (xiii) The female clerks and stenographers were significantly higher on factors A and H but lower on E. (xiv) The administrators and secretaries of government departments were significantly higher on factor A and H but significantly lower on E and Q_2. (xv) The female nurses were significantly lower on factors A, E, Q_2 and total extroversion. (xvi) The policemen were significantly higher on factors E, H, Q_2 and total extroversion. (xvii) The housewives were significantly higher on factors A and H but lower on E and F. (xviii) The lawyers were significantly higher on factors A and F. (xix) The medical doctors were significantly higher on factors H and Q_2. (xx) The engineers were significantly lower on factors A, F and Q_2. (xxi) The craftsmen were significantly lower on factors A, E, F, Q_2 and the total extroversion but significantly higher on H.

735. STATE INSTITUTE OF EDUCATION, *Norms for Intelligence Test for Classes VIII to XI of Haryana State,* Karnal, 1971

The major objective of the study was to develop norms for the Raven's Standard Progressive Matrices (RSPM) Test of Intelligence over a representative population of school children in Haryana.

The RSPM of Intelligence was administered to 974 students of Class XI, 1,374 students of Class X, 1,374 students of Class IX and 2,624 students of Class VIII from Karnal, Ambala, Rohtak and Gurgaon districts of Haryana state. The sample was selected on a random basis.

The norms for Classes VIII to XI were developed in stanine and in percentiles. Stanine consisted of dividing the set of score into nine standard groups. For percentile norms all scores were converted into thirteen designated percentile values. The procedure for converting raw scores into percentiles was finding out the raw score for the test in the particular class and reading the percentile on the side of the table.

736. THAKUR, S., *The Construction and Standardisation of a Verbal Group Test of Intelligence in Assamese for Class Group V to VIII,* Ph.D. Edu.,Dib. U., 1979

The major objective was to construct and standardize a test to measure the general mental ability of students reading in Classes V to VIII of Assamese medium high and higher secondary schools of Upper Assam.

Seven subtests — logical selections, analogies, number series, synonyms-antonyms, proverbs, classifications and best answers — were included in the test. On the basis of item validity index, item discrimination index and effectiveness of item distractors 100 items were finally selected. The final version of the test was administered to 3,039 boys and 2,243 girls, selected from Classes V to VIII, by adopting the stratified random sampling technique. In all, 10.3 per cent of the total population was included in the sample.

The major characteristics of the test were: (i) The reliability coefficients obtained by test-retest, split-half and rational equivalence methods for the entire sample and for different classes of boys and girls separately were found to range from 0.89 to 0.97. (ii) Standard errors of measurement varied from 4.58 to 4.74. (iii) Content, construct and concurrent validity were established and the obtained validity coefficients were found to range from 0.41 to 0.88. (iv) Class norms and percentile norms were fixed for different grades of boys and girls together as well as separately; norms were also fixed for the entire sample irrespective of grades. (v) Coeffficients of correlation between intelligence and academic achievement were found to range from 0.41 to 0.50 for Classes V to VIII. (vi) Co-efficient of correlation between intelligence and different school subjects, viz., Assamese, mathematics and history, was found to range from 0.29 to 0.50. (vii) Intelligence was found to differ among children belonging to parents of different occupations and

castes, though the differences were not so prominent between some occupational groups and certain castes. (viii) The 'g' saturation values calculated for seven different elements were too high to assume that there was sufficient closeness between the elements used in the sub-tests. The 'g' saturation obtained for all the seven sub-tests ranged from 0.39 to 0.90, which revealed the existence of a general mental ability factor.

737. THANEDAR, B.S., *Development of a Scale for Evaluating Handwriting of School Pupils*, College of Education, Sangli, 1976 (MSBTPCR-financed)

The main objectives of the study were: (i) to determine the criteria of good handwriting, (ii) to prepare on the basis of the criteria a scale for evaluating handwriting, (iii) to determine the objectivity of the scale, (iv) to use the scale for evaluating the handwriting of pupils, and (v) to find out the causes of bad handwriting.

The study was concerned with handwriting in the Devnagari script of primary school pupils of Classes I to IV. The sample consisted of 320 pupils. Specimens of handwriting were collected for grading. For normative study, 2,400 pupils from Classes I to IV were involved. A committee of five handwriting experts decided a list of seven criteria for evaluating handwriting. The quality of handwriting was classified under seven categories with category number one representing the best quality and category seven the worst quality. Thus a 7-point handwriting scale was prepared. The objectivity of the scale was determined by getting specimens of pupils' handwriting and getting them evaluated independently by twenty experienced teachers and comparing the results.

The major results of the study were: (i) On the basis of the criteria, the scale for evaluating pupils' handwriting was prepared. (ii) The scale was found to be valid and objective. The maximum score for the best quality of handwriting was 90 and the minimum score for the worst quality of handwriting was 10. (iii) The average scores for Classes I, II, III and IV students were 39, 47, 66 and 74, respectively. (iv) The main causes of bad handwriting were: (a) slovenly blackboard writing by teachers, (b) want of individual attention, (c) lack of copy-book practice, and (d) parental neglect.

738. THARAKAN, P.N.O., *A Restandardization of a Battery of Engineering Aptitude Tests*, Ph.D. Psy., Ker. U., 1973

The objective of the study was restandardization of a Battery of Engineering Aptitude Tests for the Kerala population to be used for vocational guidance.

The four main sub-tests were: (i) physical science comprehension, (ii) mathematics and formulation, (iii) spatial relations, and (iv) mechanical reasoning. The sample for the study was made up of 1,527 students drawn from different colleges spread over the whole of Kerala.

The reliability of the test was found to be 0.92 and validity 0.48. Percentile norms were also prepared.

739. TULI, M.R., *Mathematical Creativity as related to Aptitude for Achievement in and Attitude towards Mathematics*, Ph.D. Edu., Pan. U., 1979

The major hypotheses of the study were: (i) mathematical creativity was significantly related to aptitude for mathematics, (ii) significant relationship existed between mathematical creativity and attitude towards mathematics, (iii) mathematical creativity contributed significantly towards achievement in mathematics, and (iv) aptitude for mathematics and attitude towards mathematics conjointly contributed to mathematical creativity.

The sample comprised 1,000 students selected from Grade IX of high/higher secondary schools of Punjab State. The research tools administered were Balka's Creative Ability in Mathematics Test (CAMT) translated into Hindi by the investigator, the revised version of Differential Aptitude Tests for higher secondary schools by J.M. Ojha (the Hindi adaptation of Form L of the battery of Differential Aptitude Tests prepared by Bennet, Weisman, and Seashore) and Mathematics Attitude Scale (MAS) developed and validated by the investigator himself. The statistical analysis included descriptive statistics, factor analysis by principal component method, varimax rotation, and regression analysis techniques.

The major findings of the study were: (i) Mathematical creativity was significantly positively related to aptitude for mathematics. (ii) The attitude towards mathematics was not found to be a predictor of creative ability in mathematics. (iii) Achievement in mathematics was significantly related with creative abilities in mathematics. (iv) Aptitude for and attitude towards mathematics conjointly did not contribute to mathematical creativity in the present study.

***740.** USMANI, S.N., *Creativity in relation to Alienation, Ego-strength and Intelligence in Arts and Sci-*

ence Streams of Intermediate Students, Ph.D. Psy., BHU, 1981

The major objectives of the study were: (i) to find out differences between the students of arts and science streams on creativity measures, (ii) to find out sex differences on creativity measures, (iii) to find out differences between the students with high and low alienations on creativity measures, (iv) to find out the difference between the students having high and low ego-strength on creative measures, and (v) to find out the difference between the students with high and low intelligence on creative measures.

The investigation was conducted on the basis of five null hypotheses taking educational streams, sex, alienation, ego-strength and intelligence as independent variables and creativity as the dependent variable. A sample of 800 eleventh and twelfth graders was drawn from three districts of North-Eastern Uttar Pradesh. It included 400 students each of arts and science streams and each stream consisted of 200 boys and 200 girls. In addition to descriptive statistics, coefficients of correlations and 2×2×2×2×2 factorial design were used for the purpose of analysing the data. The tests and scales used in the investigation were Mehdi's Verbal Test of Creative Thinking, Dutt and Kureshi's Alienation Scale, Barron's Ego-strength Scale and Joshi's Test of General Mental Ability.

The major findings of the study were: (i) The science students scored significantly higher on creativity test than the arts students. (ii) There was no significant sex difference on the measures of fluency and flexibility but the girls scored significantly higher on the measures of originality and total creativity than the boys. (iii) The high and low levels of alienation did not affect the creative ability of the individuals. (iv) Highly creative individuals also possessed significantly higher degree of ego-strength. (v) Creativity was in part a function of general intelligence. Both were positively and significantly correlated. (vi) There was no sex difference in alienation, ego-strength and intelligence scores among arts students. (vii) The science boys were more alienated than the science girls; on the other hand, the science girls were significantly higher on ego-strength, intelligence and creativity. (viii) The arts boys were more alienated than the science boys but they were significantly lower on ego-strength, intelligence and creativity. (ix) The science girls were significantly higher on ego-strength, intelligence and creativity than the arts girls but the arts girls were significantly higher on alienation. (x) The science students were significantly higher on ego-strength and intelligence than the arts students but lower on alienation. (xi) In general, the adolescent boys were more alienated than the girls but the girls were significantly higher on ego-strength and intelligence than the boys. (xii) Ego-strength and intelligence showed low and negative but significant correlation with alienation. (xiii) Ego-strength and intelligence were significantly and positively correlated.

***741.** VAIDYA, V.S., *Construction and Standardization of a Test of Mechanical Comprehension*, Ph.D. Edu., Poona U., 1982

The objectives of the investigation were: (i) to construct and standardize a test of mechanical comprehension, (ii) to study the test characteristics like homogeneity, reliability and validity, (iii) to find out grade-wise norms on students studying in engineering colleges, (iv) to study the influence of medium of instruction, experiential background and social caste of students on their test performance, and (v) to study whether the test could be used as a tool for the selection of engineering graduates for jobs.

The test was designed after the format of Bennett's Mechanical Comprehension Test Form CC. The test was standardized on the students of the engineering college in Pune, studying during the year 1978-1982. Sample size for item analysis was 449, and for norms 1,055. Standard procedures of item analysis, reliability and validity were used. Norms were calculated in terms of percentiles and stanines.

The main findings of the investigation were: (i) The test was homogeneous in composition and the reliability values obtained on most of the samples (which were comparatively homogeneous in nature) though low (around 80) were satisfactory. (ii) The standard error of the score obtained was between 3 and 4 score points and showed an acceptable level of accuracy of measurement offered by this test. (iii) The test measured mechanical comprehension ability and could predict performance of entrants to engineering colleges. (iv) The test scores showed increase with training. (v) The scores on this test were not heavily influenced by intelligence and showed significant relationship with scores on space relations and abstract reasoning. (vi) The test showed potential for use as a selection test for engineering colleges. (vii) It also showed potential for use as selection test to the engineering profession. (viii) At entry to engineering colleges, the medium of instruction at S.S.C. level, experiential and social class backgrounds of students influenced test scores, but these variables did not influence the test scores at the graduate level.