

TABLE V

FAMOUS SAYINGS TEST: MEANS, S.D.s, SKEWNESS AND KURTOSIS

VARIABLES	N	MEAN	S.D.	SKEWNESS	KURTOSIS
Fear of Failure	338	37.494	7.891	-0.376	0.227
Hostility	338	35.402	6.933	-0.170	0.487
Conv. Mores	338	45.698	8.231	-0.947	1.197
Soc. Acq.	338	35.817	7.811	-0.593	0.855
Stream	338	1.281	0.450	0.978	-1.049
Sex	338	1.160	0.367	1.866	1.489
Age (17-1)	338	1.914	0.925	1.121	1.607

TABLE VI

FAMOUS SAYINGS TEST: CORRELATION MATRIX

1. Fear of Failure	1.00						
2. Hostility	0.41 ^x	1.00					
3. Conv. Mores	0.33 ^x	0.11 ^x	1.00				
4. Soc. Acq.	0.58 ^x	0.35 ^x	0.53 ^x	1.00			
5. A or B Stream	0.14 ^x	0.00	0.01	0.11 ^x	1.00		
6. Sex	-0.05	0.00	-0.18 ^x	-0.09	-0.22 ^x	1.00	
7. Age	0.01	0.02	-0.02	0.04	0.00	0.36 ^x	1.00
	1	2	3	4	5	6	7

As shown in Table VII, reliability coefficients of above 0.69 were found for Fear of Failure; 0.65 for Hostility; 0.76 for Conventional Mores; and 0.82 for Social Acquiescence (except for the Loevinger reliability estimate which is known to be overconstructive, and in this case yields extremely low coefficients) any further iterations only lowered the reliability.

In general it can be said that the Famous Sayings test appears to be a valuable instrument for the assessment of motivation and personality factors. It is an ideal form of a projective test which is unstructured for the subject but fairly well structured for the tester. The typical examinee will not be able readily to perceive the measure assessed. The reliability obtained in South Africa is similar to that obtained in the United States.

TABLE VII

FAMOUS SAYINGS TEST; RELIABILITY COEFFICIENTS (N 238)

	FEAR OF FAILURE	HOSTILITY	CONV.M.	SOC.ACD.
Kuder-Richardson 20	0.692	0.659	0.765	0.828
Kuder-Richardson 14	0.693	0.661	0.767	0.829
Loevinger	0.010	0.009	0.009	0.010
Horst	0.672	0.641	0.742	0.815

This pilot study (Schmidt, 1969b) was undertaken to test a new creativity scale and to study its relation to other measures of creativity. In addition, the project was designed to investigate different scoring procedures for the newly designed test which was named Making Symmetric Designs.

Twenty-two (3 of these were female) third year architecture students served as Ss in this study (mean age: 22½ years). Ss were treated as a group and the following tests were given in the order mentioned:

1. The Preconscious Activity Scale (Holland & Baird, 1968), a creativity test on the personality level, consisting of 38 statements which had to be answered True or False;
2. Seeing Faults (Shapiro, 1965) a test of creativity at the verbal level consisting of three fault finding situations; and
3. The newly designed Making Symmetric Designs test. A test in which Ss had to construct as many different symmetric patterns of their own using three pieces of black paper of different shapes and sizes for each design.

The means and standard deviations were calculated for the sample and are shown in Table VIII. Table IX shows the correlation matrix of the variables measured. Variables 4 and 5 belong to the Making Symmetric Designs test (MSD), and show two different scoring procedures. Variable 4 scores items according to their frequency of distribution, in other words, if all Ss made the same design no credit was given, on the other hand, if only one S produced a design several points were given, etc. Variable 5 "simple total" gave one point for each design regardless of frequency of response.

TABLE VIII
MEANS AND S.D.s OF PILOT STUDY USING THE MSD TEST

VARIABLE	MEAN	S.D.
1. Age	22.682	3.014
2. Preconscious Activity S.	22.500	3.985
3. Seeing Faults	13.364	4.510
4. MSD* weighted total	23.591	9.719
5. MSD* simple total	10.864	2.950

*Making Symmetric Designs Test

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CORRELATION MATRIX OF P

VARIABLE	
1. Age	1
2. Preconscious Activity	- 0
3. Seeing Faults	- 0
4. MSD weighted total	0
5. MSD simple total	0

The intercorrel
systems used with the M
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data also suggests some
creativity. Age seemed
Seeing Faults test. Al
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of the three creativity
Scale, Seeing Faults an
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in the next chapter.

Forty-one (one of these was female) second year architecture students served as Ss in this experiment. Ss were treated as a group and the following tests were given in the order mentioned:

1. The Preconscious Activity Scale(PAS) (Holland & Baird, 1968), a creativity test on the personality level, consisting of 38 statements which had to be answered True or False;
2. the Consequences Test(Shapiro, 1965); a test of creativity at the verbal level consisting of three unlikely situations to which the S had to respond with possible consequences of such happenings; and
3. the newly designed Common Elements test. This test is related to Shapiro's (1965) Common Properties, where two words are given to the S and he has to find qualities which belong to both of these objects(example nail and song). Similarly, the new test does require the detection of common visual elements.

The means and standard deviations were calculated for the sample and are shown in Table X. Table XI shows the correlation matrix of the variables measured. The correlations are all positive. The correlation between the Consequences test and the Common Elements is significant at the 1% level. The results of the experiment suggest that there is an interaction between the three levels of creativity, this can be noted particularly from the intercorrelation between the measure of verbal creativity, the Consequences test, and the

newly designed Common Elements, which assumes to test creativity in the spatial field. The conclusion can be drawn from the results that each of the three creativity indices, - the Consequences Test, the Preconscious Activity Scale, and the newly designed Common Elements test - can be considered valuable contributions to the assessment of the different levels of creative ability in students of architecture.

TABLE X
MEANS AND STANDARD DEVIATIONS OF PILOT STUDY USING
COMMON ELEMENTS TEST

VARIABLE	N	MEAN	S.D.
Consequences Test	41	27.146	10.910
Preconscious Activity	41	20.439	6.760
Common Elements	41	28.927	6.536

TABLE XI
CORRELATION MATRIX OF PILOT STUDY USING THE COMMON ELEMENTS TEST

VARIABLE	1	2	3
1. Consequences Test	1.00		
2. Preconscious Activity	0.26	1.00	
3. Common Elements	0.47 ^x	0.16	1.00

^x significance level is above 1%

Summary of findings :

The following tests were administered and an assessment of their value as measuring instruments was made:

1. The MAS. A high internal consistency and a high reliability for the assessment of anxiety of South African students were found.
2. The Continuous Coded Addition test and the newly developed Work Attitude Scale. These two motivation scales showed some significant intercorrelations. Indications that they provide complementary, if overlapping, measures of motivation argues for the use of both tests in predicting motivation components of creativity.
3. The newly adapted Famous Sayings test. Moderate reliability for the Fear of Failure and the Hostility scale and good reliability for Conventional Mores and Social Acquisition suggested its usefulness for the main study in assessing personality and motivational factors.
4. The newly developed tests, Making Symmetric Designs and Common Elements: These tests correlated with other creativity tests and because of this show promise in assessing factors of creativity and visualization in students of architecture.

CHAPTER VMETHOD

The purpose of this study is an attempt to assess the predictive value of a battery of 14 tests in distinguishing between high and low creativity levels in architecture students. The tests were expected to provide personality profiles typical of the two creativity levels and also to show the relationship between the various aspects of creativity and academic success. The hypotheses were constructed to assist us to find the relationship of the 2 creative groups to the following:

- 1) field-independence/field-dependence, 2) motivation,
- 3) anxiety, 4) visualization, 5) hostility and dogmatism,
- and 6) academic success.

A. A Brief Outline of the Group Tested. This group consisted of all students who were registered as first year students in the Faculty of Architecture in 1969. The total number of persons in the group was 117 at the beginning of the academic year. The Faculty of Architecture consisted of four departments, each with the following number of first-year students:

1. Architecture	47
2. Quantity Surveying	19
3. Building Science	36
4. Town and Regional Planning	15
Total	N=117

With very few exceptions the ages of the students ranged from seventeen to twenty-one years. Twelve members of

the total group were females. The number of students decreased as the year progressed, so that at the end of the first academic year only 105 students were considered for the final examination. The reason for dropping out, in nearly all cases, was academic failure. The only exception was one student who had to leave because of financial difficulties. He later sat for the examinations and received credit for the year. Two female students left to take up a one year American Field-Service tour and so missed their examinations.

B. Testing. Since one biographical questionnaire and fourteen tests had to be administered, several testing periods had to be distributed over the academic year. The fourteen tests were administered in four testing sessions for each S, usually one or two months apart. It was not possible to test all Ss at one time. Students were tested in 4-6 sub-groups with one to five testers present. Each testing period lasted for between two and three hours with the exception of the last which took one hour. The following tests were given in the stated order for each subject.

First Testing Period

N = 117

1. Continuous Coded Addition
2. Work Attitude Scale
3. Taylor's Manifest Anxiety Scale
4. Seeing Faults

Second Testing Period

N = 110

5. Making Symmetric Designs test
6. The Preconscious Activity Scale
7. Consequences Test

8. Rokeach Dogmatism Scale

9. Pattern Relations

Third Testing Period

N = 110

10. Terman Concept Mastery

11. Gottschaldt Figures

12. Famous Sayings

13. Barron-Welsh Art Scale

Fourth Testing Period

N = 105

14. Common Elements

A relatively detailed description of the instruments used is considered necessary, as together they are intended to test the hypotheses operationally.

C. Field-independence/field-dependence

1. Gottschaldt Figures: This test is an Embedded Figures Test (E.F.T.). The version used in South Africa by the N.I.P.R. consists of 45 complex figures. Each complex figure contains one of five simple figures. The subject's task is to locate in the complex figure one of the simple figures. He is allowed 20 minutes to complete all items and his score is the sum number of all correct answers. Possible score from 0 to 45. Because of copyright no test can be shown in the appendix.

The fact that the E.F.T. showed high correlations with most of the scores based on tests of bodily orientation (the Tilting-Room-Tilting-Chair, Rotating Room, and Rod and Frame test) indicates that all procedures must make some similar demand upon subjects. Persons who did well with them seemed to have the ability to analyse a complex configuration and then to respond to some part of it, ignoring other parts.

Studies mentioned in chapter II under Field-dependence showed that this ability is related to temperament or personality characteristics as well as to special aspects of intelligence. Test-retest coefficients, by the N.I.P.R. after several years interval between administration were .89.

2. Pattern Relations: This is a test devised by D. Daneel (1968) at the N.I.P.R.. It is an adaptation of Raven's Progressive Matrices to South African conditions and has a reliability of 0.86. The test consists of 30 patterns each with a part missing. The subject has to find the missing part from six pieces labelled A, B, C, D, E, and F. There is no time limit and Ss are usually finished between 45 and 50 minutes. The test is copyright.

Progressive Matrices have been constructed for use with young children as well as old people, for anthropological studies and for clinical work. The matrices can be so arranged that they can deal satisfactorily with all kinds of people and situations. Raven (1947) mentions that it is often useful to describe the scale as an instrument of observation or clear thinking. The test is not a test of "general intelligence" and it would be a mistake to describe it as such. Each problem in the scale is really the "mother" or "source" of a system of thought and for this reason it is called "Progressive Matrices". The instrument has a re-test reliability varying, with age, from 0.83 to 0.93.

The use of the Pattern Relations in this experiment is as a bridge between intelligence, clear thinking, field-dependence/independence and creativity.

D. Intelligence: Terman Concept Mastery Test (C.M.T.) (1956) is a measure of ability which deals with abstract ideas at a high level and is suitable for university students. There are two parts to the test: I, the identification of synonyms and antonyms; and II, the completion of analogies. The items have been selected from a wide variety of fields, such as physical and biological sciences, mathematics, history, geography, literature, music and many others. There is no time limit for the C.M.T. but students completed it in less than forty minutes.

The C.M.T. has widely been used as an intelligence test, particularly with gifted children. It correlates highly with other intelligence tests. Reliability for the C.M.T. lies between .86 and 0.94. There is also an intercorrelation between the two sections of the test of about 0.75.

The C.M.T. was devised at Stanford University in 1939 for use in the follow-up study of the Stanford research with gifted subjects. This research started in 1921 with the now famous Terman longitudinal study of intellectually gifted children. Since no instrument was available that met the needs of this study, the C.M.T. was constructed. The name Concept Mastery was given because the test deals chiefly with abstract ideas. The recognition of abstractions is part of the higher thought processes and the person's ability to function at a high intellectual level depends in part on the number and variety of concepts within his reach and on the ability to see a relationship between them. Certainly, the test does not tap all kinds of intellect one might like to measure, but it seemed to test some of the intellectual

abilities which are assumed to be related to creativity. It also serves as a tool in the comparison between creativity and academic achievement.

E. Creativity and visualization: These have to be grouped together, because they are overlapping and part of each other. In general it will help if we divide creativity into verbal creativity, creativity at the personality level and creativity in the spatial field. The latter can be considered as belonging partly or wholly in the area of visualization.

1. Seeing Faults: This test was designed and validated by Shapiro (1965) and consists of three parts, each with a time limit of 5 minutes. Each part consists of the verbal description of a solution to a particular problem. The subject is to name as many possible faults or weaknesses in the proposed solution to the problem.

By adding the number of acceptable faults of the solutions a score is given. All duplications and incorrect answers are ignored. The final score is the score given for each of the three items, which have been added together. A reliability coefficient of .91 was obtained by means of a generalization of the Spearman-Brown formula.

The reason for using this test is that it measures verbal creativity and critical thinking and has been successfully used in South Africa. A sample of the test can be found in the appendix.

2. Consequences Test: This is also a test of verbal creativity and critical thinking. An unlikely situation is given to the subject and he has to respond with possible consequences of such

happenings. This test was also devised and validated for South African conditions by Shapiro (1965) with a reliability of .84. It consists of three new and unusual situations which have a five minute time limit each. Scoring is done as with the Seeing Faults test.

accomplished by
 3. The Preconscious Activity Scale: The development and validation of this originality measure was accomplished by Holland and Baird (1968). This creativity scale on the personality level consists of 38 statements which the subject can answer either True or False. Test reliability ranges from .70 to .77 for different samples tested. There is no time limit for this test and all Ss had completed the scale in less than 10 minutes. Scoring is accomplished by adding the correct answers mentioned on the scoring key. In other words, the higher the number of answers that agree with the score key, the higher is the subject's position on this scale of originality.

Holland and Baird (1968) mentioned that the high scorers have artistic, intellectual, and feminine interest. These people are consciously striving toward artistic goals and conceive themselves as being original, expressive, and well read. The predictive power of this scale suggests that it has plausible construct validity and is able to forecast a student's production of original, artistic products.

Finally, the main value of the Preconscious Activity Scale lies in its usefulness as an instrument for research in that it is inoffensive, moderately reliable, and possesses some validity for the identification and prediction of artistic and writing originality. A copy of the test can be found in the appendix.

4. Barron-Welsh Art Scale: The original scale was part of the Welsh Figure Preference Test, and went through several stages of modification. The present Barron-Welsh Art Scale (B.W.) consists of 86 items of which 24 figures are scored as like (L) and 36 figures as dislike (D) for a possible score of 60. The subject has to decide whether he likes or doesn't like each of the 86 drawings and mark his answer on a separate answer sheet. The test is copyright.

Of all the different scales of the Welsh Figure Preference Test the B.W. Art Scale has been most researched upon. The first form of the B.W. Art Scale consisted of 40 items disliked by artists significantly more often than people in general and 25 items liked by artists significantly more often. These 40 items which artists disliked were of simple symmetrical type, and the 25 items which were liked were of complex-asymmetrical type. A comparison demonstrated that the total score on the scale differentiated between creative artists and non-artists. This finding was also cross-validated on two other groups.

Aiken (1967) reviews the research on the Welsh Figure Preference Test and mentions that the test-retest reliability was between .76 and .79. He mentions that positive correlation was found for a group of male graduate students, between rated creativity and B.W. Art Scale scores. High scores, that is a preference for complexity on the B.W. Art Scale was positively related to verbal fluency, expansiveness, independence of judgment, originality, and breadth of interest, but negatively related to rigidity control of

impulse by regression, social conformity, ethnocentrism, and political-economic conservatism. Other studies mentioned by Aiken (1967) show similar findings.

5. Common Elements: As thoroughly discussed in chapter I (pp. 2 & 3) architects have not only to be creative on verbal tasks, but even more so on spatial tasks. Hence their creativity has also to be tested in the area of spatial tasks. Since no suitable creativity tests in the spatial field of creativity are available, this one and the next test mentioned have been developed by the author. The new test "Common Elements" is related to Shapiro's (1965) Common Properties, where two words are given to the subject and he has to find qualities which belong to both of these objects (example nail and song). Similarly, the new test will require the detection of common visual elements.

The test, Common Elements, consists of nine simple figures, called elements, marked A to I at the top of each page. Twenty-five pairs of more complex figures, similar to the Gottschaldt Figures, appear below them. Each pair of the abstract-complex geometrical figures contains at least one of the simple elements. The contained elements are geometrically similar to those at the top of each page. In other words they will be of the same shape, but need not be of the same size and can be rotated to orientations different from those at the top of the page. The subject has to establish which of the simple elements are common to both of the complex figures and has to fill in his answer on a separate answer sheet. The score is the number of correct answers given. Each element found in a

pair of complex figures will be given one point. There is no time limit. A pilot study has shown that 50 minutes should be sufficient. The obtainment of a reliability coefficient for this test is part of the study.

6. Making Symmetric Designs Test: The Making Symmetric Designs test (M.S.D.) was developed for the same reason as the Common Elements. It is related to the N.I.P.R. Form Perception Test which was devised by Schepers and copy-righted by him. In comparison to the Form Perception Test, the M.S.D. is an extended test. This test and the previous one were developed by the author to test the process of visualization in creativity. The M.S.D. is also a creativity test in the spatial field. In the M.S.D. the subject was asked to construct as many symmetric geometric patterns of his own using a strip of paper which could be dissected into three pieces of different form. He was to use one strip of black paper for each figure. A strip consists of a small rectangle (half a square), a larger triangle (double the size of the one) and a trapezium-shaped piece (a combination of two triangles); the three pieces are loosely joined together. The booklet had an example on the first page and the subject had to make as many of his own symmetric geometric patterns as he could, putting one on each page. A pilot study showed that 20 black strips and a time limit of 25 minutes should be sufficient for this task. In an experiment mentioned in Pilot Studies this test is discussed in greater detail. It is demonstrated that a positive correlation exists between the Preconscious Activity Scale, the Seeing Faults and

designed test. Since this test is an open-ended test no item analysis or reliability coefficient is possible.

F. Motivation and Anxiety: The subjects were given four tests to measure motivational factors.

1. The Continuous Coded Addition: This is a continuous work test developed and validated at the N.I.P.R. by Reuning (1968); it is similar to the Pauli test and provides objective scores, among others, of such aspects of work motivation as perseverance and drive. However we have to keep in mind that motivation is much more than merely perseverance and drive. The test is given for an hour, subdivided into 20 three-minute periods. The subject's work output per three-minute period can be measured. The following scores can be derived from the test: total score (quantity of work done), accuracy (few errors), neatness (few corrections), slope (increase in the output over testing time), convexity (position in time of performance maximum), fluctuations and initial drop. Some of these scores provide indices of "drive" or the "activity" dimension of temperament (Reuning 1968).

The checking for errors, corrections and omissions is the first step of the scoring process, since the counting of period scores, etc., depends on these earlier stages of marking. Then the scores for each three-minute period are measured. The Continuous Coded Addition has been used by the N.I.P.R. for over ten years and has been found to be a valuable instrument in the testing of drive and perseverance. The test has been found to be a valuable tool in a pilot study with architecture students and was therefore used in this study. For further details the chapter on pilot studies should be consulted. The test is copyright.

2. The Work Attitude Scale: This is a motivation scale, designed by the author, to be given after the Continuous Coded

Addition, and consisting of 38 statements, - some pertaining to the S's attitude towards the Continuous Coded Addition, and others to work motivation in general. The S is required to answer 'yes', 'no', or '?' to each statement. An item analysis of this test is part of the study. A copy of the Work Attitude Scale will appear in the appendix.

The Work Attitude Scale, which had been included in a pilot study given to students of architecture at the end of 1968, had shown highly significant correlations with certain parts of the Continuous Coded Addition; when Academic Success was later considered, the Work Attitude Scale showed a high correlation with this variable.

The scoring of the test is simple, the correct responses are added. Each statement has one point and there are 35 possible points. Three statements are seen as neutral. There is no time limit and all subjects had finished the task within ten minutes.

3. The Famous Sayings test: It attempts to provide an objectively scored personality test lacking structure for the examinee. The typical examinee will not be readily able to perceive the measures assessed. The ideal form of a projective test is one which is unstructured for the subject but fairly well structured for the tester. The Famous Sayings test is such an instrument where administration and scoring are completely objective. The Famous Saying test was developed by Bass (1958) and adapted to South African conditions by the author. It consists of 131 proverbs or famous sayings and is divided into four measures which test:

1. Conventional Mores (C.M.)
2. Hostility (HO)
3. Fear of Failure (F.F.) (motivation)
4. Social Acquiescence (S.A.)

Bass (1958) claims that with homogeneous samples, the first three measures tend to be reliable and relatively independent of each other. The last measure has a higher reliability and overlaps some of the first three. The relative independence of each of these measures should contribute to their utility in assessment.

Bass (1958) defines the four measures in the following fashion. High C.M. scores are associated with the tendency to accept as true, statements about the desirability and need to help others, to be generous, to be forgiving, to obey the dictates of one's conscience, to be virtuous, to maintain old friendships and form new ones, to be loyal, to be humble, to conform to custom and maintain faith. HO scores are high for people who agree that most individuals enjoy being aggressive and hostile, that it is best to do things alone, that one should avoid being indebted to others, that you should avoid joining organisations, that you should be alert for false friends and that you should ignore people of low ability. F.F. scores are associated with the tendency to accept as true the need to try as hard as possible to succeed, the desirability of ambition, fame, and achievement, and the danger of carelessness. People high in S.A. tend to accept any generalizations about human behaviour, even if they contradict each other. Such persons appear to be "outward-oriented", insensitive, non-intellectual,

socially uncritical individuals - unquestioning conformists to social demands.

Scoring is done with a key, and questions can be answered either A, like; B, don't know; and C, don't like. There are 60 possible points for each of the first three scales; for the last scale there are 56 possible points. There is no time limit and all students completed the Famous Sayings test in 20 minutes.

The Famous Sayings test was administered by the author to 338 South African College of Education students in a pilot study. The reliability for the subtests are the following: C.M. .76; HO, .66; F.F., .69; and S.A., .52. Any iteration did not increase the reliability.

For this section, motivational tests, only the Fear of Failure scale of the Famous Sayings test is applicable. The test is copyright, and for this reason does not appear in the appendix.

5. Anxiety: The Taylor (1953) Scale of Manifest Anxiety (M.A.S.) consists of those items from the Minnesota Multiphasic Personality Inventory judged by clinicians to be indicators of manifest anxiety. This scale has undergone several modifications; the form used in this experiment, is the last modification and consists of 28 items which have to be answered true or false, giving a range of scores from 0 - 28 (see appendix). The scale has been applied in several hundred studies as a search through the Psychological Abstracts will indicate.

Taylor claims that performance in experimental situations ranging from simple conditioning and reaction time

to therapeutic situations involved induced stress which is related to level of anxiety. For this reason the manifest anxiety scale was produced so that the amount of anxiety could more easily be recognised and ranged. The Anxiety Scale has been tested by Taylor and others (Taylor, 1953) and a reliability coefficient of .80 or better has been found. Taylor mentions that there is no significant difference between sexes, and that the scores tend to remain constant over a relatively long period of time.

The underlying assumption is that the drive level of the person is related to his level of internal anxiety or emotionality. High anxiety subjects are assumed to operate at a chronically increased drive level which should affect all their performances. Schmidt (1970a) using white South African University and College students made an item analysis of the M.A.S. and found reliability coefficients of 0.8, suggesting that this scale of anxiety is of equal reliability in this country as overseas.

G. Dogmatism and Hostility: These are two personality traits which are acting against openness to experience, a factor considered important for creative production. (Why openness to experience is important for creative production has been discussed in chapter III). To measure hostility, the hostility scale of the Famous Sayings test has been used which has already been discussed in the last section under motivation.

For the measure of dogmatism Rokeach's famous dogmatism scale has been employed. This test, the Personal Opinion Scale (Form E) can be found in the Appendix. According

to Rokeach (1960, pp. 12 ff) the fact that the scale became known not only as the "fascism scale" but also as the "authoritarian personality scale" gave rise to a certain amount of confusion. He explained that there are many individuals who are authoritarian and intolerant without being politically conservative. He claims that with his dogmatism scale he tries to cover alternative forms of authoritarianism, by tapping properties held in common by all forms of authoritarianism. His point of departure for the theory behind the Dogmatism Scale is his concept of 'belief' and 'disbelief system'. He conceives of the 'belief system' as presenting all the beliefs, sets, expectancies, or hypotheses, conscious and unconscious, that a person at a given time accepts as true of the world in which he lives. The 'disbelief system', on the other hand, is composed of a series of sub-systems rather than any single one, and contains all the disbeliefs, sets, expectancies, conscious and unconscious, that to one degree or another, an individual at a given time rejects as false. For Rokeach all belief systems have three major dimensions: a belief-disbelief dimension, a central-peripheral dimension and a time-perspective dimension. These dimensions are tied together by an open-closed mindedness system. He uses closed mindedness as synonymous with dogmatism, which concept he defines as "the extent to which a person can receive, evaluate, and act on relevant information received from outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from without" (1960, p.57).

In constructing the Dogmatism Scale, Rokeach scrutinized the various defining characteristics of open and

closed systems. The Dogmatism scale went through five and was repeated, refined. For the final version the Opinion Scale (Form E), which is used in this experiment. Rokeach found reliability coefficients of about .80. In the standardization procedure he used only college and university students.

The Personal Opinion Scale (Form E) consists of 100 questions and the subject has to mark each statement on an answer sheet according to how much he agrees or disagrees with it. He has to mark -3, -2, -1, or +1, +2, +3, depending on how he feels in each case. (However, for statistical reasons a range of 1 - 6 was used in the evaluation of the data.) There is no time limit for this test but all students had to complete it in less than 10 minutes.

H. Biographical Questionnaire: This questionnaire was constructed by the author to furnish further information concerning each subject. A copy is included in the Appendix. Items focus on age, sex, interests, educational qualifications, health, military experience and information regarding family and parents. On page 6 four items are included to give additional information about each subject's creative potential. The subject is required to rate himself on his degree of creativity. He has to choose the one of the four statements that is most accurate in describing him. On page 5 the subject is requested to give details of anything that he did that might be considered novel, original or imaginative. The reason for giving the Biographical Questionnaire was to obtain as much information as possible about the subject and

environment and to have an additional source of validation.

I. Criterion: The problem of finding a suitable criterion by which to measure creativity is particularly difficult when applied to first-year architecture students who, at this stage, have not yet had the opportunity to display what creative ability in the field of architecture they may have. However, an attempt was made at solving the problem in the following fashion. First, each individual student's creativity was divided into four sections and rated on a nine point Rating Scale by his lecturer. Second, two additional criteria were provided by information on self-rating scales in the Biographical Questionnaire. Third, MacKinnon (1962b) has mentioned that the creative architect was a "tolerably good student" at university, however Karlin and others (1969) point out that rated creativity in graduating architecture students was related less to academic achievement than to independent design projects. In our study independent design projects were one aspect among many others on which first-year architecture students were graded by their examiners. In view of the probably conflicting opinions regarding final examination grades and their correlation with creativity, it was felt that first-year examination results would not be reliable as a criterion but should nevertheless be used in conjunction with the six other criteria for the purpose of investigating its usefulness in this respect.

J. Summary of Hypotheses and Instruments. Fourteen tests or scales and a biographical questionnaire were administered and final examination grades were utilized to verify six hypotheses and to produce the personality profile of the creative and the successful first-year student of architecture. The summary table below indicates what instruments were used for which hypothesis. Academic Achievement, i.e. rating scales and final grades, was used as criterion.

TABLE XII

Summary Table of Hypotheses and Instruments

No.	Hypothesis	Instruments
1	Field-dependent Ss are less creative than field-independent Ss.	Gottschaldt Figures, Pattern Relations.
2	Highly motivated Ss are more creative than less motivated Ss.	Continuous Coded Addition, Work Attitude Scale, Famous Sayings Test.
3	Creative Ss display more "normal" anxiety than less creative Ss.	Taylor's Manifest Anxiety Scale
4	Highly creative Ss have a greater facility for visualization than less creative Ss.	Making Symmetric Designs, Common Elements.
5	Less creative Ss are more dogmatic than creative Ss.	Rokeach Dogmatism Scale
6	Academic achievement in students of architecture is related positively to creative ability.	Rating Scale and Grades

K. Statistical Treatment of the Results.

The following steps were taken in the statistical treatment of the results obtained in the final study. The details of the results will be reported and discussed in the next chapter in the same order as in the outline that follows.

1. Means and standard deviations were calculated for all the predictor test scores as well as for items from the biographical questionnaire, the rating scale and final examination grades.
 2. Reliability estimates were calculated for the following tests: Work Attitude Scale, Famous Sayings test, Rokeach Dogmatism Scale and Common Elements.
 3. Scores on the predictors, the criteria, the intelligence test, final examination grades and biographical information, were intercorrelated by Pearson's product-moment coefficients and a matrix of these intercorrelations was drawn up. The intercorrelations were examined in detail. The investigations were in the nature of an exploratory study. The 5% level of significance had been accepted by previous researchers and to accept any other level would have unduly complicated correlation of my results with those of my predecessors. The following accepted usage, "highly significant" indicates a significant level of 1%.
 4. A "total predictor score" was obtained for each student, by adding the standard measures on the predictors. Also the total score of the predictors was divided into the following areas according to the composition of the tests: verbal, spatial, personality and art appreciation.
- The 105 subjects were ranked according to their

total predictor score. In order to compare the high creative and the low creative subjects, the sample was divided. The high creative group consisted of the top ranking 53 subjects and the low creative the bottom 52 subjects. As the sample comprised an odd number of subjects the individual remaining after the median split was randomly assigned to the high creative group. Means and standard deviations were calculated for all variables for the high creative and the low creative groups, and a correlation matrix was supplied for each group.

5. A further criterion measure was provided in the biographical questionnaire, here the student rated himself on certain statements. The high and low creative students were compared, by means of chi-squares, on the ratings which they made. Additional biographical items were analysed by means t-tests in order to record the significance level between the H.C. and the L.C. group. The H.C. and the L.C. groups were compared on the basis of the ratings made by their first year lecturer on a 9 point Creativity Rating Scale. Chi-squares were computed to test the significance of differences in frequency of the "6 or better" rating given to the H.C.'s and the L.C.'s. The Final Examination Results were also compared by means of the Chi-Square test. The two groups

were also compared by means of t-tests on personality and other variables.

6. The statistical analysis focused on the creativity tests, which were intercorrelated with the various tests used to determine selected personality factors. Comparison among the different subgroups was made and profiles of the first year students of architecture, creative/noncreative, and successful/unsuccessful were provided. Profile analysis of the personality measures using multiple regression analysis were made to determine if profiles are at the same level or at different levels. Similarly, the efficacy of the creativity tests for predicting creativity was investigated by means of multiple linear regression.

CHAPTER VIRESULTSA. Means, Standard Deviations, and Skewness for all Subjects.

Table XIII represents the means, standard deviations and skewness for all tests which are concerned with factors of motivation and anxiety. Table XIV takes care of all creativity tests and factors and of other variables used later on in the correlation matrix and other parts of the analysis.

TABLE XIII

Means, S.D.s, and Skewness for Motivation and Anxiety Tests for all Subjects.

Variables	Mean	S.D.	Skewness
Taylor's MAS	8.11	4.53	0.78
Fear of Failure (Famous Sayings test)	36.50	8.21	-0.28
Work Attitude Scale	20.23	5.31	-0.64
Continuous Coded Addition (components)			
Total	1676.08	355.85	-0.09
Error	14.04	17.84	3.54
Correction	14.24	11.53	0.98
Accuracy	218.45	41.00	-0.34
Neatness	216.67	41.72	0.59
Initial Drop	3.98	7.77	4.78
Duration/ Init. Drop	2.01	1.33	1.32
Increase	0.93	0.64	-0.13
Slope	0.98	0.62	-0.07
Max. input./p. unit	14.62	4.43	-0.81
Convexity	2.46	1.64	-0.10
Early Increase	1.73	1.20	-0.05
Slope Difference	2.22	1.46	0.02
Fluctuation Difference	4.80	2.01	0.80
Fluctuation Maximum	4.71	1.63	1.20

TABLE XIV

Means, S.Ds, and Skewness for Creativity and other Variables for all Subjects

VARIABLES	MEANS	S.D.	SKEWNESS
<u>Creativity tests</u>			
Barron Walsh Art S.	26.71	12.31	0.02
Consequences	28.76	10.14	0.47
Seeing Faults	14.00	4.99	1.04
Precons. Activity S.	20.82	5.87	0.30
Making Sym. Designs	10.13	3.64	0.21
Common Elements	23.77	6.82	0.05
<u>Creativity Rating Scale</u>			
Spatial Expression	5.00	1.37	0.02
Spoken Expression	5.48	0.86	0.56
Written Expression	5.25	1.23	-0.07
Suc. Personal Interact.	5.63	1.06	0.00
Academic Success	0.59	0.338	-0.24
Creative Production	1.04	0.93	-0.08
Self-Rating	2.01	1.14	-0.49
Gottschaldt Figures	26.68	9.24	-0.04
Pattern Relations	13.82	5.57	0.34
Concept Mastery	49.46	22.99	0.72
Rokeach Dogma. Scale	145.16	22.86	-0.27
Hostility	36.03	7.20	0.09
Conventional Mores	37.92	9.72	-0.57
Social Aquiescence	30.15	9.61	0.06
Sex (M=0) (F=1).	0.095	0.30	2.80
Age	19.70	1.60	1.10
Religion	1.51	0.93	0.83
Language	1.12	0.33	2.32
Parents Job	1.59	0.49	-0.37
Military Serv.	0.78	0.77	0.40

It was considered unnecessary to normalize the scores since nearly all variables are not significantly skewed either positively or negatively.

B. Reliability Estimates

In addition, an item-analysis was carried out using the Kuder Richardson 14 and 20 formulas (Kuder & Richardson, 1937), as also Horst (1953) formula 21 for each of the mentioned tests below in order to assess the consistency of item selection and validity of individual test items with regard to total score.

Work Attitude Scale	$r = 0.78$
Famous Sayings test	
a. Fear of Failure	$r = 0.74$
b. Hostility	$r = 0.72$
c. Conventional Mores	$r = 0.74$
d. Social Acquiescence	$r = 0.83$
Rokeach Dogmatism Scale	$r = 0.83$
Common Elements	$r = 0.75$

C. Intercorrelation

Scores on all predictors, criteria, personality and intelligence tests, as well as other information from the Biographical Questionnaire were intercorrelated. Table XV represents a matrix of these intercorrelations (decimals omitted). Sex, Religion, Language, Parent's job and military experience were omitted from the table; These variables will be discussed later.

(1) The Predictors: From Table XVI which shows the intercorrelation matrix of the six creativity measures, it can be

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1 Making Symmetric Figures																						
2 Common Elements	18																					
3 Seeing Faults	18	04																				
4 Consequences	22	16	59																			
5 Baron Welsh Arts Scale	07	00	13	18																		
6 Preconscious Activity Scale	11	25	27	32	43																	
7 Rating Spatial Expression	18	-06	-05	-10	03	09																
8 Rating Spoken Expression	10	11	26	37	36	67	-02															
9 Rating Written Expression	09	03	-15	-15	-14	-30	37	-59														
10 Successf. Interpers. Contact	21	01	15	18	20	48	32	51	-21													
11 Final Exam. Grades	-01	-13	-03	-01	02	-06	41	-02	16	14												
12 Creative Production	01	01	20	29	16	38	06	41	-26	27	-09											
13 Self-rating	07	03	28	23	21	57	16	43	41	-44	-05	41										
14 Concept Mastery	21	09	36	36	18	45	04	40	00	28	11	16	32									
15 Gottschaldt	28	26	12	20	11	13	23	13	08	17	20	04	18	18								
16 Pattern Relations	11	26	08	11	05	19	19	12	01	07	15	05	24	23	38							
17 Rokeach Dogmatism	-05	-06	-26	-15	-19	-27	-09	-21	22	-23	-06	-06	-22	-27	-05	-02						
18 Hostility	-04	04	-11	-05	-10	-01	-09	-03	-08	-06	03	-02	08	-05	-02	14	48					
19 Conventional Morals	-07	-09	-27	-14	-17	-37	-04	-24	11	-14	05	-07	-22	-24	-12	07	43	28				
20 Social Acquiescence	-12	-02	-19	-17	-35	-45	-03	-35	21	-18	-01	-12	-20	-28	00	06	45	45	64			
21 Total	04	-04	00	04	-02	-03	-04	-03	-02	-07	01	-18	-06	11	17	28	16	02	05	09		
22 Error	04	07	02	08	-20	-01	07	04	-01	11	00	08	09	-05	-14	-09	-02	-08	-05	-03	-31	
23 Correction	06	-03	-08	03	-11	-08	16	-21	23	01	04	09	03	-13	16	19	19	18	26	31	02	03
24 Accuracy	-06	01	01	-02	12	-06	-11	-14	05	-19	-08	-17	-13	01	09	16	10	07	01	10	54	-82
25 Neatness	-03	05	12	26	17	09	-12	18	-18	-03	-06	-06	00	16	-10	-09	-16	-09	-22	-26	07	-08
26 Initial Drop	-03	-10	08	-04	-05	00	-07	-04	04	-10	04	01	-03	-09	-08	-06	-05	-14	09	06	-03	-05
27 Dur/Initial Drop	-01	-08	-06	-02	10	07	-16	-03	02	-13	-12	-05	09	-14	-05	03	06	13	00	03	-09	-10
28 Increase	-05	-02	07	00	06	05	08	12	-08	11	10	12	05	09	10	22	-03	-13	07	-03	23	05
29 Slope	-05	04	12	02	04	08	08	18	-13	16	09	17	10	07	08	19	-03	-13	01	-01	19	09
30 Max. Input Per Unit	-09	-06	-11	-12	07	02	03	04	-11	06	05	-05	-11	01	-13	-01	-02	-06	-07	-03	02	02
31 Convexity	08	06	-03	-03	04	02	10	-03	09	19	03	-02	-01	03	19	22	-12	-05	15	00	31	-09
32 Early Increase	-04	11	-08	-13	00	-01	-07	-08	02	14	00	-01	-04	01	10	12	-22	-03	12	03	21	-18
33 Slope Dif.	-04	09	-11	-11	-03	-03	01	-07	05	16	03	-03	-03	04	12	16	-19	-03	15	05	13	-12
34 Fluctuation Difference	-01	-14	-08	-07	-07	17	16	05	00	14	06	-04	05	-05	09	-12	08	-06	-10	04	13	17
35 Fluctuation Max.	-04	-23	-06	-12	-15	03	12	-08	08	05	05	-04	-04	-04	-05	-13	07	-04	02	09	17	02
36 Work Attitude Scale	05	13	-01	-03	-09	-14	06	-13	18	06	-02	-11	-12	-09	06	17	06	-16	32	32	18	-06
37 Fear of Failure	09	12	-01	-07	-18	-22	00	-17	11	-08	00	-12	-01	-20	05	16	46	58	50	58	-10	06
38 MAS Taylor	01	-08	11	16	14	21	00	16	05	-05	06	07	03	22	-06	-05	24	31	-07	-09	01	-15
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Correlation Matrix
(Decimal)

Continuous Coded Addition

[illegible]

observed that scores on the predictor tests intercorrelated positively and some of them at a high (0.01) level of significance. The correlation coefficient between single predictor variables ranged from 0.00 to 0.59. Of the fifteen correlations four reached significance beyond the 1% level and two others beyond the 5% level.

TABLE XVI

Interrelation Matrix: The Six Creativity Measures for all Subjects
(Decimal points omitted)

	1	2	3	4	5
1 Barron Welsh Art Scale					
2 Consequences	18				
3 Seeing Faults	13	59			
4 Preconscious Activity	43	32	27		
5 Making Symmetric Designs	07	22	18	11	
6 Common Elements	00	16	04	25	18

N = 105

Significance level (two-tailed)

5% level = 19

1% level = 26

The Barron Welsh Art Scale which measures artistic appreciation intercorrelated highly with the Preconscious Activity Scale, which is a measure of creativity as a personality dimension. This can be expected, since art appreciation and a feeling for novelty go hand in hand. But the Barron Welsh Art Scale did not intercorrelate significantly with the measure of verbal creativity, Consequences and Seeing Faults and Spatial Creativity, Making Symmetric Designs and Common Elements.

As can be expected, there was a highly significant

correlation between Consequences and Seeing Faults, both measures of verbal creativity. The Consequences Test also correlated highly significantly with the Preconscious Activity Scale. However, Consequences, (the measure of verbal creativity) correlated only at the 5% level with one measure of spatial creativity, namely, Making Symmetric Designs.

The other measure of verbal creativity, the Seeing Faults test, like Consequences intercorrelated highly significantly with the Preconscious Activity Scale, but not with spatial creativity, that is Making Symmetric Designs and Common Elements.

The Preconscious Activity Scale had a highly significant intercorrelation with one of the spatial creativity measures, Common Elements, the other measure Making Symmetric Designs did not quite reach the 5% level of significance.

The measures of spatial creativity, Common Elements and Making Symmetric Designs were reasonable high but not significant at the 5% level.

TABLE XVII

Intercorrelation Matrix: The Seven Criteria Measures for all Subjects (Decimal points omitted).

		1	2	3	4	5	6
1	Spatial Expression						
2	Spoken Expression	-.02					
3	Written Expression	.37	-.59				
4	Successful Interpersonal Contact	.32	.51	-.21			
5	Final Examination Grades	.41	-.02	.16	.14		
6	Self Rating	.16	.43	.41	.44	-.05	
7	Creative Production of student	.06	.41	-.26	.27	-.09	.41
		1	2	3	4	5	6

Significance level (two-tailed)

5% level = .19

1% level = .26

(ii) The Criteria: From Table XVII (an intercorrelation matrix of the seven criteria measures) we note that we have both positive and negative intercorrelations. The first part of the criteria is a 9 point rating scale which was completed by the first year lecturer for each subject. As explained in the first chapter, a successful or creative architect scores high on rated spatial expression, rated spoken expression, rated written expression and in successful or creative interpersonal contact. For this reason this rating scale was produced as an all-inclusive criterion for creativity in all its aspects in students of architecture.

If we examine the intercorrelation between the four parts of the scale we note that all intercorrelations are highly significant with the exception of Rated Spatial Expression and Rated Spoken Expression, (which do not correlate at all) and Rated Written Expression and Successful Interpersonal Contact are negatively correlated at the 5% significance level. In this sample there seems to be no relation between judged Spatial Expression and Spoken Expression. Also a person who is judged high on Written Expression is judged low on Interpersonal Contact and vice versa. It is interesting to note that a person who is judged high in expressing his creativity orally is judged low in expressing his creativity in written form. Also a subject who is rated high on Spatial Expression is rated high on Rated Written Expression and Successful Interpersonal Contact. However, a person who can express his creative ideas orally has also a successful relationship with other persons.

In view of the conflicting opinions regarding examination results and their correlation with creativity, it was felt that first-year grades would not be reliable as a criterion but should nevertheless be retained in conjunction with other criteria for the purpose of investigating its usefulness in this regard. In the current study the other criteria used were the four sections of the Teacher's Rating Scale and two self-rating scales. The fact that grades correlated positively with only one of the other criteria, Rated Spatial Expression, could merely emphasise the importance of other factors involved in academic success, such as motivation and maturity. This, however, does not detract from the fact that first-year grades do appear to be related in some way to Rated Spatial Expression, a faculty which is essential to success in the field of architecture.

The Biographical Questionnaire had a Self-Rating scale which is more closely analysed in section E of this chapter. The scale has been rearranged so that self-rated average creativity was at the lower end and self-rated high creativity at the other end. Intercorrelations here are positive at the 1% level of significance. A subject who rated himself high was judged as high on points 2, 3, and 4 of the Teacher's Rating Scale. There was no intercorrelation between Self-Rating and Rated Spatial Expression. Self-Rating and Academic Success did not correlate. A person who rated himself high on creativity did not necessarily perform equally well on his final examination. However, a person who mentioned that he produced something that might be considered novel or original had a high Self-Rating. The intercorrelation between Self-Rating and Creative Production of the student was above the 1% level of significance.

In the Biographical Questionnaire the student was asked to mention if he had produced anything which might be considered novel. If he did not mention anything or it did not appear to be novel according to his own explanations or lack of them, he

was given a 0, the grade 1 was given for one creative product, 2 for more than one. Here we have a highly positive intercorrelation between Creative Production of the student and judged Rated Spoken Expression and also with Successful Interpersonal Contact. We have a highly significant negative correlation between Creative Production of the student and Rated Written Expression and a highly significant intercorrelation between Self Rating and Creative Production of the student.

The ipsative nature of most of the criteria measures must also be recognized. Each rater, that is teacher and student, bases his ratings on his own personal subjective standards, irrespective of the type of question he is answering.

(iii) The Predictors and the Criteria: The results (Table XV) appear to be promising because five of the seven criterion measures correlate significantly with at least some of the predictors. However, it is apparent that certain criterion scores are better in this respect than others.

It is interesting to note that the second part of the Teacher's Rating Scale, Rated Spoken Expression, correlates highly significantly with all creativity tests, with the exception of Spatial Creativity, i.e. Making Symmetric Designs and Common Elements. We have to admit that the criterion measure which is best predicted in this study is the section of the rating scale, Rated Spoken Expression.

The best single predictor, as evidenced by its high correlations with five criteria, is the Preconscious Activity

Scale. The correlations are all significant at the 1% level. The two criteria with which the Preconscious Activity Scale does not correlate are Rated Spatial Expression and Final Examination Results. All highly significant correlations (1% level) are positive with the exception of Rated Written Expression which is negative.

Rated Successful Interpersonal Contact intercorrelates at the 5% level with two creativity tests, Making Symmetric Designs and the Barron Welsh Art Scale. The criterion Creative Production of Student rated highly significantly with Consequences test and the Preconscious Activity Scale and it rates above the 5% level with Seeing Faults. The highest correlation coefficient obtained is between the Preconscious Activity Scale and the rating of Rated Spoken Expression. The Self-Rating Scale correlated significantly with four of the predictors.

On the basis of the above findings, several brief assumptions can be ventured. First, there appears to be definite evidence of validity for the battery of all but one of the predictor tests used in this study. Second, it appears that students of architecture are able to assess their own creative potential. Thirdly, academic success appears to have no relation to any of the predictors. Fourth, the results lend support to the idea that there are at least quantitative, if not qualitative, personality differences between high and low creative students of architecture.

(iv) Intelligence: As a measure of intelligence Terman's Concept Mastery was used. This intelligence test correlated

highly significantly with three creativity tests, Seeing Faults, Consequences, and the Preconscious Activity Scale (Table XV). It also correlated at the 5% level with Making Symmetric Designs. There was also a correlation at the 1% level of significance between intelligence and three of the criteria, Rated Spoken Expression and Successful Interpersonal Contact, and Self-Rating.

A highly significant negative correlation was also found between intelligence and Social Acquiescence. Negative correlation above the 5% level of significance was found between intelligence and Conventional Mores and the motivation scale, Fear of Failure. Positive correlations at the 5% level of significance appeared between intelligence and Pattern Relations, as also between intelligence and Manifest Anxiety.

There appears to be nearly no relationship between intelligence and academic success. However some relationship can be noted between intelligence and creativity, as shown by the correlation between intelligence and creative predictors and criteria. This suggests that these tests require a certain amount of convergent thinking ability next to divergent thinking ability.

(v) Field-dependence- Field-independence: The Gottschaldt Embedded Figures and Pattern Relation were utilized as tests for the field-dependence/field-independence dimensions. Both tests intercorrelate extremely highly with each other and with the Common Elements, a test of spatial creativity, at the 1% level (Table XV). This relationship appears to be useful when the visualization factor is investigated.

Gottschaldt Figures correlate also highly significantly with Making Symmetric Designs which is another test of spatial creativity. There were also correlations at the 5% level of significance between the Gottschaldt Figures and Consequences, Rating Spatial Expression and Final Examination Grades.

There exist also significant correlations between Pattern Relations and Preconscious Activity Scale, Rated Spatial Expression, Self-Rating and the measure of intelligence, the Concept Mastery test. Pattern Relations is also correlated at the 1% level of significance with the "Total" component of the Continuous Coded Addition.

(vi) Motivation: As measures of motivation we used the "objective" test, Continuous Coded Addition, and as "subjective" tests the Work Attitude Scale and the Fear of Failure component of the Famous Sayings test.

Continuous Coded Addition consists of several components which measure motivation and also perserverance, and many of these components intercorrelated highly with each other (Table XV). The Component "Total" correlates highly with Pattern Relations. Error correlates negatively with the Barron Welsh Art Scale at the 5% level. Corrections give us a highly significant correlation with Conventional Mores and Social Aquiescence; and also correlate at the 5% level of significance with Dogmatism, and Rated Written Expression, having a negative correlation with Rated Spoken Expression. There is also a negative correlation at the 1% level of significance between Neatness and Social Aquiescence, and Increase. Slope and Convexity is correlated at the 5% level of significance

with Pattern Relations. Convexity is also correlated at the 5% level of significance with the Gottschaldt Figures and Rated Successful Interpersonal Contact. Slope Difference has also a significant negative correlation with Dogmatism.

The Work Attitude Scale which was given after the Continuous Coded Addition correlated at the 1% level of significance with several parts of this test, e.g. positively with Slope, Convexity, Early Increase, Slope Difference and negatively with Fluctuation Difference; it correlated at the 5% level with Correction, and Increase and negatively at the same level with Duration, Fluctuation Maximum, Neatness and Dur/Initial Drop. The Work Attitude Scale also correlated very highly with Conventional Mores and Social Acquiescence.

Fear of Failure component of the Famous Sayings Test at the 1% level of significance correlated positively with Correction and negatively with Nearness, both components of the Continuous Coded Addition. There are high correlations between Fear of Failure and Dogmatism, Hostility, Conventional Mores and Social Acquiescence; and negative correlations between Fear of Failure and the Preconscious Activity Scale, a creativity measure, and Concept Mastery, the measure of intelligence. Both motivation scales, the Work Attitude Scale and the Fear of Failure, correlate significantly with each other.

(vii) Anxiety: The Taylor Manifest Anxiety Scale correlates negatively with several components of the Continuous Coded Addition, e.g. at the 1% level of significance with Early Increase and Slope Difference and at the 5% level with Increase, Slope and Convexity (Table XV).

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