THE RELATIONSHIP BETWEEN CREATIVITY AND FLUID INTELLIGENCE

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TABLE OF CONTENTS

Introduction	1
Historical Perspective	4
Method of Investigation	15
Results	18
Summary and Conclusions	19

LIST OF TABLES

Table 1-A	Occupational Scale
Table 1-B	Educational Scale
Table 2-A	Factor Weights
Table 2-B	Conversions of Scores to Social Class Position
Table 3	Distribution of Subjects by Age and Sex
Table 4	Statistical Properties of Variables
Table 5	Intercorrelations among the Variables

ABSTRACT

The purpose of this study was to determine if there is a significant relationship between fluid intelligence and creativity. A correlation of .24, significant at the 10 percent level of significance, was found between the two variables. Of the four subscores of the creativity test, only one, Elaboration, correlated significantly with fluid intelligence.

Socioeconomic status and grade-point average were also correlated with the two variables. No significant correlations were found.

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INTRODUCTION

Statement of the Problem. The purpose of this study is to determine if there is a significant relationship between creativity and fluid intelligence. Results of previous research on the relationship between creativity and intelligence are contradictory. Three findings appear in the available research: 1. There is no significant relationship between creativity and intelligence; 2. There is a significant, possibly high, positive correlation between intelligence and creativity; 3. There is a positive correlation between creativity and intelligence up to a certain level of intelligence, after which there ceases to be a significant relationship. A high level of intelligence is a necessary, but not sufficient, condition for creativity.

Factors associated with either or both variables may have led to this confusion. The fact that different measures of intelligence and different measures of creativity were used in previous research may explain in part the contradictions. Different tests of creativity may sample different abilities. Some intelligence tests may rely more heavily on certain abilities than do other tests.

According to Cattell's theory, there are two general factors of intelligence, crystallized and fluid intelligence. Most traditional intelligence tests measure crystallized intelligence, an

ability largely determined by educational experience and cultural opportunity. Fluid intelligence, postulated to be an innate capacity to perceive complex relationships, is measured by Cattell's Culture Fair Intelligence Test, which is, theoretically, relatively free from cultural bias.

Most of the research exploring relationships between intelligence and creativity has employed tests which measure crystallized intelligence rather than fluid intelligence. A test of fluid intelligence, Cattell's Culture Fair Intelligence Test, is employed in the present study because, according to Cattell, it is a measure of native intelligence. It is hypothesized that there is a significant positive relationship between fluid intelligence and creativity. Creativity was measured by the Figural Form of Torrance's Tests of Creative Thinking. It is realized that generalizations from the results of this study may be limited. For the purposes of this study, intelligence and creativity are the abilities sampled by the Culture Fair Intelligence Test and the Tests of Creative Thinking, respectively; these may not be the same as abilities sampled by other tests of intelligence and creativity.

Two additional variables, grade-point average and socio-economic status, will be considered in relationship to the major variables.

Importance of the Problem. Because of contradictory findings, more research needs to be done in the area of creativity and intelligence. It is difficult to accept or reject any theorist's position on the basis of previous research.

The development of intelligence and creativity are both, supposedly, goals of our educational system. If the findings of various research projects show conclusively that intelligence and cr ativity are unrelated, there will be implications for our educators. The present emphasis in the educational system on intelligence test scores perhaps is leading to the neglect of creative abilities. Some researchers are convinced that measures of creativity should be used to select students for scholarships and fellowships. More knowledge of the relationship between creativity and intelligence will be useful in evaluating our educational system and in making innovations in the future.

Definitions. The variables to be studied are defined as follows:

FLUID INTELLIGENCE. Fluid intelligence is a "general relation-perceiving capacity, independent of sensory area, and it is determined by the individual's endowment in cortical, neurological-connection count development." (Cattell, 1969). For the purposes of this study, fluid intelligence is defined as the score on Cattell's Culture Fair Intelligence Test.

CREATIVITY. On the basis of his analysis of the many different ways of defining creativity, Torrance (1965) defines creativity as

> the process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses and possibly modifying and retesting them, and, finally, communicating the results. This definition describes a natural human process.

For the purposes of this study, creativity is defined as the

score on the Figural Form of Torrance's Tests of Creative Thinking.

GRADE-POINT AVERAGE. The average of grades earned in classes at Appalachian State University, on a scale from 0 to 4.

SOCIOECONOMIC STATUS. Position in the status structure of American society, defined for the purposes of this study by the score on Hollingshead's Two Factor Index of Social Position (Hollingshead and Redlich, 1958).

HISTORICAL PERSPECTIVE

Basic Theory: Fluid Intelligence. According to Cattell (1963), there are two general factors of intelligence: crystallized general intelligence and fluid general intelligence. Evidence for the existence of these two general factors is found in factor-analytic studies (Cattell, 1940; Cattell, 1963; Horn and Cattell, 1966; Humphreys, 1967). Crystallized intelligence is shown in culturally acquired judgmental skills--habits of logical reasoning, vocabulary, numerical skills, and a well-stocked memory (Cattell, 1969). Many of the subtests included in traditional intelligence tests are high in crystallized intelligence, such as subtests of vocabulary size, word analogies, and classifications involving cultural knowledge of objects. Fluid intelligence is high on tests considered culture fair, such as perceptual and performance tests, and specially developed tests of judgment and reasoning.

Cattell (1969) reports that the two general factors of intelligence were not known until techniques of factor analysis

were developed which were sophisticated enough to identify them. Spearman (1927) with factor analysis identified one general factor of intelligence. Later, Thurstone (1938) with multiple factor analysis identified twelve primary mental abilities. Spearman's "g" then became a second-order general factor of intelligence. Cattell's advanced techniques allowed him to divide "g" into two general factors of intelligence.

Cattell (1963) defines crystallized intelligence as "skilled judgmental abilities which have become crystallized as a result of earlier learning application of some prior, more fundamental general ability to these fields". Fluid intelligence is a "general relation-perceiving capacity, independent of sensory area, and it is determined by the individual's endowment in cortical, neurological-connection count development" (Cattell, 1969). Persons high in fluid intelligence would be able to perform at a high level in novel situations, in which crystallized intelligence would be relatively useless.

Crystallized intelligence depends partly on the innate fluid intelligence, so the correlation between the two abilities is positive (Cattell, 1969). Individual discrepancies between crystallized intelligence and fluid intelligence will, before biological maturity, reflect mostly differences in cultural opportunities and interests. For adults, discrepancies between crystallized and fluid intelligence may also reflect the fact that fluid intelligence follows a biological growth curve (Cattell, 1969). Fluid intelligence reaches a plateau at about fourteen years and begins to decline at about twenty-two years.

Crystallized intelligence shows increases to eighteen years and beyond and usually keeps its level as long as the individual is involved in cultural endeavors.

Traditional intelligence tests measure crystallized intelligence. A test which could measure fluid intelligence would have to be relatively free of cultural influences. To devise a test which would not be culturally loaded, one would have to draw from a body of knowledge common to all cultures or from a body of knowledge so novel that no one culture would have an advantage over the others (Cattell, 1940). Knowledge common to all men would include common objects, such as the human body; sun, clouds, stars; fire, smoke; etc.; common processes, such as breathing, sleeping, eating. The difficulty with this method is that the same objects may have different meanings in different cultures (Cattell, 1940). In Cattell's test of fluid intelligence, the Culture Fair Intelligence Test, he uses common objects, but in such a way that only perceptual knowledge of the objects is required. He also includes some novel perceptual objects that would have no particular meaning in any culture.

Basic Theory: Creativity. Many different definitions have been given for creativity, ranging from those which define creativity as a rare and unusual gift to those which define creativity as an ability which almost all individuals possess to some degree.

Torrance (1969) defines creativity as

> a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for so-

> solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses, and possibly modifying and retesting them; and finally, communicating the results.

According to this definition, creativity is a natural, rather than a rare, human process.

Torrance developed Tests of Creative Thinking, a battery of tests consisting of tasks which are models of the creative process. There is both a figural and a verbal form of the battery. The tasks are evaluated in terms of four of Guilford's divergent thinking factors--fluency, flexibility, originality, and elaboration.

According to Guilford (1968), there are different types of creative abilities, of which the four used by Torrance are a part. Fluency is the ability to produce a large number of ideas within a specified time. Flexibility is the ability to change sets with ease. Originality is the ability to produce novel ideas or responses. Elaboration is the ability to add details to the bare outline of an idea. Guilford (1968) says that these abilities are similar in that tests of them require a variety of answers. There is no one right answer. Guilford (1968) makes a distinction between two major classes of abilities: divergent thinking and convergent thinking. The four abilities described above would belong to the divergent thinking category. Convergent thinking is exemplified by tasks in which the individual must arrive at a specific right answer.

Intelligence and Creativity. According to Getzels and Jackson (1969), creativity and intelligence are relatively independent phenomena. Using adolescent subjects, Getzels and Jackson

attempted to discover variables which distinguish the creative person from the intelligent person. The creativity tests used were taken from Guilford and Cattell, and some were constructed especially for the study. Intelligence was determined by the score on either the Binet, Wechsler, or Henmon-Nelson, one of which was available for each student. Two experimental groups were formed, a high creativity group, consisting of the top twenty percent in creativity who were not simultaneously in the top twenty percent in intelligence, and a high intelligence group, consisting of students in the top twenty percent in intelligence who were not simultaneously in the top twenty percent in creativity. Among other things, Getzels and Jackson found that, despite differences in mean intelligence, the high creativity group and the high intelligence group were equally superior to the total population in school performance (measured by standardized achievement tests).

The Getzels and Jackson study prompted much research, and also some criticism. Flescher (1963), replicating the study, did not get the same results. Using sixth-grade subjects, he found no positive relationship between creativity and intelligence. One of the creativity scales was inversely related to intelligence. (Some critics claim that Getzels and Jackson do not report it, but that there was a moderate positive correlation between intelligence and the majority of their creativity scales.) Two-way analysis of variance showed that intelligence played a significant role in scholastic performance. Creativity was not determined to be related to academic success.

Edwards and Tyler (1965) also replicated the Getzels and Jackson study without getting the same results. The high intelligence group was superior to the high creative group on both grade-point average and scores on an achievement test. To explain the discrepancy between Getzels and Jackson's findings and the findings of others, it had been hypothesized that below some critical level of intelligence, intelligence is a major determinant of achievement, but above this level, creativity is more closely related to achievement. To test this hypothesis, the high intelligence group was compared with the group high on both intelligence and creativity. The groups did not differ significantly on achievement test scores but the "twice-talented" group was significantly lower on grade-point average.

It seems that the findings of the Getzels and Jackson study are limited. In addition, DeMille and Merrifield (1962) criticize the methods of the study. They say that proper statistical techniques are not employed and that dividing subjects into groups high on one variable and low on the other is meaningless if the "high-highs" and"low-lows" are ignored. McNemar (1964) echoes DeMille and Merrifield's criticisms, criticizing also the failure of Getzels and Jackson to report the correlation of creativity with intelligence. The median intercorrelation of the five creativity tests was only .28. From Getzels and Jackson's published data, McNemar found the correlation of intelligence and creativity to be .40, which McNemar considers to be greatly attenuated because of three factors: 1. usual measurement errors; 2. highly selected subjects on intelligence (mean, 132); 3. intelligence

scores which were a mixture from three different scales--Binet, Henmon-Nelson, and Wechsler. It seems that the correlation of intelligence and creativity in Getzels and Jackson's study is much higher than they lead one to believe. McNemar (1964) found seven replications which supported Getzels and Jackson's findings, but, he says, only because these studies repeat the same faulty design and false logic.

Some other studies report positive correlations of intelligence with creativity. Yamamoto (1964) reports an r of .3 between Torrance's Tests of Creative Thinking and the Lorge-Thorndike Intelligence Test, using adolescent subjects. Using Torrance's Tests of Creative Thinking with disadvantaged Southern children, Bruininks and Feldman (1970) found low positive r's between intelligence and creativity, ranging from .18 to .31. Guilford and Hoepner (1966) found a mean correlation of .32 between divergent production test scores and intelligence (California Test of Mental Maturity) for ninth-graders. Torrance (1962) reports correlations of creativity with various intelligence tests ranging from -.16 to .32. Nguyen (1970) found a high positive correlation between intelligence and creativity. Using a battery of twelve creativity tests, some developed by Guilford, Thurstone, and Cattell and some devised by Nguyen, and Raven's Progressive Matrices, Nguyen found a correlation coefficient significant beyond the .005 level. McNemar (1964) reports an r of .67 between creativity and intelligence for 7,648 fifteen-year-olds in Project Talent. Corrected for attenuation, he says, this r becomes .80.

Some other studies find no significant relationship between creativity and intelligence. In Cox's (1969) factor-analytic study using Torrance's Tests of Creative Thinking, figural creativity scores were independent of the intelligence and achievement factor and were also independent of a third factor. Verbal creativity scores were independent of the factor accounting for intelligence and achievement and also independent of the figural creativity factor.

Another factor-analytic study, done by Lichtman (1969), indicates that intelligence and creativity are different aspects of human behavior. Lichtman tested preschool disadvantaged black children, using the Wechsler Preschool and Primary Scale of Intelligence, the Figural Form of Torrance's Tests of Creative Thinking, and the Mother Goose Test (a verbal test of creativity). Massad's (1967) factor-analytic study again showed intelligence and creativity to be independent. Massad also found a difference in the quality of the process underlying creativity for middle and low socioeconomic level children.

Herr, Moore, and Hansen (1965) found no significant correlation between scores on Guilford's Test of Creativity and scores on the Lorge-Thorndike Intelligence Test and the Terman Concept Mastery Test. Flescher (1963) found no significant relationship (r of .04) between scores on seven creativity tests and California Test of Mental Maturity for sixth-graders.

Using Guilford's Test of Creativity, Kanderian (1969) found that three of the subtests and the total score did not correlate significantly with school achievement or intelligence as measured

by Cattell's Culture Fair Intelligence Test and the Primary Mental Abilities Test. The fourth subtest (Fluency) correlated highest (r of .45) with school schievement. The Cattell Culture Fair Intelligence Test also correlated significantly (r of .45) with school achievement.. There was a significant correlation between socioeconomic status and school achievement, Primary Mental Abilities scores, and Culture Fair Intelligence Test scores. There was no significant correlation between Test of Creativity scores and socioeconomic status.

Wallach and Kogan (1965) criticize many studies, saying that they do not show that the intercorrelation of creativity measures is high and that the intercorrelation of creativity tests with intelligence tests is low. Using a battery derived from Guilford, Wallach and Kogan found a correlation among creativity measures of .5 and among intelligence measures, .5. The intercorrelation among intelligence tests and creativity tests was found to be -.1.

A general criticism sometimes made of studies of creativity and intelligence is that paper and pencil tests are all too often used rather than real-life measures of creativity. Dellas and Gaier (1970) say that a test of creativity is not "creativity". The tests may tap a low level of creativity, very different from real-life creativity. McNemar (1964) also objects to the use of paper and pencil tests of creativity. According to McNemar, if we have real-life criteria of creativity, the relationship between intelligence and creativity would be this: at the high intelligence levels there would be a very wide range of creativity, and going down to average intelligence and lower, the scatter for

creativity would be less and less. McNemar (1964) says that "having a high IQ is not a guarantee of being creative; having a low IQ means creativity is impossible."

Judging creativity from real-life criteria may not be as easy or as valid a procedure as McNemar implies. Cattell (1968) discusses the difficulties. Whether an artist is judged creative would depend upon which school of art is in vogue. The task may be easier in science than in literature, art, or music. Even in science, however, Cattell has doubts, for the scientist who receives the most acclaim from his peers is usually the one who is impressive without being disturbing or controversial. Holland (1959) points out the difficulties of using teachers' ratings of students' creativity. Teachers tend to prefer low creative students more than high creative students and may tend to confuse or equate high intelligence with high creativity.

Studies which have used real-life ratings of creativity are no more conclusive than the studies which used tests of creativity. Most of the studies reviewed which used rated creativity found no correlation between creativity and intelligence, but the subjects in most of the studies had a very high level of intelligence. The only study (Nuttal, 1969) not so restricted in intelligence range found a significant correlation between intelligence and creativity.

MacKinnon (1962) found that architects' rated creativity correlated about 0 (r of -.08) with intelligence as measured by Terman's Concept Mastery Test. Karlins, Schuerhoff, and Kaplan (1969) found that rated creativity of advanced architectural students did not correlate significantly with intelligence or

academic achievement.

Holland (1961) rated the creativity of a random sample of National Merit Finalists by a self-checklist of accomplishments assumed to require creativity. Creativity measured in this way was unrelated to scholastic aptitude and scholastic achievement.

Barron (1963) found that rated creativity of artists correlated about 0, or slightly negatively, with scores on Terman's Concept Mastery Test. Barron (1968) states that studies of highly creative people show that highly creative people have IQ's in the upper five or ten percent, but that within this range, intelligence is not related to creativity.

A study by Nuttal (1969) found that teacher-rated creativity of a group of ten-year-old boys was positively correlated with intelligence, grades, and achievement test scores.

Summary of the Literature. The findings of the studies exploring the relationship between creativity and intelligence are contradictory. Some of the studies are poorly designed and have been criticized extensively. Most of the studies come to one of the following conclusions: 1. There is no significant relationship between intelligence and creativity; 2. There is a positive relationship between intelligence and creativity; 3. Above a certain critical level of intelligence, there is no significant relationship between creativity and intelligence, but below this level, there is a positive correlation between intelligence and creativity.

Studies which employ tests of creativity rather than real-life criteria have been criticized. Real-life criteria, however,

may not always be valid. Studies using rated real-life creativity often find no significant relationship between intelligence and creativity, but range of intelligence is usually restricted in these studies, the subjects being of very high intelligence.

METHOD OF INVESTIGATION

Restatement of the Problem. The purpose of this study was to determine whether there is a significant relationship between fluid intelligence and creativity. The hypothesis prompting the study was that there is a significant positive correlation between creativity and fluid intelligence. The correlation of socio-economic status and grade-point average with the two major variables was also examined. There was a total of three null hypotheses tested in this study:

1. There is no significant correlation between creativity and fluid intelligence.
2. There is no significant correlation between socioeconomic status and any other variable.
3. There is no significant correlation between grade-point average and any other variable.

Instruments. Form A, Scale 3 (Superior Adults) of Cattell's Culture Fair Intelligence Test was used to measure fluid intelligence. The test consists entirely of perceptual, or figural items. There are four timed subtests: Series, Classifications, Matrices, and Conditions. The total time allowed to complete the test is 12½ minutes, excluding the time allowed for instructions and for samples. The test design includes samples--a "practice section"--

at the beginning of each subtest to supplement the verbal instructions. The items in each subtest are arranged in the order of increasing difficulty. In the first subtest, Series, the subject is given a series of three figures and must choose, from five possible answere, the fourth which would logically follow in the series. In the Classifications subtest,the subject is given five figures, three of which are alike in some way, and two of which are different from the others. The subject must identify the two different figures. The Matrices subtest requires the subject to choose the correct square to fit into the missing space of a large drawing. In the Conditions subtest, the subject must choose a figure which would allow the placement of a dot under the same conditions as the placement of the dot in the given figure.

Creativity was measured by Form A of the Figural Form of Torrance's Tests of Creative Thinking. There are three subtests: Picture Construction; Incomplete Figures; Repeated Figures.

For Picture Construction, the subjects are required to draw a picture using a pear-shaped piece of colored paper with adhesive backing. The shape is to be placed anywhere on the paper the subject wishes and is to be placed for originality and elaboration. Originality is encouraged by instructing the subject to think of something that no one else would think of. Elaboration is encouraged by instructing the subject to make the picture tell as complete and interesting a story as possible. There is a time limit of ten minutes.

The Incomplete Figures subtest requires the subject to draw

a picture for each of the ten figures given. The time limit is ten minutes. Each figure is scored for originality, elaboration, and flexibility.

The Repeated Figures subtest is similar to the Incomplete Figures subtest, except that the stimulus material for this task is 30 sets of parallel lines. The subject is required to develop and elaborate a picture for each set of lines. Each item is scored for fluency, flexibility, originality, and elaboration. Fluency is encouraged by the instructions: "See how many objects or pictures you can make"; Flexibility, by the instructions: "Make as many different pictures and objects as you can; Originality, by the instructions: "Try to think of things that no one else will think of"; and Elaboration, by the instructions: "Put as many ideas as you can into each one". The time limit is ten minutes.

Socioeconomic status was determined by Hollingshead's Two Factor Index of Social Position. The occupation and educational levels of the father are scored and weighted to give a numerical score for social position. The scores for different categories of occupations are given in Table 1-A and scores for educational levels in Table 1-B. Table 2-A lists the factor weights for occupation and education and Table 2-B gives social class positions corresponding to numerical scores.

Characteristics of the Sample. The subjects were volunteers from a general psychology class at Appalachian State University in Boone, North Carolina. For participating, all subjects were given extra credit toward their psychology grades. Both male

and female subjects were used. Most of the subjects were between ages 18 and 21 years. Table 3 gives the distribution of subjects by age and sex.

Procedure. Subjects were asked to complete an information sheet, reporting age, sex, grade-point average, occupation of father, and education of father. Cattell's Culture Fair Intelligence Test and Torrance's Tests of Creative Thinking were administered according to the instructions in the test manuals. For most subjects, testing was completed in one session. Others, because of limited time, were tested in two sessions.

Torrance's Tests of Creative Thinking and Cattell's Culture Fair Intelligence Test were scored according to directions in the test manuals. Information given by subjects about occupation and education of father was used to determine social class position, following Hollingshead's Two-factor Index of Social Position.

RESULTS

Correlational techniques were used to analyze the data. Zero-order correlations were found between most parts of variables. Table 4 presents basic descriptive properties (range, mean, standard deviation, variance) for the major variables of this study. Table 5 records the correlations found among these variables.

The correlation of the total score on Torrance's Tests of Creative Thinking with the IQ score measured by Cattell's Culture Fair Intelligence Test is .24, a value significantly different from 0 at the .10 level. The null hypothesis that there is no significant correlation between intelligence and creativity is

rejected. The hypothesis of this study is supported: there is a positive relationship between creativity and intelligence. This finding is consistent with other studies which have found a low positive correlation between the two variables. The correlations between three of the creativity subscores, Fluency, Flexibility, and Originality, and IQ did not differ significantly from 0. On the other hand, these three subscores did correlate significantly among themselves, and with the total creativity score, beyond the .005 level of significance.

The fourth subscore, Elaboration, correlates significantly with IQ. The correlation coefficient is .39, which is significant beyond the .005 level. Elaboration correlates more highly with IQ than with either of the three other creativity subscores. The correlation of Elaboration with Fluency and with Originality are significant at the .10 level; the correlation with Flexibility is significant at the .05 level. Elaboration correlates significantly with the total creativity score beyond the .005 level.

The correlations of socioeconomic status (SES) with each other variable and of grade-point average (GPA) with each other variable did not differ significantly from 0.

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine if there is a significant relationship between intelligence and creativity. The correlations of socioeconomic status and grade-point average with the two variables was also examined.

The correlation between creativity and intelligence, as

measured in this study, was low and positive (r =.24), significantly different from 0 at the .10 level. Only one of the four creativity subscores, Elaboration, correlated significantly with fluid intelligence. Elaboration correlated significantly with fluid intelligence beyond the .005 level of significance. The correlations of socioeconomic status with the other variables, and of grade-point average with the other variables did not differ significantly from 0.

Of the abilities measured by the creativity test, Elaboration correlates highest with fluid intelligence. The Elaboration score, determined by the number of details added to the basic idea in the drawings, did not correlate highly with scores from the other creativity subscores. Creativity may be a composite of abilities rather one specific or general ability. The various abilities labeled "creative" may differ in the degree to which they covary with intelligence.

The degree of correlation between creativity and intelligence may depend in part on how creativity is defined, or on the tests used to measure creativity. Generalizing results from research employing one creativity to "creativity" in general is questionable. More research is needed to clarify the relationship of different creative abilities and intelligence.

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Table 1-A

Occupational Scale

Score	Occupation
1	Higher Executives, Proprietors of Large Concerns, Major Professionals
2	Business Managers, Proprietors of Medium-sized Businesses, Lesser Professionals
3	Administrative Personnel, Small Independent Businesses, Minor Professionals
4	Clerical and Sales Workers, Technicians, Owners of Little Businesses
5	Skilled Manual Employees
6	Machine Operators, Semi-skilled Employees
7	Unskilled Employees

Table 1-B

Educational Scale

Score	Educational Level
1	Graduate Professional Training
2	Standard College or University Graduation
3	Partial College Training
4	High School Graduates
5	Partial High School
6	Junior High School
7	Less Than Seven Years of School

Table 2-A

Factor Weights

Factors	Weights
Occupation	7
Education	4

Table 2-B

Conversion of Scores to Social Class Position

Social Class	Range of Computed Scores
I (Upper)	11-17
II (Upper-Middle)	18-27
III (Lower-Middle)	28-43
IV (Upper-Lower)	44-60
V (lower-Lower)	61-77

Table 3

Distribution of Subjects by Age and Sex

	Age in Years				
Sex	18	19	20	Over 20	Total
Male	8	11	3	4	26
Female	19	17	1	1	38
Total	27	28	4	5	64

Table 4

Statistical Properties of Variables

N=64

Variable	Low	High	Mean	SD	Variance
GPA	1.74	3.84	2.68	.50	.25
SES	11	73	45.59	13.63	185.89
Fluency	8	39	20.32	6.93	48.03
Flexibility	8	29	17.09	4.89	23.90
Originality	9	65	30.25	11.99	143.68
Elaboration	5	99	51.23	23.01	529.57
Total	49	224	118.9	36.02	1297.6
IQ	76	140	110.12	13.67	187.03

Table 5

Intercorrelations among the Variables

	1	2	3	4	5	6	7
1							
2	-.03						
3	.14	-.03					
4	.08	-.16	***.93				
5	-.01	.09	***.84	***.81			
6	-.16	.06	*.21	**.29	*.22		
7	-.07	.04	***.73	***.77	***.75	***.79	
8	-.18	-.03	.01	.00	.00	***.39	*.24

The Variables

1. Grade-point average
2. Socioeconomic status
3. Fluency subscore
4. Flexibility subscore
5. Originality subscore
6. Elaboration subscore
7. Total creativity
8. Fluid intelligence

***Significantly different from 0 at the .005 level (sig. r=.325)

**Significantly different from 0 at the .05 level (sig. r=.25)

*Significantly different from 0 at the .10 level (sig. r=.21)