RELATIONSHIP OF PERSONALITY FACTORS, CREATIVITY AND ACADEMIC ACHIEVEMENT AMONG HIGH SCHOOL SENIORS

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Evidence of a lack of high relationship between creative capacities and academic performance has become available through a number of studies. Notably, Guilford (1956) reported numerous correlation coefficients between Guilford creativity factors and course grades for students in institutions of higher learning. There was considerable variation in these data. The highest coefficient reported was .60 but many coefficients were of the order of .20 to .30. Although some of these correlations are small, McKinnon (1961), Barron (1957), and others note that generally there is a positive correlation between these variables.

Jex (1963) found a correlation of -.09 between grade point average in the Freshman year and score on Flanagan's Ingenuity Test for 52 Freshmen students at the University of Utah. In examining the relationship of the undergraduate grades of 239 scientists to their ultimate success in research, Taylor (1958) found course grades could not be used to predict research success. MacKinnon (1961) reported a correlation of .08 between high school grade point average and creative work in architecture.

Interest in what personality factors distinguish individuals exhibiting high creative ability from those showing little creativeness has also been burgeoning. Drevdahl and Catell (1958) found that artists and writers differed from a normal population in 16 PF test performance in that they were more intelligent, emotionally mature, dominant, adventurous, emotionally sensitive, bohemian, radical, self sufficient and of higher ergic tension level. They were also less cyclothymic, surgent and subject to group standards and control. Barron's (1957) study with Air Force officers yielded very similar conclusions in regard to the creative officers. Studying the personalities of gifted adolescent artists, Hammer (1961) found that the "truly creative" adolescent differed from those who were "merely facile" in exhibiting deeper feelings and stronger determination, ambition, independence, rebelliousness and self-awareness. In addition, the creative subjects showed stronger needs for self-expression and a greater tolerance for discomfort. One finding of the oft-quoted study by Getzels and Jackson (1962) of high school students of high and low creative ability was that the more creative adolescent was characterized by greater humor and playfulness.

Although of obvious significance for personality theory and education, very few studies have given consideration to interrelationships of creative ability, academic achievement, and personality traits. A notable exception is the Getzels and Jackson (1962) investigation of these factors in a high school population. However the population was highly atypical of the average United States high school in that the measured intelligence of the students fell almost exclusively in the very superior range.

A main purpose of this study was to investigate the relationship of creative ability and academic achievement in typical urban high school. A second purpose of the present experiment, like the study by Getzels and Jackson, was to investigate personality trait differences between groups of high school students differing systematically in both creativity and academic achievement.

Method

Subjects

The subjects were 226 members of the senior class of an urban high school in Tampa, Florida. The age range was 16 to 20 years with a median of 17 years. The N includes 120 males (37% of the male population of the class) and 106 females (37% of the female population of the class).

Measurement of Variables

The Sixteen Personality Factor Questionnaire, 16 PF Test, form A, was used as the measure of personality traits. The creative capacities of the subjects were measured by means of three of Guilford's tests of creativity: Alternate Uses, Consequences, and Expressional Fluency. The raw scores on each of these tests were converted to T scores with a mean of 50 and a standard deviation of 10 and the three T scores of each subject were added to obtain a Composite Creativity score.

Scores on the Florida Twelfth Grade Test (F.T.G.T.) were used to measure academic achievement. The F.T.G.T. which measures achievement in English, Social Studies, Natural Sciences, and Mathematics is administered yearly to all seniors enrolled in Florida high schools. The experimental population had taken this test under the supervision of school officials approximately five months before administration of the 16 PF Test and Guilford tests.

According to state records the mean F.T.G.T. score for all males in the experimental high school was 282 and for all females was 258. The corresponding mean scores for the selected experimental subjects were male 330 and female 258. The median score for the experimental population was 312. This score is at approximately the 60th percentile for the senior population of the state. The range of scores for the experimental population was 6-495 while the possible range of scores on the F.T.G.T. is 0-499. Therefore the range of academic achievement as measured by F.T.G.T. was approximately the same for our sample as it was for the entire population of the experimental high school and for the entire state. However, the experimental male subjects scored higher on the F.T.G.T. test than either the seniors in the high school state population or the population from which this sample was taken. This bias in sampling was unavoidable due to the method of scheduling classes within the high school.

Procedure

The 16 PF Test was administered to all subjects during a fifty minute period. All subjects were in their usual classrooms and with their usual classroom groups. Eight examiners were used. All were clinical psychologists experienced in test administration. One week later the same procedure was followed for administration of the Guilford tests. Subjects were told that test results would be known only to the experimenters.

Each of the Guilford tests was scored independently by a graduate assistant and one of the authors. Inter-judge reliability was .95 Alternate Uses; .93 Expressional Fluency; and .92 Consequences. In addition, critical ratio tests for differences between means of male and female subjects were made for each of the Guilford tests and for the Composite Creativity Score. No statistically significant differences were found.

Summary data on scores of the experimental subjects on these tests and intercorrelations of the tests are given in Tables 1, 2, and 3.

Table 1

Means, Standard Deviations, Range and Percentile Scores for F.T.G.T. and Creativity Tests

Test	Mean	S.D.	Range	Percentiles		
				40	50	60
F.T.G.T.	295	127	6-495	263	312	340
Consequences	25	10	4-65	21	23	26
Alternate Uses	19	7	0-45	18	19	21
Expressional Fluency	6	3	0-17	5	6	7
Composite Creativity	149	17	108-205	141	147	152

Table 2

Inter-correlations of F.T.G.T. and Creativity Tests

	F.T.G.T.	Alternate Uses	Consequences	Expressional Fluency
F.T.G.T.	-	.59	.22	.35
Alternate Uses	-	-	.37	.34
Consequences	-	-	-	.22
Expressional Fluency	-	-	-	-

Table 3

Inter-correlations of F.T.G.T. and Composite Creativity Score for Total Group and by Sex

	N	Correlation
Total Sample	226	.46
Males	120	.55
Females	106	.26

Experimental Groups

The subjects were assigned to four groups on the basis of their performance on the F.T.G.T. and the Composite Creativity measure. Criteria by which the four experimental groups were drawn are indicated in Table 4.

Critical ratio tests indicated no statistically significant differences between the mean F.T.G.T. scores of groups HC-HA and LC-HA and groups HC-LA and LC-LA. Likewise no statistically significant differences were found between the mean Composite Creativity scores for groups HC-HA and HC-LA and groups LC-HA and LC-LA.

Results

Table 5 indicates the mean scores and results of F tests for significance of difference between experimental group means for each of the 16 PF Factors.

The F tests indicated significant differences among mean scores of the experimental groups on nine of the 16PF Factors. Mean group differences on these factors were studied by means of t test of differences between means. Table 6 presents means found to be significantly different at the .05 level through the t test analysis.

Table 4

Mean Scores of Experimental Groups on FTGT and Composite Creativity

Experimental Groups	Composition	N	M	F	Mean FTGT	Mean Composite Creativity
HC-HA High Creativity High Achievement	Every S scoring at or above the 60th percentile on Composite Creativity and FTGT	59	42	17	428	172
HC-LA High Creativity Low Achievement	Every S scoring at or above the 60th percentile on Composite Creativity and at or below the 40th percentile on FTGT	16	4	12	172	169
LC-HA Low Creativity High Achievement	Every S scoring at or below the 40th percentile on Composite Creativity and at or above the 60th percentile on FTGT	16	9	7	405	134
LC-LA Low Creativity Low Achievement	Every S scoring at or below the 40th percentile on Composite Creativity and on FTGT	60	24	36	157	127

Table 5

F Tests of Mean Differences on 16PF Factors Between Experimental Groups

16PF Factor	Description (low to high)	Mean Scores Experimental Groups				F
		HC HA	HC LA	LC HA	LC LA	
A	Aloof, Cold: Warm, Sociable	5.13	7.56	5.50	6.43	8.57*
B	Dull, Low Capacity: Bright, Intelligent	5.30	3.18	4.81	3.51	13.81*
C	Emotional, Unstable: Mature, Calm	4.23	4.00	5.50	3.90	2.97*
E	Submissive, Mild: Dominant, Aggressive	5.77	4.68	3.87	4.58	4.38*
F	Glum, Silent: Enthusiastic, Talkative	6.54	7.56	5.68	6.33	.87
G	Casual, Undependable: Conscientious, Persistent	5:25	5.18	6.00	5.68	.78
H	Timid, Shy: Adventurous, Thick Skinned	5.88	5.93	4.87	5.15	1.67
I	Tough, Realistic: Sensitive, Effeminate	4.45	4.81	5.12	5.45	3.77*
L	Trustful, Adaptable: Suspecting, Jealous	6.72	6.50	6.12	6.38	.49
M	Conventional, Practical: Bohemian, Unconcerned	6.25	5.50	5.87	6.03	.72
N	Simple, Awkward: Sophisticated, Polished	6.49	6.50	6.18	6.30	.55

(Table continued on next page)

Table 5 - Continued

16PF Factor	Description (low to high)	Mean Scores Experimental Groups				F
		HC HA	HC LA	HC HA	LC LA	
O	Confident, Unshakable: Insecure, Anxious	5.32	6.81	6.12	6.84	6.29*
Q_1	Conservative, Accepting: Experimenting, Radical	6.00	5.25	5.62	4.85	4.28*
Q_2	Dependent, Imitative: Self-Sufficient, Resourceful	6.55	4.75	6.56	5.86	3.86*
Q_3	Lax, Unsure: Controlled, Exact	5.64	5.62	6.75	6.48	2.99*
Q_4	Phlegmatic, Composed: Tense, Excitable	5.54	6.18	4.68	6.03	1.85

Note.--F test analysis according to Lindquist (1953), p. 57.

*F significant at .05 level.

Table 6

Mean Scores on 16PF Factors for Mean Differences Significant at the .05 Level by Use of t Tests

Experimental Groups	16PF Factors								
	A	B	C	E	I	O	Q_1	Q_2	Q_3
HC-HA	5.13	5.30	-	-	4.45	5.32	-	6.55	-
HC-LA	7.56	3.18			5.81	6.81		4.75	
HC-HA	-	-	4.23	5.77	-	-	-	-	5.64
LC-HA			5.50	3.87					6.75
HC-HA	5.12	5.30	-	5.77	4.45	5.32	6.00	-	5.64
LC-LA	6.43	3.51		4.58	5.45	6.84	4.85		6.48
HC-LA	7.56	3.18	4.00	-	-	-	-	4.75	-
LC-HA	5.50	4.81	5.50					6.56	
HC-LA	-	-	-	-	-	-	-	-	-
LC-LA									
LC-HA	-	4.81	5.50	-	-	-	-	-	-
LC-LA		3.51	3.90						

Discussion

These results support the findings of MacKinnon (1961) and others (Barron, 1957; Getzels and Jackson, 1962) that when a group of academically high achieving individuals are selected, they tend to measure above average on creativity tests. Although there are some dramatic exceptions to this, most researchers in this area report a positive relationship.

As seen in Table 3 the correlation between the creativity and achievement measure did differ markedly when subjects were separated according to sex. Two explanations

are suggested. First, there might well have been a sampling error since the data are based upon high school classes composed exclusively of seniors. School officials report that exclusively senior classes may include a disproportionate number of low achieving females since the sample included clerical courses containing students who are likely to terminate their formal education after high school graduation. Another possible explanation is found in the fact that males score higher than females on the achievement measure (Florida Twelfth Grade Test) used in this study.

Tables 5 and 6 present the most striking differences in the data comparing high achievement-low creativity and low achievement-high creativity groups. The HC-HA group appears to be composed of individuals who are less sociable, more intelligent, more dominant, tougher, more confident, and more experimental than the other groups. However, in comparison with the HA-HC groups, the low creative groups show greater emotional control.

These findings support the image of the highly creative person as being somewhat out of step with his associates (low sociability scores), and demonstrating an impatience with a world (low control) which doesn't reward his creative efforts. However, inspection of the data reveals that the basic controlling factor in accounting for personality differences was achievement. This suggests that withdrawal (low sociability scores) might characterize high academic achievers as well as highly creative individuals. It is reasonable to expect that some of the personality characteristics stemming from rejection can be seen in both the academically superior and the highly creative individuals.

In studies of creative scientists, Cattell (1959) found that they tended to be cool, aloof, dominant and introspective. This study supports these general conclusions (with the exception of introspection) but points to the distinct possibility that these differences are functions of intelligence and not creativity alone. The results are inconsistent with those found in creative psychologists and chemists. Chambers (1964) reports that the scientists were more silent, introspective and self-sufficient than the general male population. Cattell and Drevdahl (1955) also found a correspondence between introspective inclination, self-sufficiency and scientific creativeness.

A comparison of creative scientists and creative adolescents is not an appropriate one. However, toughness, confidence, experimental orientation, dominance, and confi-

dence seem to typify the bright creative adolescent while the more mature scientist seems to demonstrate more independence (self-sufficiency) and introspectiveness.

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