DIFFERENCES BETWEEN HIGH AND LOW CREATIVE UNIVERSITY STUDENTS ON AN OBJECTIVE MEASURE OF PERSONALITY

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DIFFERENCES BETWEEN HIGH AND LOW CREATIVE UNIVERSITY STUDENTS ON AN OBJECTIVE MEASURE OF PERSONALITY

THESIS

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

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Denton, Texas
January, 1968
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CHAPTER I

INTRODUCTION

The question of how the creative individual differs from the non-creative individual strikes to the center of psychological and educational goals. A variety of authors have offered models of the creative individual in an attempt to understand the elusive quality \((2, 4, 5, 6, 7, 8, 9, 12, 13, 14)\). Guilford \((6, 7, 8)\) has developed a model of intellect which analyzes the basic processes of the creative or productive thinker. In analyzing the structure of intelligence, he states that the category of operations is the distinguishing characteristic between creative and non-creative individuals. Guilford proposes that intellect is made up of three major structures: operations, contents, and products. The operations structure is defined as containing the major kinds of intellectual activities. These activities are 1. cognition or awareness of information, 2. memory or the retention of information, 3. evaluation or the making of judgements about information, 4. convergent thinking, the reaching of the conventional (best) solution from given information, and 5. divergent thinking, the generation of new and unusual ideas from a single source. For Guilford, this last characteristic of intellect is the major determinant of creative or productive thinking.
The subclass divergent thinking consists of word fluency and ideational fluency, semantic spontaneous flexibility and figural spontaneous flexibility, associational fluency and expressional fluency, figural adaptive flexibility and symbolic adaptive flexibility, originality, and elaboration. Now through this sifting process, the elements of creativity, as seen by Guilford, are brought into focus. The creative person is fluent, flexible, and original. The individual has the ability to transform thoughts, reinterprete ideas, and is "...free from functional fixedness in the derivation of unique solutions" (8, p. 11). Sensitivity is another important condition for creativity. This is an evaluative ability and results in a transformation of ideas (8).

Whereas the Guilford model of the structure of intellect describes the intellectual processes associated with productive thinking, the psychoanalytic writers (1, 4, 10, 11) attempt to describe the developmental sequences in the personalities of the creative individual that distinguish him from the non-creative individual. Two main themes underlie the psychoanalytic approach to creativity. The first is exemplified by Deutsch (3) when he states that the source of creativity is conflict in the same mode as neurotic conflict. Deutsch states that the motive and function of the creative production is "As the instinctual pressure rises and a neurotic solution appears imminent, the unconscious defense against it leads to the creation.... The psychic effect is the discharge of the
ment-up emotion until a tolerable level is reached" (3, p. 34). The material for working out the conflicts, which becomes the substance of the creative production, is founded in the experiences of childhood. A current event, which makes a strong impression on an individual, stirs a memory of an earlier experience. The memory arouses a wish that finds fulfillment in a creative work, and elements of both the recent event and the memory are discernible in the production. The major issues in Deutsch's approach, and in like manner Freud's (4) approach, are that creativity has its beginnings in conflict. The function of the creative production is tension reduction. Day-dreaming and childhood play give rise to related fantasies and freely rising ideas, and creative production is a substitution for and continuation of childhood play.

These early conceptions of the psychoanalytic frame of reference, though still advocated by Deutsch and others, have been replaced by a later Freudian conception, the preconscious processes. Such authors as Kris (10), Kubie (11), and Alexander (1) have dealt with the ramifications of the preconscious processes in terms of creativity. Kris (10) states that ego regression, or the regression of the ego into more primitive states, occurs not only in a weak ego, or in sleep or fantasy or psychoses, but also during types of creative processes. Accordingly, the preconscious thought is entrusted for a moment to unconscious elaboration and is not overwhelmed by these unconscious forces. Thus the creative ego has the power or
ability to regulate its regression. Kubie (11) places the creative process directly within the preconscious processes and states that their contribution depends "upon their freedom in gathering, assembling, comparing and reshuffling ideas" (11, p. 370). He goes on to state that flexibility of the symbolic imagery is essential to the creative endeavors of mankind. The distinction between the creative and the non-creative individual evolves into this: creative thought derives from the elaboration of freely rising fantasies and ideas from the preconscious processes. The creative person accepts these freely rising ideas and the non-creative individual suppresses them due to predominant conscious controls.

Other authors in other areas have expounded theoretical models of creativity and creative individuals besides the two very formal and formidable models previously presented (9, 12, 13). Hitt (9) proposes a two-factor theoretical formulation of creativity in which he depicts the creative process as being a balance between logical reasoning and intuitive thinking. Hitt states that in the early life of the creative individual, there was a balance between novel and conventional behavior. He also postulates that the home life of the creative individual was marked by a freeing atmosphere in which the child was allowed to make his own mistakes while being held responsible for his actions at all times.

Murphy (12) postulates that creativeness begins with sensitivities, impressions, wants, and energies, and the first
of these Murphy intended to be a sensitiveness to some form of sensory experience. But concomitant with sensitiveness is found a delight with this sensitiveness and a ramifying of it into all directions. The result of the initial controlling drive is an inveterate habit. As satiation occurs of a specific type of sensation or goal, a new and more complex goal of the same type is set by the organism. Creativity is, in effect, a learned phenomenon. This learning, however, is easily arrested by frustrations and the demands of a conventional, conforming society. In likeness to psychoanalytic teachings, Murphy remarks that the creative individual freely relates to what he termed the co-conscious processes. These non-conscious ideas or products surge upon the conscious mind and flood the creative individual's existence with a torrent of ideas and thoughts.

Perry (13) has sifted through the maze of written work on creativity and synthesized several component parts of the creative or productive individual. Four major criterion categories are involved to make the recognizable creative individual. These four are intuitive thinking, tolerance of ambiguity, originality and freedom from anxiety. He states that all intact, normally functioning individuals are born with the potential for creative productivity. Early experiences with a freeing environment are, according to Perry's formulation, the catalyst that makes the individual creative.
The theoretical orientations presented above all make a singular point; that point being that the highly creative individual differs from the low-creative individual due to factors referred to as personality variables. The question remains, however, whether or not on objective personality inventories the highly creative individual will answer differently from the low-creative individual.

Statement of The Problem

This study was conducted to determine if high-creative college students differ from low-creative college students on an objective measure of personality. An additional purpose was to determine if university drama majors are more creative than non-drama majors. In order to find solutions to the problems and based on the theoretical models of the creative individual previously mentioned, the following specific hypotheses are offered for investigation.

Hypotheses

I. Junior and senior drama majors will score significantly higher—be more creative—on the Brick Uses Test and the Cognitive-Width Test than will a group of randomly selected university juniors and seniors from areas excluding art and music.

II. The high-creative student, as measured by the Brick Uses Test and the Cognitive-Width Test, regardless of his major field of endeavor, will score significantly higher
than the low-creative students on these Guilford-Zimmerman Temperament Survey scales: G (general activity), A (ascendancy), T (reflectiveness).

III. The high-creative student, as measured by the Brick Uses Test and the Cognitive-Width Test, regardless of his major field of endeavor, will score significantly lower than the low-creative student on these Guilford-Zimmerman Temperament Survey scales: R (restraint), S (sociability), F (friendliness), P (cooperativeness), M (masculinity).

Importance of The Study

The results of these hypotheses will afford the counselor another aid when faced with the difficult task of assessing creative potential. In addition results could indicate a starting point in re-evaluating a student who is consistently at odds with his teachers. This would bring more sharply into focus the possibility that a troublesome student may be a highly creative but bored student. Results could aid the psychologist in making alternative judgements to the "sick-normal" continuum when analyzing personality data. This study would also indicate a starting place for better understanding the stereotype of the drama student as something of an oddity in the university population. These possibilities make this statement from Barron (2) more poignantly clear, "...our capacity for creative thought may literally make all the difference in the world. Human creativity may prove to be the
key to success or failure in mankind's quest for knowledge and...in his exploration of the unknown" (2, p. 8).

**Definition of Terms**

High creative: a total score on the Brick Uses Test and the Cognitive-Width Test of 76 or more.

Low creative: a total score on the Brick Uses Test and the Cognitive-Width Test of 75 or less.
CHAPTER BIBLIOGRAPHY


13. Perry, R. T., Education Department, North Texas State University, Denton, Texas, personal interview.

CHAPTER II

RELATED STUDIES

Various researchers (1, 10, 11, 6) have investigated the relationship of creativity and personality variables in an attempt to better understand the creative individual. Mackinnon (6) evaluated three groups of architects of high, medium, and low creativity as measured by university professor ratings and direct, objective measurement. The personality ratings done on these groups utilized the Minnesota Multiphasic Personality Inventory (MMPI) and the California Personality Inventory (CPI). The MMPI did not show significant differences on any scale except the masculinity-femininity scale or Mf. On the CPI, however, the two extreme groups—high and low creative architects—did differ significantly (p=.05) on some important variables. The profiles of the low-creative group or group III were more favorable or well adjusted profiles. The high-creative group—group I—was significantly deviate on scales Sy (sociability), So (socialization), Sc (self-control), Gi (good impression), Sa (self-acceptance) and Fe (femininity). The group I architects were viewed as more confident, more able to express themselves, more spontaneous, more outspoken, free from conventional restraint and inhibitions and not interested in making a good impression on others. The group III architects were described
as being more like the American population in general than like the creative architects.

Eiduson (3) investigated the possibility that individuals in the arts are different from individuals not in the arts on characteristics of thinking, perception, personality make-up, and motivational structure. His study involved three groups of subjects. The first group—group I—was a group of university students from the arts who came to the counseling service at the school for psychological help. The second group—group II—was a fairly well matched group to the first but these subjects did not come to the counseling service for help. The third group—group III—was a group of students from the areas of general business, accounting, sales, and management.

Eiduson used the Rorschach and the Thematic Apperception Test (TAT) to determine the personality dynamics of the subjects. To summarize the findings of his study, Eiduson derived composite paragraphs to describe the art students and the non-art students. The art student was described as imaginative and curious about the world around him. He was eager to find unique ways of communicating his feelings and experiences to others. He felt that his work not only offered him a chance to express himself but also to bring him the recognition and admiration that he sought. He tried to rid himself of those influences which he felt were outmoded or not representative of his own thoughts. He was unthreatened by unusual, original or ambiguous ideas. The non-art student was described by
Eiduson as being practical and down to earth. He tried to find realistic solutions to all problems he encountered. He felt that those things which have been tried and proved true are the most reliable. He felt that there was not much advantage in looking for solutions which were not directly realizable or which might not be effective in altering the daily conditions of life. He was disturbed by indecision and did not hesitate to rely on the knowledge and attitudes of others to provide a stable and secure environment. He wanted his own personal psychological role to be well defined.

A more specific study was the one reported by Littlejohn (4) which used the Welch Figure Preference Test to dichotomize a group of subjects into high creatives and low creatives. The Female-Male scale from the same instrument was used to indicate the direction of masculine-feminine interests. The results indicated significant (.05 level) sex identification reversals for the group designated highly creative.

Marks, Michael, and Kaiser (7) tried to ascertain what psychological dimensions of creativity and temperament exist for Marine officers. The results showed that eight of the subscales from the Guilford-Zimmerman Temperament Survey could be subsumed under three trait categories which the authors devised. The three were affiliativeness, aggressiveness, and inhibitory control. These three trait categories differentiated the "more productive Marine officer" from the "less productive Marine officer" (7, p. 636).
Lundin and Lathrop (5) conducted a study using three groups of male subjects from the junior and senior classes of a university population. The first group was made up of biology-chemistry majors, the second was composed of history majors, and the third was English literature majors. The Minnesota Multiphasic Personality Inventory (MMPI) was used as a criterion measure of personality. Using a Kruskal-Wallis one-way analysis of variance, the authors found no significant differences among their three groups on any of the clinical scales from the MMPI. Smaller groups were then derived from the larger sample. These groups were made up of the students who were intending to pursue graduate study in their major field. The same statistical analysis was applied to these new groups and two scales yielded significant differences among the three groups. The scales were Pt (psychasthenia) and So (schizophrenia). A Mann-Whitney U Test was applied to the entire sample on these two scales. It was found that the history majors differed significantly from the English literature majors on both of these scales.

In a study proposed to determine whether or not high-creative art students differed from low-creative art students, Allred (1) used the Cattell 16 Personality Factor Questionnaire to measure personality variables and art instructor ratings to determine creativity. Three groups of subjects were used for this study; high creative art majors were designated as the first group, low creative art majors were designated as
the second group, and non-art majors composed the third group. A panel of art instructors rated the art major subjects into the high-low dichotomy. Significant differences among the three groups were found on only a few of the sixteen factors from the questionnaire. The high-creative group was found to be less cyclothymic (warm, sociable) than either of the other two groups. The high-creative group was also found to be more bohemian-introverted (absent-minded) than either of the other two groups. Two other factors supported the hypotheses. These were factor E (dominant, aggressive) and Q2 (self-sufficient, resourceful). Allred concluded: "This suggests that what the personality factors were actually measuring...was a difference between artists and non-artists, and not differences between high and low degrees of creativity" (1, p. 65).

A study by Rees and Goldman (10), however, indicated significantly different results. Their study was conducted with art and science majors from a university population forming the experimental samples. The subjects were given a questionnaire form to fill out indicating experiences and interests. Also they were asked to relate in the questionnaire those contests they had ever entered, whether won or not. The subjects were divided into three groups of high, medium, and low creativity. These groupings were made by two raters on the basis of the responses to the original questionnaire. The Guilford-Zimmerman Temperament Survey (GZTS) and the Minnesota Multiphasic Personality Inventory (MMPI) were used as indices of personality. The
analyses were made among the high creative group and each of the two lower creative groups. An analysis was also made of profile scores from the art major subjects and science major subjects.

The analysis among the three creativity classifications indicated no significant differences on either the GZTS or the MMPI. An analysis between the highest creativity group and the lowest creativity group, however, revealed significant differences on the Hy (hysteria) scale from the MMPI and on three scales from the GZTS: restraint, ascendance and friendliness. The highly creative group had the higher scores on the Hy scale from the MMPI and GZTS factor ascendance. The lower creative group had higher scores on the GZTS factors of restraint and friendliness.

The analysis of the profile scores for art major subjects and science major subjects revealed significantly higher scores for the art subjects on the MMPI scales of D (depression), Pd (psychopathic-deviate), and Mf (masculinity-femininity).

In their analysis of the results of the investigation, the authors concluded that the highly creative individual is less serious and deliberate, more prone to impulsiveness, and displays less restraint in his behavior. The highly creative individual was also depicted as being more dominant and aggressive than the less creative individual. The significance of the lower depression scores for the highly creative
individual was interpreted to indicate a better self concept and feelings of worthiness for the highly creative group.

Pine (9) reported an investigation in which he attempted to explore one of the psychoanalytic interpretations of the creative process and individual. The study specifically sought to examine the modes of expression of drive content in completed productions and to study the relation of such expression to the quality of the production. Pine stated that creative individuals were characterized by expression rather than suppression of drives. Drive content appearing in a creative production is not—per se—a manifestation of the primary processes. In such productions, drive material is ordinarily subordinated to the requirements of aesthetic value or scientific sense. In a primary process however, drive expressions tend to dominate the cognitive activity. In a creative production, drives appear as a secondary process, i.e. a logical, goal-directed way. Their expression in creative production implies that the individual maintains control over drives. This ego control differentiates the socially valued creative production from drive-laden psychotic productions.

The subjects for Pine's study were university students. They were all given the VPT, TAT, The Science Test, The Humor Test, The Consequences Test, The Brick Uses Test, and The Animal Drawing Test. Pine states that the quality scores of the TAT stories were directly and significantly (p=.01) related--
-.25 and -.08 respectively—to quality scores on the TAT. Non-appropriate use of drive was defined as drive content totally unrelated to the stimulus story and incidental use of drive was defined as drive content that was part of the story but extraneous to the main theme.

Pine deduces that the creative person in either science or literature may be described as one with heightened receptivity to thought contents which can be molded into creative production. His results showed that the better quality TAT stories were produced by those subjects that had more use of drive material, and that the poorer quality TAT stories were produced by those subjects who used inappropriate drive material.

Even the area of vocational choice and personality variables contributes to the fund of knowledge about the creative individual. Cooley (2) and Melton (8) in separate studies found significant results to indicate that those university students in various major fields of study related to a specific vocational choice have characteristics which distinguish among the vocational choices.

Cooley (2) found that research-oriented science students differed from non-research-oriented science students in their ability to perceive the abstract and to express themselves and their ideas. The research-oriented science student was more seclusive and suspicious of other people and did not actively seek interpersonal relationships.
A significant research effort is reported by Taft (11). In his study in which two groups were used, one group was made up of professional actors and the other group was an unselected college population excluding the performing arts fields. Taft listed those characteristics of the acting profession which he felt were responsible for a particular personality type choosing that field of endeavor. The characteristics were these: it affords an opportunity for self-exhibition, it affords the actor the opportunity to imitate and identify with various characters, the actor can partake of institutionalized pretense, the actor is given social sanction for unconventional behavior, and the actor gets social support from a close-knit in-group.

The MMPI was used for a measure of personality dynamics. The author found significant differences between his groups on five clinical scales. The professional actor group had higher scores on scales D (depression), Pd (psychopathic-deviate), Pt (psychasthenia), Sc (schizophrenia), and Ma (hypomania). The actor group also had higher scores on the newer scales: Anxiety, Neuroticism, Female-masochism, and Control. The college student group had higher scores on the following scales: Social responsibility, Ego strength, Role playing, Schizophrenic screening, and Leadership potential.

Taft interprets the actor profiles as indicating a personality that is comparatively under-controlled and disorganized. The actor is flexible and responds to his environment
in unconventional ways. He is distrustful of close interpersonal relationships.

Summary

The research reported in this study has indicated that the high-creative person's personality profile, as determined by various personality assessment techniques including the inventory and the projective techniques, was not viewed as being as well adjusted as the low-creative person's profile (6). The high-creative person has been found to be suspicious of others and domineering (2). The high-creative males have been found to have more feminine interests than do low-creative males (6, 4). However, the research indicated that the high-creative individual had a better self concept than the low-creative individual (10). The high-creative person has been shown to be able to tolerate ambiguity better than the low-creative person (3).
CHAPTER BIBLIOGRAPHY


CHAPTER III

METHODOLOGY

Subjects

The subjects for this study were twenty-eight junior and
senior students from the Department of Speech and Drama at
North Texas State University and thirty junior and senior
students from North Texas State University from various depart-
ments excluding art, drama, and music. Drama students were
chosen for one group because drama, as well as the other per-
forming arts—music and art—requires an individual to be crea-
tive in order to be successful in the field. To determine
whether or not drama students were more creative than non-drama
students, students from the areas of music, art, and drama
were excluded from the non-drama group. In this manner, the
two groups differed on only the one major characteristic: that
of being either a drama major or a non-drama major. All sub-
jects were volunteers. The drama group included sixteen male
and twelve female subjects. The non-drama group consisted of
fourteen males and sixteen females. Only junior and senior
students were included in an attempt to limit the study to
those students who were committed to a major field of study.

Guilford and Zimmerman (3) in designing and scaling the
Guilford-Zimmerman Peperament Survey constructed scales to
allow for comparisons across sex differences whenever sex
differences were found. No statistically significant differences were reported between sexes for either the Brick Uses Test or the Cognitive-Width Test. Therefore, the subjects were not dichotomized, for the testing of the proposed hypotheses, according to sex. The mean age for the drama group was 22.0 years and the mean age for the non-drama group was 21.4 years.

Instruments

The Guilford-Zimmerman Temperament Survey was used as a measure of personality traits. The standard instructions printed on the front of the test booklet were read before the subjects proceeded to the questions (3). The combined score of Guilford's (1) Brick Uses Test and Pettigrew's (6) Cognitive-Width Test was used as a measure of creativity for each subject. A combined score of 76 or more was designated as high creative and a combined score of 75 or less was designated as low creative. The Brick Uses Test, Appendix A, is a measure of ideational fluency and originality (1, p. 382). The subject is told that he has ten minutes in which to list as many uses as he can for the common brick. The score reported is merely the total of reasonable uses listed. Guilford and Christensen (2) offered coefficients from .35 to .45 between college student scores and teacher ratings. The test-retest reliability coefficients were from .60 to .70.

The Cognitive-Width Test, Appendix B, yields a measure of the "open-mindedness-narrow-mindedness" (6, p. 357) dichotomy.
or what Guilford referred to as flexibility (1, p. 38). The instrument is a questionnaire form in which the subject is asked to circle an answer that is his estimate of the dimensions of a particular question based on a stated factual material. Score values are assigned to the different choices of the questionnaire and the reported score is based on the total sum of the points assigned to each estimate. Pettigrew (6) gives a coefficient of .65 between college students and teacher ratings. The test-retest reliability coefficient reported was .72. The combination of these two tests yields an accurate measure of the major aspects of creativity proposed by Guilford (1) and Perry (5). These aspects are fluency, flexibility, and originality.

Procedure

All the subjects were given the same informational data and instructions. They were informed that the data would form part of a master's thesis, and that the objective was to relate interests to creativity. The subjects were not required to put their names on the answer sheets. Only an M for male or an F for female was required. Care was taken to assure the subjects that no one would see the results except the researcher. Numbers one through fifty were used to designate the drama major group or group I and numbers fifty-one through one hundred were used to designate the non-drama group or group II. Group I was tested in two testing sessions on consecutive Saturdays in November. It was difficult to obtain the sample
of volunteers for group II and a total of five testing sessions were required. The maximum time for any testing session for either group was one and one-half hours.

Statistical Analysis

A Fisher's $t$ was run between the means of group I and group II for the combined scores from the Brick Uses Test and the Cognitive-Width Test. A Hotelling's $T^2$ technique was used to test for significant differences between the Guilford-Zimmerman Temperament Survey profiles of the high-creative, group A, and low-creative, group B, groups. These data were analyzed on an IBM 1910 computer at the North Texas State University computer center. A Simultaneous Confidence Interval technique was used to test for significant differences between group A and group B on the subscale score means which were pertinent to the stated hypotheses of the study. The .05 level of confidence was established as the criterion for rejection of the null hypotheses. For statistical purposes, all hypotheses were converted into the null form.
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5. Perry, H. T., Education Department, North Texas State University, Denton, Texas, personal interview.

CHAPTER IV

RESULTS

To test the first hypothesis—that drama majors would be more creative on the Brick Uses Test and the Cognitive-Width Test than would a group of randomly selected students outside the areas of art, drama, and music—a Fisher's t was run between the means of the two groups on the total scores from the two instruments mentioned above. The data are presented in tabular form in Table I.

**TABLE I**

<table>
<thead>
<tr>
<th></th>
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<th>Non-Drama Majors</th>
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<td>( \bar{x} ) s.d.</td>
<td>86.678 4.982</td>
<td>76.867 3.980</td>
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<td>.05</td>
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The drama group was significantly more creative than the non-drama group beyond the .05 level of confidence. Therefore, the null hypothesis was rejected.

All of the subjects were combined in order to re-dichotomize them into high- and low-creative subjects. The high-creative
group consisted of twenty-two drama majors and ten non-drama majors. The low creative group consisted of six drama majors and twenty non-drama majors. A Hotelling's $T^2$ technique was used to test for significant differences between the Guilford-Zimmerman Temperament Survey profiles of the high and low creative subjects. The results of this test are presented in Table II.

### Table II

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<td>161.282</td>
<td>9.036</td>
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Significant differences were found between high and low creative subjects beyond the .05 level of confidence; therefore, the second and third hypotheses were tested using the Simultaneous Confidence Interval technique. Table III presents the means and standard deviations from the Guilford-Zimmerman Temperament Survey for both low and high creative groups. From this data, the Simultaneous Confidence Interval values were obtained and the second and third hypotheses were tested. Subscales E and O were excluded from Table III because they were not pertinent to the hypotheses of this study.
TABLE III
MEANS AND STANDARD DEVIATIONS FOR HIGH, GROUP II, AND LOW CREATIVE, GROUP I, SUBJECTS ON THE EIGHT SUBSCALES FROM THE GZPS

<table>
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<th>Subscale</th>
<th>Low Creative</th>
<th>High Creative</th>
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<td>Group I $\bar{X}$</td>
<td>Group I s.d.</td>
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<td>G</td>
<td>18.154</td>
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<td>R</td>
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<tr>
<td>A</td>
<td>11.154</td>
<td>3.201</td>
</tr>
<tr>
<td>F</td>
<td>18.115</td>
<td>2.547</td>
</tr>
<tr>
<td>T</td>
<td>14.769</td>
<td>2.792</td>
</tr>
<tr>
<td>P</td>
<td>19.731</td>
<td>3.095</td>
</tr>
<tr>
<td>M</td>
<td>20.731</td>
<td>4.355</td>
</tr>
</tbody>
</table>

The second hypothesis stated that high creative subjects would score significantly higher than low creative subjects on the following Guilford-Zimmerman Temperament Survey subscales: G (general activity), A (ascendancy), and T (reflectiveness). On two of the subscales--A and T--the high creative subjects did score significantly higher than the low creative subjects beyond the .05 level of confidence. This would indicate that the high creative subject is more outspoken and critical than is the low creative subject. Non-significant results were obtained for subscale G. In originally designing the present
study the G factor was thought of as a measure of anxiety. However, the factor was weighted towards a general activity level rather than anxiety or internal tension. The non-significant results were not unusual when the G factor was considered from this aspect. Neither the researched literature nor the theoretical models presented predict a difference in activity level for high- and low-creative subjects. Table IV presents the results of the testing of the second hypothesis.

**TABLE IV**

<table>
<thead>
<tr>
<th>Variable</th>
<th>High-Creative</th>
<th>Low-Creative</th>
<th>SCI* value</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \bar{X} )</td>
<td>( \bar{X} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>17.625</td>
<td>18.154</td>
<td>-6.387</td>
<td>N.S.</td>
</tr>
<tr>
<td>A</td>
<td>18.168</td>
<td>11.154</td>
<td>2.162</td>
<td>.05</td>
</tr>
<tr>
<td>T</td>
<td>20.906</td>
<td>14.769</td>
<td>2.208</td>
<td>.05</td>
</tr>
</tbody>
</table>

*Simultaneous Confidence Interval*

The third hypothesis stated that high-creative students would score significantly lower than low-creative students on the following Guilford-Zimmerman Temperament Survey subscales: R (restraint), S (sociability), P (friendliness), P (cooperativeness), and M (masculinity). A tabular presentation of this material is presented in Table V.
TABLE V

SIMULTANEOUS CONFIDENCE INTERVAL TEST FOR SIGNIFICANT DIFFERENCE BETWEEN GZTS SUBSCALES R, S, F, P, AND M FOR HIGH AND LOW CREATIVE SUBJECTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>High Creative</th>
<th>Low Creative</th>
<th>SCI* value</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>s.d.</td>
<td>X</td>
<td>s.d.</td>
</tr>
<tr>
<td>R</td>
<td>16.531</td>
<td>4.776</td>
<td>17.231</td>
<td>3.876</td>
</tr>
<tr>
<td>F</td>
<td>12.687</td>
<td>2.788</td>
<td>18.115</td>
<td>2.547</td>
</tr>
<tr>
<td>P</td>
<td>20.906</td>
<td>1.738</td>
<td>14.769</td>
<td>3.792</td>
</tr>
<tr>
<td>M</td>
<td>17.125</td>
<td>3.237</td>
<td>20.731</td>
<td>4.355</td>
</tr>
</tbody>
</table>

*Simultaneous Confidence Interval

Factors F and P significantly differentiated between high and low creative subjects beyond the .05 level of confidence. These two factors combine to indicate that the high creative subject is intolerant of weaknesses in himself and others and is suspicious of close interpersonal relationships. The non-significant results obtained on subscales R and S indicate that the high creative group is not more impulsive or socially shy than the low creative group. These factors conflict with some of the published material (1, 2) in the area of creativity. The use of subjects exclusively from a state university—as was done in the present study—rather than from a university-professional group—as Taft (2) did—raised the possibility that
the population of the present study was a more homogeneous population than the one used by Taft. This is a probable explanation for the conflicting results obtained in the present study.
1. Pine, F., "Thematic Drive Content and Creativity."

DISCUSSION, CONCLUSIONS AND SUMMARY

The results of this study showed that only one of the three hypotheses was completely confirmed. The drama group was more creative, as measured by the Brick Uses Test and the Cognitive-Width Test, than the non-drama group. This supports the major findings of Guilford (3) and Perry (7) and adds further support to Guilford's (4) theoretical model of creativity.

The major substance of the study, however, was an attempt to discover those personality traits that would correlate with creativity. In the first hypothesis, two of the three Guilford-Zimmerman Temperament Survey subscale variables did differentiate significantly between the high and low creative subjects. The two subscales were A (ascendence) and T (reflectiveness). From the list of traits given below that form subscales A and T, the high creative subjects were characterized as being bold and outspoken and philosophically inclined. Subscale A covers five dichotomous categories and two singular categories. These seven are

<table>
<thead>
<tr>
<th>High score</th>
<th>vs</th>
<th>Low score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-defense</td>
<td></td>
<td>Submissiveness</td>
</tr>
<tr>
<td>Leadership habits</td>
<td></td>
<td>Habits of following</td>
</tr>
<tr>
<td>Speaking with others</td>
<td></td>
<td>Hesitation to speak</td>
</tr>
</tbody>
</table>
Speaking in public vs Hesitation to speak
Persuading others
Being conspicuous vs Avoiding conspicuousness
Bluffing

Subscale T covers six general areas:

<table>
<thead>
<tr>
<th>High score</th>
<th>Low score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflectiveness</td>
<td>Observing of behavior in others</td>
</tr>
<tr>
<td>Interested in thinking vs Interested in overt action</td>
<td></td>
</tr>
<tr>
<td>Philosophically inclined</td>
<td>Observing of self</td>
</tr>
<tr>
<td>Mental poise vs Mental Disconcertedness</td>
<td></td>
</tr>
</tbody>
</table>

These two subscale categories fit in with other researchers' (1, 6, 8) work in the area of creativity. The factor G was originally thought of as being a measure of anxiety. However, the scale is focused on general activity and is not a measure of innate anxiety. There is no basis for an expected difference between high and low creative subjects on this subscale because the G factor is reflecting high energy or mobility rather than inward tension. Research in the area of creativity has not indicated a difference between high and low creative subjects on an activity level measure.

The third hypothesis, which consisted of predicted scores for five Guilford-Zimmerman Temperament Survey subscales, was supported by only two of these subscales. These two were F (friendliness) and P (cooperativeness). Low scores on these
two subscales characterize the high-creative subject as being highly resistant to domination, rather contemptuous of others, and given to finding fault in others. Subscale P included five categories, which were

<table>
<thead>
<tr>
<th>High score</th>
<th>Low score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerance of hostile action vs</td>
<td>Belligerence</td>
</tr>
<tr>
<td>Hostility, resentment</td>
<td></td>
</tr>
<tr>
<td>Acceptance of domination vs</td>
<td>Resistance to domination</td>
</tr>
<tr>
<td>Desire to dominate</td>
<td></td>
</tr>
<tr>
<td>Respect for others vs</td>
<td>Contempt for others</td>
</tr>
</tbody>
</table>

Subscale P included four categories, which were

<table>
<thead>
<tr>
<th>High score</th>
<th>Low score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerance of people</td>
<td>Fault finding habits</td>
</tr>
<tr>
<td>Faith in social institutions vs</td>
<td>Criticalness of institutions</td>
</tr>
<tr>
<td>Suspiciousness of others</td>
<td></td>
</tr>
<tr>
<td>Self pity</td>
<td></td>
</tr>
</tbody>
</table>

The three subscales which did not confirm the hypothesis were R (restraint), S (sociability), and M (masculinity). A factor that conflicts with some of the research reports quoted in this study (5, 8) is the fact that the groups did not differ on the factor R (impulsiveness-restraint) and S (shyness-sociability). The subjects used in the quoted research studies (5, 8) were diverse groups of professional people and college students, and there should have been a greater expectancy of finding significant differences between groups such as these.
because of their diversity. However, the fact that the subjects used in the present study were all upper-level university students suggests that they were a more homogeneous group than the samples used in the above stated studies. This is a probable explanation for the conflicting results obtained in the present study.

Factor M (masculinity-femininity), which has been demonstrated (5) to differentiate high creative from low creative subjects, failed to yield significant differences in the present study. Several factors could have accounted for the lack of significant results on this subscale. The high percentage--48--of females in the sample could have confounded the results. The fact that females were included at all in this study could have confounded the results on factor M. To secure an adequate sample size, however, both males and females were included. The most acceptable explanation is the fact that the male and female scores show a reversal of category interpretations which caused the combined scores for male and female subjects to distort and be invalid. It is recommended that further research be done in this area holding male and female scores separate. This would control for the above-mentioned confounding.

The creative subject, from this study, may be described as an individual who is critical of himself and others as indicated by his scores on the Guilford-Zimmerman Temperament Survey subscales A and F. He is intolerant of weaknesses in
others, as seen from his score on subscale P, and he is suspicious of interpersonal relations and predisposed to thoughtfulness rather than overt action, as judged from his subscale scores on scales T and P. This characteristic view of the creative person is quite similar to the description given by Taft (9) and Eiduson (2).

The present study emphasizes that personality questionnaires can be used for purposes other than clinical diagnosis. The results of this study would indicate to the counselor in both the secondary school and the college counseling service that the personality questionnaire can be an invaluable aid in determining potential beyond academic achievement. These results also indicate that the classic stereotype of the drama student as an off-beat, non-conforming, individualistic person, has some basis in fact. The high-creative group—predominantly drama majors—were characterized by outspokenness, criticalness of social institutions, and intolerance of others.

It is recommended that further research in this area be conducted on a secondary school population. This type of research could better eliminate the selective factor that is in evidence in a university population. In addition, by using secondary school subjects, the results would become more meaningful for the high school counselor.

Summary

The present study was conducted to determine whether or not high-creative junior and senior university students would
differ from low creative junior and senior university students on an objective measure of personality. Fifty-eight students were selected from North Texas State University. Thirty subjects were from areas of study excluding art, drama, and music; twenty-eight of the subjects were obtained from the Speech and Drama Department of North Texas State University. To dichotomize the sample into high and low creative subjects, a combined score from the Brick Uses Test and the Cognitive-Width Test was used. The Guilford-Zimmerman Temperament Survey was used to identify personality traits. Three hypotheses were advanced for inspection:

I. Junior and senior drama majors will score significantly higher, be more creative, on the Brick Uses Test and the Cognitive-Width Test than will a group of randomly selected university juniors and seniors from areas excluding art, drama, and music.

II. The high creative subject, as measured by the Brick Uses Test and the Cognitive-Width Test, regardless of his major field of interest, will score higher than the low creative subject on these Guilford-Zimmerman Temperament Survey scales: G, A, and T.

III. The high creative subject, as measured by the Brick Uses Test and the Cognitive-Width Test, regardless of his major field of interest, will score lower than the low creative subject on these Guilford-Zimmerman Temperament Survey scales: R, S, F, P, and M.
The results showed that only the first hypothesis was completely confirmed. Of the other two hypotheses, factors A, E, F, and P showed significant differences in the predicted direction beyond the .05 level of confidence. Factors H, S, M, and G failed to meet this level of confidence. The high-creative subject was described by the results of this study as an individual that was self-critical and critical of others and intolerant of weaknesses in others. He was described as being suspicious of others and philosophically inclined.

It is substantiated in this study that the personality questionnaire has merit as an aid in the identification of creativity in university populations. It is recommended that further research be done on secondary school populations to enable the high school counselor to make the results reported here more meaningful.
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You will have 10 minutes to familiarize the user with the control brick.
APPENDIX B

ESCALATION QUESTIONNAIRE

Indicate the correct answers on the following questions by circling the number of the selected answer.

1. It has been estimated that the cost of the building will be $500,000. The architect has said:
   a. $400,000
   b. $500,000
   c. $600,000
   d. $700,000

2. On the basis of the information you have, what would be the most reasonable time to think...
   a. 13 months
   b. 16 months
   c. 17 months
   d. 19 months

3. The crew of length of ships required to be 60 ft. by the fact that you think:
   a. is the length...
   b. is the length of the ship...
   c. 6 ft.
   d. 9 ft.

4. Shipping commission on the weight of merchant ships was based on the weight of all... Commission in 1946 was $1,200 tons. For ship...
   a. is the weight of the merchant ship...
   b. is the weight of the ship...
   c. 12,000 tons
   d. 15,000 tons

5. Which of the following would you select as the most likely answer?
   a. 100 people
   b. 200 people
   c. 300 people
   d. 400 people
a. was the time of the fastest train from New York City to Washington in 1953...
1. 237 minutes  2. 302 minutes  3. 265 minutes  4. 203 minutes
b. was the time of the fastest train from New York City to Washington, D.C., in 1953...
1. 236 minutes  2. 202 minutes  3. 248 minutes  4. 145 minutes

12. The average number of births in the world per day during 1953 has been computed to be 22,150. Why do you think:
   a. was the largest number of births in the world in any one day during 1953...
      1. 26,501  2. 28,207  3. 42,876  4. 30,023
   b. was the smallest number of births in the world in any one day during 1953...
      1. 26,940  2. 24,207  3. 14,276  4. 17,026

13. When all of the world's written language is combined, linguists tell us that the average number of words on a page must be somewhere around 15,000. Why do you think:
   a. is the current number of words in a page...
      1. 1,000  2. 10,000  3. 50,000  4. 1,000,000
   b. is the smallest number of words in a page...
      1. 1,000  2. 10,000  3. 5,000  4. 500

14. The average muzzle to tail length of a dog is 20.5 in. Why do you think:
   a. is the length of the longest dog in the world...
      1. 60.3 in.  2. 47.9 in.  3. 60.9 in.  4. 20.5 in.
   b. is the length of the shortest dog in the sample...
      1. 30.6 in.  2. 23.9 in.  3. 30.6 in.  4. 20.5 in.

15. The average population of South America has been computed accurately 2.4 billion people each. Why do you think:
   a. is the population of the least populated country in South America...
      1. 11.2 million  2. 63.7 million  3. 23.8 million  4. 100 million
   b. is the population of the least populated country in South America...
      1. 7,000  2. 63.7 million  3. 23.8 million  4. 29,000

16. A student at Harvard have estimated 50 million average Americans smoke around 50 cigarettes of his day habit. Why do you think:
   a. is the longest smoking time of day 2 hours...
      1. 725 minutes  2. 135 minutes  3. 36 minutes  4. 360 minutes
   b. is the shortest smoking time of day...
      1. 725 minutes  2. 135 minutes  3. 36 minutes  4. 360 minutes
17. In 1955 it was estimated that the average number of churches per religious denomination in the United States is estimated to be 516. What is the largest number of churches in a single religious denomination in the U.S.A.?  
   a. 4,000  
   b. 7,000  
   c. 10,000  
   d. 7,000

18. Immediately after World War II, the average number of submarines owned by the largest seven navies in the world was 53. What do you think the average number of submarines owned by those seven navies was?  
   a. 125  
   b. 150  
   c. 200  
   d. 250

19. The average number of churches per religious denomination in the United States is estimated to be 516. What a. is the largest number of churches in a single religious denomination in the U.S.A.?  
   a. 4,000  
   b. 7,000  
   c. 10,000  
   d. 7,000

20. In the years 1910 through 1956, according to an estimate, the average annual number of marriages in the United States was 2,100,000. In what year in the U.S.A. was the largest number of marriages in a single year?  
   a. 1920  
   b. 1930  
   c. 1940  
   d. 1950

21. In the years 1910 through 1956, according to an estimate, the average annual number of marriages in the United States was 2,100,000. In what year in the U.S.A. was the smallest number of marriages in a single year?  
   a. 1920  
   b. 1930  
   c. 1940  
   d. 1950
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