

AN ABSTRACT OF THE THESIS OF

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BEHAVIOR AMONG PRESCHOOL-AGED CHILDREN

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The purpose of this study was to investigate the relationship between creativity and independent or autonomous behavior among preschool-aged children.

Forty children, 19 boys and 21 girls, with a mean age of 4 years-1 month, and a mean I.Q. of 113, acted as subjects for this study. All children came from families of the upper- and middle socioeconomic classes as determined by Hollingshead's "Two Factor Index of Social Position". Cooper's Incomplete Figures Task was used to assess subject's creativity, while Beller's Scale of Independence or Autonomy Among Children was used to assess their independent or autonomous behavior. Guilford's and Torrance's theoretical approaches to creativity were used as the theoretical framework.

A regression analysis, using the variables of age, sex and I.Q. as co-variates was used to test five null hypotheses. The .01 probability level was used as the criterion for statistical significance.

In addition, further analyses using descriptive statistics and the t-statistic were applied to the data to determine the significance of the variables of age and sex in explaining the differences in creativity and independent or autonomous behavior among the subjects.

Results obtained revealed significant positive relationships between preschool-aged children's total creativity scores ($p < .01$), the creativity subscales of originality ($p < .01$), fluency ($p < .01$) and elaboration ($p < .01$), and their independent or autonomous behavior. However, no significant relationship was found between preschool-aged children's penetration creativity scores and their independent or autonomous behavior. In addition, the variables of age, sex and I.Q. were not significant in explaining the relationship between creativity and independent or autonomous behavior among the subjects. However, further analysis of the data indicated interesting trends in age and sex differences on the creativity subscale scores of penetration and independent or autonomous behavior among the subjects, respectively. Subjects in the youngest age group (3 years to 3 years-6 months) tended to show more variation in their penetration creativity scores than other older age groups. Also, girls tended to have higher independent or autonomous behavior scores than boys ($p < .08$).

Generally, the results obtained supported Guilford's and Torrance's theoretical approaches to creativity. In addition, tendencies in the data suggested that the variables of age and sex be studied or controlled for in future studies in this area. Due to the limitations encountered relative to the instruments used, sample employed and a variety of variables left uncontrolled, a note of caution was indicated in interpreting the results obtained.

RELATIONSHIP BETWEEN CREATIVITY
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AMONG PRESCHOOL-AGED CHILDREN

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RELATIONSHIP BETWEEN CREATIVITY
AND INDEPENDENT OR AUTONOMOUS BEHAVIOR
AMONG PRESCHOOL-AGED CHILDREN

INTRODUCTION

Discussions of current theoretical approaches to creativity indicate that four major approaches to creativity can be delineated at this time. These include: (1) the cognitive-aptitude approach, (2) the non-aptitude personality traits approach, (3) the mental health approach and (4) the creative process approach. Guilford approaches creativity as a cognitive ability involving specific aptitude traits including: (1) fluency, (2) flexibility, (3) elaboration, (4) redefinition, (5) penetration, (6) originality and (7) sensitivity to problems. Although Guilford's approach to creativity is basically a cognitive one, Guilford was also aware that creative activity involved several non-aptitude traits. However, it was Torrance and others who elaborated on the importance of these non-aptitude personality traits in their research investigations. Several non-aptitude personality traits related to creativity that have been identified by Torrance and others include: (1) independence, (2) self-confidence, (3) self-sufficiency, (4) humor, (5) emotional independence and (6) intellectual non-conformity. The cognitive-aptitude traits approach and non-aptitude personality traits approach related to creativity focus primarily upon behaviors that are observable in nature. However, other theorists have focused their attention on more global and less tangible aspects of creativity. One of these aspects is mental health.

Rogers and Maslow view creativity as a means of achieving mental health, while psychoanalytic theorists view creativity as a means of maintaining mental health. Still another less tangible approach to creativity is the existential or psychodelic approach. This approach looks at creativity as a process of mystical or paranormal experiences.

A study of these various approaches to creativity indicates that the concept of creativity is multi-dimensional in nature and, therefore, a complex concept to delineate. While each approach emphasizes important aspects of creativity that can ultimately be combined to formulate a more comprehensive view of creativity, only Guilford's and Torrance's approaches were used as a framework for this study. More specifically, this study attempted to relate some of the cognitive aptitude traits of creativity identified by Guilford to the non-aptitude personality trait of independent or autonomous behavior identified by Guilford and Torrance as related to creativity among preschool-aged children.

Research studies relating creativity to independent or autonomous behavior among preschool-aged children are sparse. Only one study (Cooper, 1968) was found directly related to this topic. Findings of this study reported that no relationship existed between creativity and independent or autonomous behavior among preschool-aged children. However, an analysis of the research design revealed that these non-significant findings may have been due to problems in the measurement of independent or autonomous behavior and a lack of control over pertinent variables previously shown to be related to both creativity and/or independent or autonomous behavior among preschool-aged children. These variables include sex, I.Q. and socioeconomic status.

These findings, therefore, suggested that further examination of the relationship between these variables among preschool-aged children would be fruitful.

Purpose of the Study

The primary purpose of this study was to further investigate the relationship between creativity and independent or autonomous behavior among preschool-aged children. The concept of creativity is based on Guilford's cognitive-aptitude traits of creativity, while the concept of independent or autonomous behavior is based on the non-aptitude personality trait identified by Guilford and Torrance as related to creativity. The definition of these terms follow.

Definition of Terms

In order to carry out the purpose of this study two instruments were used. Cooper's Incomplete Figures Task was used to measure the cognitive-aptitude traits of creativity, while Beller's Scale of Independence or Autonomy Among Children, was used to measure independent or autonomous behavior.

The definitions of terms relevant to Cooper's Incomplete Figures Task include:

- (1) Creativity - the combination of the cognitive-aptitude traits of originality, elaboration, fluency and penetration which are continuously variable within all individuals.

- (2) Originality - a cognitive-aptitude trait of creativity which is the ability to give unique and clever responses and to make remote associations.
- (3) Elaboration - a cognitive-aptitude trait of creativity which is the ability to add to ideas already produced.
- (4) Fluency - a cognitive-aptitude trait of creativity which is the ability to produce quantities of ideas, words, and figural symbols and relationships.
- (5) Penetration - a cognitive-aptitude trait of creativity which is the ability to see more aspects of a problem such that it enables one to continue working or resist the tendency to close or to stop.

The definitions of terms relevant to Beller's Scale of Independence or Autonomy Among Children include:

Independent or Autonomous Behavior - a non-aptitude trait of creativity which is represented by the behaviors of:

- (1) Work Satisfaction - the ability to concentrate and be involved in a task.
- (2) Self-Confidence - the ability to complete or attempt to complete routine tasks without asking for help.
- (3) Self-Sufficiency - the ability to rely on oneself to overcome obstacles.
- (4) Initiative - the ability to carry out one's own ideas.
- (5) Perseverance - the ability to complete a task.

Assumptions

Two assumptions were made in this study. They include:

- (1) Cooper's (1968) Incomplete Figures Task can be used as a measure of aptitude traits of creativity among preschool-aged children. (Cooper, 1968; Lieberman, 1964; Torrance, 1962)
- (2) Beller's Scale of Independence or Autonomy Among Children can be used as a measure of independent or autonomous behavior among preschool-aged children. (Beller, 1955, 1957; Emerich, 1964, 1966)

Hypotheses and Analyses

The hypotheses tested in this study included:

- Hypothesis I: There will be no significant relationship between total creativity scores and independent or autonomous behavior among preschool-aged children.
- Hypothesis II: There will be no significant relationship between originality scores and independent or autonomous behavior among preschool-aged children.
- Hypothesis III: There will be no significant relationship between fluency scores and independent or autonomous behavior among preschool-aged children.

Hypothesis IV: There will be no significant relationship between elaboration scores and independent or autonomous behavior among preschool-aged children.

Hypothesis V: There will be no significant relationship between penetration scores and independent or autonomous behavior among preschool-aged children.

A regression analysis using age, sex and I.Q. as co-variates was applied to the data to test all hypotheses. Furthermore, descriptive statistics and the t-statistic were applied to the data to determine the significance of the variables of age and sex in explaining the differences in creativity and independent or autonomous behavior among preschool-aged children.

REVIEW OF LITERATURE

Because of the complexity of the problem related to this thesis, this review of literature has been divided into two major parts. Part I includes a discussion of the theoretical approaches to creativity available to researchers in the field, while Part II consists of the theoretical framework used in this study and a summary of research relating creativity to independent or autonomous behavior among pre-school-aged children.

Part I: Theoretical Approaches to Creativity

A review of the literature regarding the available theoretical approaches to creativity indicates that the concept of creativity is included in a number of major personality theories. The definitions of creativity in these theoretical approaches vary a great deal, although none of them are mutually exclusive. They are interrelated and all contribute to an understanding of creativity. There are four major theoretical approaches to creativity. These include:

- (1) The Cognitive-Aptitude Approach
- (2) The Non-Aptitude Personality Traits Approach
- (3) The Mental Health Approach
- (4) The Creative Process Approach

The Cognitive-Aptitude Approach

The major proponent of the cognitive-aptitude approach to creativity is J. P. Guilford. Guilford defines creativity as a cognitive

ability which involves aptitude traits that are continuously variable within all individuals (Guilford, 1965). Through factor analysis Guilford delineated a model of the intellect which includes seven aptitude traits. These traits include the following:

- (1) sensitivity to problems - the ability to perceive implications from given information.
- (2) fluency - the ability to produce quantities of ideas, words, figural symbols, and relationships.
- (3) flexibility - the ability to change the mode of response spontaneously or because adaptation is needed.
- (4) elaboration - the ability to add to ideas already produced.
- (5) redefinition - the ability to rearrange variables using existing information to form a new definition.
- (6) penetration - the ability to see more aspects of a problem which enables you to continue working or resist the tendency to close or to stop.
- (7) originality - the ability to give unique, clever responses and to make remote associations. (Guilford and Hoepfner, 1971)

Although Guilford's approach to creativity is basically a cognitive-aptitude one, involving the delineation of aptitude traits and their combinations, Guilford was also aware that creative activity involved an interaction with non-aptitude traits attributed to motivation and personal temperament (Guilford, 1965). In recognizing that creativity is more than a cognitive phenomenon Guilford introduced the need for more information about the non-aptitude traits related to creativity.

The Non-Aptitude Personality Traits Approach

E. P. Torrance supplies the non-aptitude information that Guilford's cognitive approach lacks. He does this by focusing upon various non-aptitude personality traits and their relationships to creativity. Torrance, however, continued to use Guilford's seven aptitude traits in his research.

Although Guilford's major emphasis in studying creativity was cognitive in nature, he later did apply factor analysis to creativity for the purpose of identifying some of the non-aptitude personality traits related to creativity. From his research, Guilford consistently found five non-aptitude traits in subjects who displayed significant amounts of the seven aptitude traits of creativity mentioned previously. These non-aptitude traits include: (1) humor, (2) self-confidence, (3) self-sufficiency, (4) willingness to take risks and (5) independence.

Torrance and other researchers who emphasized the non-aptitude personality traits have expanded Guilford's list of non-aptitude traits to include such traits as: (1) intellectual non-conformity, (2) spontaneity, (3) relaxation, (4) playfulness and (5) willingness to express attitudes and interests of the opposite sex. (Getzel and Jackson, 1962; Torrance, 1962; Lieberman, 1964; Littlejohn, 1967; Urbina et al., 1970)

The Mental Health Approach

The third approach to creativity is the mental health approach. While E. P. Torrance and others focused their research upon delineating non-aptitude personality traits related to creativity, these non-aptitude traits were essentially observable in nature. There are, however, theoretical approaches to creativity that center upon more global and less tangible characteristics of creative individuals. One of these characteristics is mental health. A. H. Maslow and Carl Rogers view creativity as a means by which individuals achieve mental health; while Freud and the neo-Freudians view creativity as a means by which individuals maintain mental health.

Maslow (1959) and Rogers (1959) both recognize that there are two levels of growth. The first level of growth involves the use of a special talent type of creativity that is denoted by behavior that results in creative production. Both theorists, however, emphasized the importance of a second level of growth in which a person uses creativity to integrate his personality to emit a unique person by actualizing his potentials. This process results in mental health. Rogers explains this process in his essay, "Towards a Theory of Creativity" (1959) by stating:

The main spring of creativity appears to be the same tendency which we discover so deeply as the curative force in psychotherapy, man's tendency to actualize himself, to become his potentialities. (Rogers, 1959, p. 72)

Freud and the Neo-Freudians (Kubie, Getzels and Jackson, Gowan) both view creativity as a means of maintaining mental health, by placing creativity in different parts of the mind to explain its use. According to Freud, creativity originates in a conflict within the unconscious (Kneller, 1965). If the creative impulses are at odds with the ego, neurosis can result, but if the impulses are not at odds with the ego, a balance is achieved. The balanced creative impulses are then instrumental in maintaining emotional well-being. However, the Neo-Freudians place creativity in the preconscious and explain creativity as a "regression permitted by the ego...and that a creative person can draw on his preconscious more freely than other people" (Kneller, 1968, pp. 33-34). According to the Neo-Freudians, this freedom is a primary factor in maintaining mental health.

The Creative Process Approach

The fourth major theoretical approach to creativity is known as the creative process approach posed by the existential and psychedelic philosophers. As mentioned previously, theorists who emphasized the mental health approach to creativity view creativity as a process with the specific purpose of either achieving or maintaining mental health. It is a voluntary process that proceeds inside the human mind (Gowan, 1972). The existential and psychedelic philosophers also view creativity as a process, but emphasize the process as a mystical, paranormal

experience that is influenced from outside the human mind (Gowan, 1972). The existentialists explain the outside influence as cosmic, mystical or perhaps a divine inspiration, while the psychedelic philosophers connect such an influence with psychedelic drugs.

The existential writer Rollo May defines creativity as an intense "process of bringing something new into being." (May, 1959, p. 57) The existential writer Eric Fromm (1959) adds that a special attitude is necessary to experience that which enables one to create. Fromm calls this experience an encounter with life and this encounter is the creative process. Many poets of other eras have described this encounter or process as a transitory state.

Keats remarked that his poetry often came to him "by chance or magic, to be, as it were something given to him," and George Eliot confided that in her best writing there was a "not herself." (Gowan, 1972, pp. 21-22)

The psychedelic philosophers assume that the outside influence which induces and facilitates the creative process is psychedelic drugs. They indicate that the use of psychedelic drugs provides the individual with a chemically induced experience similar to an existential encounter. Krippner (1969) reviews a number of personal anecdotal and clinical observations which report the use of psychedelic drugs to induce the creative process. These reports are said to be similar to the poets' reports of a mystical, paranormal experience.

Summary

Consideration of these various approaches to creativity suggest that such a concept is multi-dimensional in nature, and as such is

a very complex concept to delineate. While each of these approaches to creativity emphasizes important aspects of the concept and can ultimately be combined to formulate a more comprehensive view of creativity, only Guilford's and Torrance's approaches to creativity will be used as the theoretical framework in this study.

Part II: A Theoretical Framework and Research Studies

Theoretical Framework

According to Guilford, the structure of the intellect is a cross-classification of cognitive abilities that has been built through factor analysis. It classifies the intellect into three parameters: content, products, and operations. (Guilford and Hoephner, 1971) The parameter that this discussion will focus on is the operational parameter.

Cognitive operations in the operational parameter describe the way information is processed into content and products and thus describes the process of creativity and its outcome. These operations include: (1) divergent production, (2) convergent production, (3) cognition, (4) memory and (5) evaluation. (Guilford and Hoephner, 1971; Guilford, 1965)

Divergent production is the central operational area of creativity. The emphasis in divergent production is on new products, variety, quantity of ideas and relevance of the solution for the given situation. (Guilford and Hoephner, 1971) The mental activity during divergent production is characterized by the aptitude traits of fluency,

flexibility, originality and elaboration. The individual who has significant levels of these aptitude traits has a higher capacity to process this information into different contents and produce this information in a large variety of products. According to Guilford, this capacity is creativity.

Even though divergent production is the major operational area of creativity, other cognitive operations utilize the other creative aptitude traits that Guilford has isolated. The operation of cognition utilizes the aptitude traits of penetration and sensitivity to problems. The operation of convergent thinking utilizes the traits of redefinition and penetration. The last two operations of memory and evaluation are generally utilized with all of the aptitude traits. (Guilford and Hoepfner, 1971; Guilford, 1965)

According to Guilford all individuals possess these seven aptitude traits in varying amounts. (Guilford, 1965) However, creative production involves more than the use of these aptitude traits during mental operations. Creative production involves the interaction of temperament and motivation with these aptitude traits. The effect of temperament and motivation are not yet accounted for by Guilford, and thus these variables cannot be totally isolated. (Guilford, 1965) However, Guilford (1965) has suggested that part of the interaction of temperament and motivation occur in the parameter of content. Originally this parameter had only three factors: figural content, symbolic content and semantic content. Guilford has added the category of behavioral content to allow for the existence of non-aptitude traits. Through factor analysis Guilford has isolated five non-aptitude traits which he attributes to temperament and motivation. These

include: (1) independence, (2) self-confidence, (3) self-sufficiency, (4) humor and (5) willingness to take risks.

E. P. Torrance and other researchers (Getzel and Jackson, 1962; Lieberman, 1964; Littlejohn, 1967; Urbina et al., 1970) who emphasized the non-aptitude personality traits approach to creativity have added depth to Guilford's beginning studies of non-aptitude personality traits by carrying out extensive research on the personality correlates of creativity. These research have not only confirmed the existence of Guilford's non-aptitude traits, but have also added other non-aptitude traits to the list. These added traits include: (1) intellectual non-conformity, (2) spontaneity, (3) relaxation, (4) playfulness and (5) willingness to express attitudes and interests of the opposite sex.

The above discussion indicates that Guilford's Model of the Intellect and Torrance's research on the non-aptitude personality traits related to creativity can provide a theoretical framework for this study. As indicated previously, in this study an attempt was made to explore the relationship between creativity and independent or autonomous behavior among preschool-aged children. Creativity in this study was defined according to four of Guilford's Cognitive-Aptitude traits of creativity, including:

- (1) originality - the ability to give unique and clever responses
and to make remote association
- (2) elaboration - the ability to add to ideas already produced
- (3) fluency - the ability to produce quantities of ideas,
words and figural symbols and relationships

- (4) penetration - the ability to see more aspects of a problem which enables one to continue working or resist the tendency to close or to stop

Cooper's Incomplete Figures Task was used as the measurement device to assess these aspects of preschool-aged children's creativity.

Independent or autonomous behavior is a non-aptitude personality trait related to creativity, identified by Guilford and further elaborated on by Torrance. Independent or autonomous behavior in this study is defined according to components or aspects of independent or autonomous behavior that represents a general independence or autonomy striving including:

- (1) Work satisfaction - the ability to concentrate and be involved in a task
- (2) Self-confidence - the ability to complete or attempt to complete routine tasks without asking for help
- (3) Self-sufficiency - the ability to rely on oneself to overcome obstacles
- (4) Initiative - the ability to carry out one's own ideas
- (5) Perseverance - the ability to complete a task

Beller's Scale of Independence or Autonomy Among Children was the measurement device used to assess these aspects of independent or autonomous behavior.

Research Studies

A review of the literature on preschool-aged children regarding the relationship between Guilford's cognitive-aptitude traits of creativity and Guilford's and Torrance's non-aptitude personality trait of creativity, independent or autonomous behavior, indicates a paucity of studies in this area. Only one study was found directly related to this topic. This study, however, provided information counter to the theoretical positions of Guilford and Torrance. Cooper (1968) in studying the relationship between certain aptitude traits of creativity and autonomous behavior among 28 four-year old children, found no significant relationships between these variables. A revision of Torrance's Incomplete Figures Task was used to measure the children's aptitude traits of creativity, including: (1) elaboration, (2) fluency, (3) originality and (4) penetration, while an Autonomy Ranking Scale was completed by the Nursery School Teachers to measure children's autonomous behavior. However, the Autonomy Ranking Scale used by Cooper (1968) emphasized sociability and emotional and instrumental independence as characteristic of independent or autonomous behavior but not the specific traits of self-confidence and self-sufficiency, as emphasized by Guilford (1965) and Torrance (1962) and found in Beller's Scale of Independence or Autonomy Among Children to be used in this study. Also, Cooper in her study did not control for the subjects' I.Q., socioeconomic status or sex; variables that have been shown to be related to both creativity and independent or autonomous behavior among young children. (Torrance, 1962; Starkweather,

1964, 1971; Getzel and Jackson, 1962; Ward, 1968; Beller, 1955, 1957; Emmerich, 1964)

There are several other studies with older subjects, however, which suggest that a positive relationship may exist between the aptitude traits of creativity and children's independent or autonomous behavior. Torrance (1962) in attempting to relate creativity and independent or autonomous behavior among 23 groups of children, grades one through six, matched for age, sex, I.Q. and class in school found that "creative" children stood out as being more independent and non-conforming. The Minnesota Test of Creative Thinking, which measures Guilford's seven cognitive-aptitude traits in verbal and figural tasks, was used to assess the children's creativity scores and both teacher and peer nominations were used to measure children's independent and non-conforming behavior. A further study by Torrance (1962) with the same group of children using the Draw-a-House-Tree-Person Test with the children's drawings analyzed by independently trained observers revealed that the same "creative" children exhibited non-conforming, non-essential details in their drawings indicating the ability to carry out their own ideas and to resist pressure to be dependent upon group norms, which Torrance described as a form of independent or autonomous behavior.

Recognizing that a relationship between creativity and independent or autonomous behavior may exist, Torrance (1962) compiled a list of non-aptitude personality traits that he judged to be descriptive of an independent or autonomous individual in order to better understand the concept of independence or autonomy. These non-aptitude traits include:

- (1) independence in thinking and judgment - the ability to carry out one's own ideas, actions; to take initiative
- (2) self-awareness - the ability to recognize one's own abilities
- (3) self-confidence - the ability to attempt tasks by oneself
- (4) self-sufficiency - the ability to rely on oneself
- (5) non-conformity - the ability to be independent of group pressures and norms

Wadthe and Wallter (1965) in comparing two groups of 32, fourth and fifth grade, children divided into creative and non-creative groups in low teacher control and high teacher control situations found that the creative children retained significantly higher levels of self-direction and initiative, which are dimensions of independent or autonomous behavior, in both situations than the non-creative children. The Torrance Tests of Creative Thinking, which measures Guilford's seven cognitive-aptitude traits, was used to assess creativity and the dimensions of independent or autonomous behavior were assessed by an observation scale that was used by both teachers and independent observers. Furthermore, Getzel and Jackson (1962) in studying an adolescent sample of 292 boys and 241 girls in private schools found that subjects who possessed a high degree of Guilford's seven cognitive-aptitude traits of creativity were found to be intellectually independent (i.e., ability to initiate symbolic, complex ideas and judgments). Guilford's Battery of Tests was used to assess the cognitive-

aptitude traits of creativity and intellectual independence was obtained through teacher ratings. Finally, in studies with adults, Guilford (1965) found through factor analysis of data from his Creativity Battery that the non-aptitude traits of independence, self-sufficiency and self-confidence were related to his aptitude traits of creativity.

Summary

Research studies relating the aptitude traits of creativity and the non-aptitude personality trait of independence or autonomy among preschool-aged children are sparse. The only study found using preschool-aged children as subjects (Cooper, 1968) provided data contrary to Guilford's and Torrance's theoretical approaches, indicating no relationship existed between these variables. An analysis of the research design used by Cooper (1968) may in part explain this lack of a significant relationship. Problems in measurement of independent or autonomous behavior and lack of control of pertinent variables were evident. Studies with older subjects using more controls and measurement devices based on Guilford's and Torrance's approaches to creativity suggest that a positive relationship may exist between these variables. These research findings indicate that further examination of the relationship between Guilford's cognitive-aptitude traits of creativity, and Guilford's and Torrance's non-aptitude trait of creativity, independent or autonomous behavior, among preschool-aged children would be fruitful.

METHOD

Subjects

The subjects of this study consisted of 40 children attending three half-day preschool programs at the Child Development Laboratories sponsored by the Family Life Department at Oregon State University.

Age

The age range of these subjects was 3 years-4 months to 5 years, with a mean age of 4 years-1 month (see Table 1). A review of the literature suggests that creativity levels among children correspond to changes in age. (Lieberman, 1964; Torrance, 1962; Ward, 1968) A further review indicates that levels of independence or autonomy among children also changes with age (Beller, 1955; Charlesworth and Hartup, 1967; Emmerich, 1964, 1966; Heathers, 1955; Kagen and Moss, 1960). Because of this, a regression analysis which uses age as a co-variate was

Table 1. Description of Subjects by Sex, Age and I.Q.

Sex	N	Age Range (yrs./mos.)	Mean Age (yrs./mos.)	I.Q. Range	Mean I.Q.
Boys	19	3/4-4/10	4/2	92-134	113
Girls	21	3/4-5/0	4/1	91-141	114
Total	40	3/4-5/0	4/1	91-141	113

applied to the data to test the hypotheses of this study. A more detailed description of the ages of subjects in this study is found in Appendix A.

Sex

A total of 19 boys and 21 girls comprised the sample of this study (see Table 1). The age range for boys was 3 years-4 months to 4 years-10 months, with a mean age of 4 years-2 months. The age range for girls was 3 years-4 months to 5 years-0 months, with a mean age of 4 years-1 month. While a review of research reveals no significant differences between the creativity scores of boys and girls (Berretta, 1971; Lieberman, 1964; Torrance, 1962), significant differences between the amount of independent or autonomous behavior displayed by them has been found (Charlesworth and Hartup, 1967; Emmerich, 1964, 1966; Heathers, 1955; Kagan and Moss, 1960). Because of this, a regression analysis, which uses sex as a co-variate was also applied to the data to test the hypotheses of this study. A more detailed description of the subjects by sex is found in Appendix A.

I.Q.

The I.Q. scores of subjects ranged from 91 to 141, with a mean I.Q. score of 113 (see Table 1). The range of I.Q. scores for boys was 92 to 134, with a mean of 113. The range of I.Q. scores for girls was 91 to 141, with a mean of 114. The Peabody Picture Vocabulary Test, which assesses children's passive or receptive vocabulary,

was used to obtain the subjects' I.Q. scores. A review of the literature regarding the relationship between creativity and I.Q. suggests that some relationship may exist between these variables. Getzel and Jackson (1962) concluded from their investigations that a certain amount of intelligence is required for creativity, but intelligence and creativity are by no means synonymous. Torrance (1962) reports eight replications of Getzel and Jackson's study with six of the eight studies providing supportive results. Lieberman (1964) further found that kindergarten children with higher mental age scores also had higher creativity scores than children with lower mental age scores. Because of these findings, a regression analysis, which uses the variable of I.Q. as a co-variate was applied to the data to test the hypotheses of this study. A more detailed description of the subjects' I.Q. scores is found in Appendix A.

Socioeconomic Status of the Family

A review of literature regarding the relationship between socioeconomic status and creativity indicates that upper- and middle-class children tend to experience an encouraging social climate and an enriched physical environment which may positively affect a person's creativity scores (Parnes and Brunnell, 1967; Parnes, 1972; Berreta, 1971; Torrance, 1961; Starkweather, 1964). Because of this, the sample of this study was limited to subjects who come from the three upper socioeconomic classes as determined by Hollingshead's (1958) "Two Factor Index of Social Position".

Hollingshead set forth the two factors of education and occupation as indices for socioeconomic status. His basic assumptions included the notion that (1) a status structure existed within our society, (2) occupation and education could be used to determine the family's status in the social structure and (3) these characteristics, symbolic of status, could be scaled and combined through the use of statistical procedure. Scaled scores ranging from 1 to 7 are given to varying levels of occupation and education of the head of the household. The score for occupation is multiplied by a factor weight of 7, while the score for education is multiplied by a factor weight of 4. The products of these multiplications are then added to yield a range of scores from 11 to 77. These scores were assumed to indicate five socioeconomic classes. These classes and their related scores include:

<u>Class</u>	<u>Score</u>
I(upper)	11-17
II	18-27
III	28-43
IV	44-60
V(lower)	61-77

The families of subjects in this study were distributed among the socioeconomic classes as described in Table 2.

Table 2. Description of Subjects of Socioeconomic Class

<u>Class</u>	<u>N</u>
I (upper)	29
II	10
III	1
IV	0
V (lower)	0
Total	40

Instruments

Two instruments were used to collect the data in this study. Cooper's Incomplete Figures Task was used to measure subjects' creativity, while Beller's Scale of Independence or Autonomy Among Children was used to measure their independent or autonomous behavior.

Cooper's Incomplete Figures Task

The Incomplete Figures Task is a measure of figural creativity which was originally designed by E. Paul Torrance as part of the Torrance Test of Creative Thinking used with elementary and high school students. The form used in this study was adapted for use with pre-school-aged children by Cooper (1968). The test has two parts. In part one, children are asked to respond to six stimulus figures drawn one at a time by the examiner on separate sheets of 9" x 12" blank paper by completing the figure with a crayon. The stimulus figures are shown in Appendix B. In part two, each drawing is placed on the table in front of the subject one at a time. The subject is then instructed to add anything he would like to the drawing, with another colored crayon.

Scoring. The Incomplete Figures Task is scored for four of Guilford's aptitude traits which includes: (1) originality, (2) penetration, (3) elaboration and (4) fluency. The subject is rated on each trait in each of the six drawings. The sum of the traits comprise his score. Thus, the end scores have five parts, one part for each trait, plus a total of all parts. A description of the

scoring procedures taken from Cooper's (1968) study is found in Appendix D.

Reliability. Prior to the present study, there were no reliability measures for Cooper's (1968) form of the Incomplete Figures Task, since it had only been used once. However, the results of Cooper's study gave a normal distribution of scores for elaboration and penetration which suggested that these two factors may be reliable.

In the present study an attempt was made to establish interscorer reliability for Cooper's test, using two different scorers. Both scorers were trained prior to scoring the data. The interscorer reliability coefficients obtained from this reliability study were as follows: Total Creativity = 0.941; Originality = 0.799; Fluency = 0.922; Elaboration = 0.991 and Penetration = 0.973. The range of correlation coefficients obtained was from 0.799 to 0.991, with a mean of 0.925. The Pearson product moment correlation method was used to obtain these correlation coefficients.

Aside from the interscorer reliability established for Cooper's test, reliability has been established for the entire Torrance Test of Creative Thinking. The original Incomplete Figure Task is part of the Torrance Test of Creative Thinking and the basis for Cooper's (1968) adaptation. Reliability coefficients obtained using the test-retest method (Buros, 1972) ranged from 0.50 to 0.93 over a one to two week time span and from 0.35 to 0.73 over a three year time span. The higher coefficients come from studies that had controlled testing situations and the lower coefficients came from studies that used few controls.

Buros (1972) also lists an alternate form reliability on two forms of the Torrance Test of Creative Thinking. In 15 studies in which the time variable ranged from one week to three years, the coefficients were all 0.70 or above.

Goldman and Clarke (1967) tested for interscorer reliability for trained scorers on the Torrance Test of Creative Thinking which was given to 13 boys and 10 girls aged 10 and 11. Their study yielded coefficients ranging from 0.93 to 1.00. However, Buros (1972) reports that if the scorers have little or no experience the coefficients tended to be lower, starting at 0.66.

Validity. Cooper's (1968) adaptation of the Incomplete Figures Task has no-established validity. However, construct validity has been established for the entire Torrance Test of Creativity Thinking. Buros (1972) quotes several studies that deal with the validity of individual constructs such as fluency and elaboration and states that results are consistent with theories and literature on creativity. Stubbings (1968) compared the Torrance Test of Creative Thinking and Guilford's measures of creative ability on two matched groups of 14 and 15 year old children of 50 each. The correlation coefficient was 0.56. However, Stubbings felt that the Torrance Test of Creative Thinking generally followed Guilford's theoretical position and yielded similar results.

Beller's Scale of Independence or Autonomy Among Children

Beller's Scale of Independence or Autonomy Among Children is a rating scale for preschool-aged children based on teacher ratings of

children's independent behavior. The rating scale consists of five items or subscales which are rated on seven points according to the variables of frequency and persistence. The five subscales measure the following behaviors:

- (1) Work satisfaction
- (2) Independence in carrying out routine tasks
- (3) Skills in overcoming environmental obstacles
- (4) Initiative in independent activities
- (5) Ability to complete an activity

A description of these categories was made previously. The ratings are carried out by a pair of teachers, in this case by the Head Teacher and their graduate assistant. A training period preceded the actual rating. In this training period the raters received training on the observation of relevant behavior and in the use of the criteria for the measurement.

Scoring. There are seven points on each of the five subscales and two criteria variables. Points 7, 5, 3 and 1 are used when both variables are applied equally. Points 6, 4 and 2 are to be used as intermediate points and are checked only when one of the two criteria apply and the other will fall above or below that point. The high point is 7-and the low point is 1. The final score is the sum of all five subscales. Beller's Scale of Independence or Autonomy Among Children is included in Appendix E.

Reliability. Beller (1957) established interscorer reliability using eleven teachers. Pairs of teachers rated the same group of ten children at least three times a-year for 2½ years. The product moment

correlations ranged from 0.67 to 0.80 with a median of 0.75 and reliability coefficients of the summated ratings of teacher pairs ranged between 0.69 and 0.93 with a median of 0.83.

Validity. Some evidence of construct validity is present for Beller's Scale of Independence or Autonomy Among Children. In constructing the scale, Beller (1955) posited the existence of a general independence drive which consisted of five related components. These components have been described previously, and have been related to various behaviors displayed by children in a school setting. (See Appendix E)

Some evidence of concurrent validity has also been found for this instrument. Emmerich (1966), in comparing the scores of 53 middle class preschool-aged children on Beller's Scale of Independence or Autonomy Among Children and Heather's (1955) Observational Rating Scale over a two year period, found that these children showed the same general trends in their display of independent behavior on both instruments.

Procedures

Cooper's Incomplete Figures Task

Establishment of Rapport. In order to obtain cooperation of subjects and reliable results, the examiner spent several days interacting with the subjects in the preschool classroom as a student aide, prior to data collection.

Collection of Data. Collection of data from subjects on Cooper's Incomplete Figures Task was done during Spring Term, 1974. Only one examiner was used to collect this data from the subjects.

Each subject was approached individually by the examiner during the preschool program's daily "free play periods" when the subject was not involved in any structured classroom activity. In approaching a subject, the examiner said:

I have a special drawing game that I would like to play with you. Would you like to play it with me now?

If the subject was unwilling to participate in the research project at that time, the examiner said:

Well, maybe some other time, I do not want you to miss your turn.

Later, if the subject still did not wish to participate in the research project he was not forced to do so.

Testing Rooms. Rooms adjoining the preschool classroom were used to administer Cooper's Incomplete Figures Task to all subjects. The rooms were private and a "testing" sign was hung on the door to insure no interruptions. The testing room was devoid of play materials and equipment to minimize distractions and avoid stimulation. The examiner and the subject were seated at child-sized chairs with the testing materials laid on a small table directly in front of them.

Presentation of Instrument. Cooper's Incomplete Figures Task was administered individually to all subjects. The administration began with the examiner saying, "We draw pictures in this game. I'm going to draw a line and you make a-picture out of the line." Three demonstrations of completing stimulus Figure A was given to the subject to let him know what was expected of him in the test situation

(see Appendix C). In order to help the subject fully understand and to maintain rapport, the examiner made the following statement during the demonstration:

I'll show you a picture first. See this line (stimulus figure A)? I could make a house out of it (example A). The lines are the walls, here's a roof, a window, a door. I could even put a-door knob on the door and here are lots of bushes. I could make something else out of the lines, like flowers (example B). There is a tulip with a leaf and there's another kind of flower. Sometimes you just want to make a design with lines (example C). I'll draw the line for you and now it's your turn to make a picture or design.

Following these demonstrations and when the subject fully understood what was expected of him in the test situation, the stimulus figure materials used for data collection were presented to the subject one at a time. Each stimulus figure was drawn by the examiner on a 9" x 12" sheet of white blank paper and the subject was allowed to choose a blue or green colored crayon to complete the drawing. After the subject responded to all of the stimulus figures presented, each completed drawing was placed on the table in front of the subject again one at a time in the same order. The subject was then instructed to add anything he would like to add with an orange or red colored crayon.

The subject was encouraged to verbalize about his drawings in terms of names, descriptions and actions when the examiner asked "Is there something special about your drawing that you would like to tell me." As the subject completed each figure, the examiner sketched the drawing and noted all verbalizations that referred to the drawing. Approximate testing time was 15 minutes.

Beller's Scale of Independence or Autonomy Among Children

Training Procedures. Head teachers and their graduate assistants acted as raters for this study, and completed Beller's Scale of Independence or Autonomy Among Children for all subjects. In order to obtain reliable results on the subjects from the rating scale, a training session was held for the raters.

Training to-use this rating scale consisted of a seminar focused upon the criteria used in rating the behaviors of subjects and the scoring procedures (see Appendix E). Head teachers and graduate assistants had spent two terms in interaction with the subjects in their respective preschool programs, before using this rating scale. It was assumed that such extensive interaction with the subjects of this study was adequate for completing the rating scale.

Collection of Data. Since the subjects in this study consisted of children from three preschool programs and each preschool program consisted of a head teacher and a graduate assistant, each subject was rated twice. Head teachers and their graduate assistants independently rated each subject in their respective preschool programs. After this was done, the head teachers and graduate assistants compared their ratings on each subject and resolved their points of disagreement. Only one score on each child that was agreeable to both head teachers and graduate assistants was used in data analysis. Approximate testing time was five minutes per child.

RESULTS

Introduction

The purpose of this study was to investigate the relationship between creativity and independent or autonomous behavior among preschool-aged children. The subjects included children from upper- and middle socioeconomic class who were enrolled in three half-day preschool programs in the Child Development Laboratories sponsored by the Family Life Department at Oregon State University during Spring Term, 1974. The subjects, 19 boys and 21 girls, ranged in ages from 3 years-4 months to 5 years (mean: 4 years-1 month) and in I.Q.'s from 91 to 141 (mean: 113). Cooper's Incomplete Figures Task was used to measure creativity, while Beller's Independence or Autonomy Among Children was used to measure independent or autonomous behavior.

Test of Hypotheses

Five null hypotheses regarding the relationship between creativity and independent or autonomous behavior among preschool-aged children were developed for this study. A regression analysis using the variables of age, sex and I.Q. as co-variates was applied to the data to test all hypotheses. Spearman rho coefficients and F-values were calculated to express these relationships. The 0.01 level of significance was used as the criterion for statistical significance. In addition, further analyses using descriptive statistics and the t-statistic were applied to the data to determine the significance of the variables of age and sex in explaining the differences in creativity and independent or autonomous behavior among preschool-aged children.

Hypothesis I

Hypothesis I: There will be no significant relationship between total creativity scores and independent or autonomous behavior among preschool-aged children.

The results obtained relative to Hypothesis I are found in Table 3. These results reveal that there is a significant and positive relationship (Sp rho = .611; $F = 20.77$, $p < .01$) between preschool-aged children's total creativity scores and their independent or autonomous behavior. The null hypothesis related to this finding, therefore, may be rejected.

Table 3. Spearman rho Correlation Coefficients and the F-Values Expressing the Relationship Between Creativity and Independent or Autonomous Behavior Among 40 Preschool-Aged Children.

Relationship of Independent Behavior to:	Sp rho	F-values
Total Creativity	.611	20.77 ^{**}
Creativity Subscales		
Originality	.318	10.95 ^{**}
Fluency	.413	7.82 ^{**}
Elaboration	.500	16.36 ^{**}
Penetration	.029	.05

^{**} significant at $p < .01$.

Hypothesis II

Hypothesis II: There will be no significant relationship between originality scores and independent or autonomous behavior among preschool-aged children.

The results obtained relative to Hypothesis II is also found in Table 3. These results reveal that there is a significant and positive relationship ($S_p \rho = .318$; $F = 10.95$, $p < .01$) between preschool-aged children's originality scores and their independent or autonomous behavior. The null hypothesis related to this finding, therefore, may be rejected.

Hypothesis III

Hypothesis III: There will be no significant relationship between fluency scores and independent or autonomous behavior among preschool-aged children.

The results obtained relative to Hypothesis III are found in Table 3. These results reveal that there is a significant and positive relationship ($S_p \rho = .413$; $F = 7.82$, $p < .01$) between preschool-aged children's fluency scores and their independent or autonomous behavior. The null hypothesis related to this finding, therefore, may be rejected.

Hypothesis IV

Hypothesis IV: There will be no significant relationship between elaboration scores and independent or autonomous behavior among preschool-aged children.

The results obtained relative to Hypothesis IV are found in Table 3. These results reveal that there is a significant and positive relationship ($Sp\ \rho = .500$; $F = 16.36$, $p < .01$) between preschool-aged children's elaboration scores and their independent or autonomous behavior. The null hypothesis related to this finding, therefore, may be rejected.

Hypothesis V

Hypothesis V: There will be no significant relationship between penetration scores and independent or autonomous behavior among preschool-aged children.

The results obtained relative to Hypothesis V are found in Table 3. These results reveal no relationship exists ($Sp\ \rho = .029$; $F = .05$) between preschool-aged children's penetration scores and their independent or autonomous behavior. The null hypothesis related to this finding, therefore, cannot be rejected.

Further Analyses

In the present study, the variables of age, sex and I.Q. were used as co-variates when applying the regression analysis to the data to examine the relationship between creativity and independent or autonomous behavior among preschool-aged children. Results obtained revealed none of these variables were significant in explaining such a relationship. However, further analyses of the data using descriptive statistics and the t-statistics revealed interesting trends.

On the creativity subscale of penetration, age differences between children became apparent. Using the range and standard deviations of the subjects penetration scores in these age groups, results revealed that subjects in the 3 years to 3 years-6 months group tended to have a larger range and standard deviation penetration scores than all other age groups (see Table 4).

Table 4. Range and Standard Deviations of Penetration Scores of Subjects in Four Age Groups.

Age Group	N	Range	S.D.
3/0 - 3/6	9	0-12	3.90
3/7 - 3/11	8	4-6	0.89
4/0 - 4/6	15	3-11	2.40
4/7 - 5/0	8	3-7	1.30

Furthermore, the variable of sex in relation to preschool-aged children's independent or autonomous behavior approached significance. When a t-test was applied to test the difference between the mean independent or autonomous behavior scores of boys and girls, the t-value obtained indicated a tendency for girls to have higher independent or autonomous behavior scores than boys ($p < .08$). Table 5 summarizes the results obtained from this analysis.

Table 5. The Means and t-Value Associated With the Sex Difference Between Independent or Autonomous Behavior of 40 Preschool-Aged Children.

Category	Boys (n=19)	Girls (n=21)	t-value
Means	26.42	29.05	1.76 ^t

* t-value for $p < .05$ 2.03

t significant at the $p < .08$ level.

SUMMARY AND DISCUSSION

Summary

Research studies relating creativity to independent or autonomous behavior among preschool-aged children are sparse. Only one study (Cooper, 1968) was found directly related to this topic. In that study results revealed that no significant relationship existed between creativity and independent or autonomous behavior. However, an analysis of the research design of that study indicated that this non-significant relationship may have been due to problems in the measurement of independent or autonomous behavior, and a lack of control over the variables of sex, I.Q. and socioeconomic status. These variables have previously been shown to be important in understanding the development of creativity and/or independent or autonomous behavior among young children.

The purpose of the present study was to further investigate the relationship between creativity and independent or autonomous behavior among preschool-aged children. Forty children, 19 boys and 21 girls, ranging in ages from 3 years-4 months to 5 years (mean: 4 years-1 month) acted as subjects for this study. Their I.Q. scores ranged from 91 to 141 (mean: 113), and all of them came from families of the upper- and middle-socioeconomic classes as determined by Hollingshead's "Two Factor Index of Social Position." Cooper's Incomplete Figures Task was used to measure creativity, while Beller's Scale of Independence or Autonomy Among Children was used to measure independent or autonomous behavior. Guilford's and Torrance's theoretical approaches to creativity were used as the theoretical frameworks for this study.

Five null hypotheses regarding the relationship between creativity and independent or autonomous behavior among preschool-aged children were developed for this study. A regression analysis using the variables of age, sex and I.Q. as co-variates was used to test all hypotheses. The .01 level of significance was used as the criterion for statistical significance. In addition, further analyses using descriptive statistics and the t-statistic were applied to the data to determine the significance of the variables of age and sex in explaining the differences in creativity and independent or autonomous behavior among preschool-aged children.

Results obtained revealed that there were significant positive relationships between preschool-aged children's total creativity scores ($p < .01$), the creativity subscale scores of originality ($p < .01$), fluency ($p < .01$) and elaboration ($p < .01$) and their independent or autonomous behavior. However, no significant relationship was found between preschool-aged children's creativity subscale scores of penetration and their independent or autonomous behavior. In addition, the regression analysis indicated that the variables of sex, age and I.Q. of subjects were not significant in explaining the relationship between creativity and independent or autonomous behavior among preschool-aged children. However, further analyses of the data using descriptive statistics and the t-statistic indicated interesting age and sex trends among preschool-aged children on the creativity subscale of penetration and independent or autonomous behavior, respectively. Subjects in the youngest age group (3/0-3/6) indicated a tendency toward more variation in their scores on the creativity subscale of penetration

than subjects in all other older age groups. Also, girls tended to have higher independent or autonomous behavior scores than boys ($p < .08$).

Discussion of Results

A discussion of the results obtained in this study is divided into three parts. These include a discussion of (1) the relationship of the results obtained to previous research, (2) the relationship of the results obtained to Guilford's and Torrance's theoretical approaches to creativity and (3) additional findings.

Relationship of Results to Previous Research

Only one study was found directly related to the present study. Cooper (1968) in investigating the cognitive-aptitude traits of creativity, including originality, fluency, elaboration and penetration, among four-year-old children found no significant relationships between these cognitive-aptitude traits of creativity and independent or autonomous behavior among these children. The results obtained in the present study, however, provide information contrary to those reported by Cooper (1968). While no significant relationship was found between the creativity subscale of penetration and independent or autonomous behavior among the subjects in this study, significant positive relationships were found between the subjects' total creativity scores, their creativity subscale scores of originality, fluency and elaboration, and their independent or autonomous behavior.

Aside from the paucity of previous studies in the area, two major limitations in Cooper's (1968) study, including the lack of control over the variables of sex, I.Q. and socioeconomic status, and the problems of measuring independent or autonomous behavior among preschool-aged children were alluded to as justifications for the present study. The finding in the present study that age, sex and I.Q. were not significant in the regression analysis to explain the relationship between creativity and independent or autonomous behavior provided some justification for Cooper's decision not to control for the variables of sex and I.Q. in her study. Furthermore, as indicated in the further analyses of the data, using descriptive statistics, tendencies in age differences among children scores on the penetration creativity subscale, supports Cooper's decision to control for this variable in her study. However, the added finding regarding tendencies in sex differences in independent or autonomous behavior among the subjects obtained through application of the t-statistic, and the significant positive relationships found between creativity and independent or autonomous behavior on all but the penetration creativity subscale with the variable of socioeconomic class controlled, suggest that Cooper's decision not to control for these variables may have been unwise. The findings related to the tendencies in age and sex differences found in the present study regarding the subjects' penetration creativity scores and their independent or autonomous behavior, respectively, will be delineated more fully in a later section of this thesis.

With respect to problems in the measurement device used by Cooper (1968) to assess independent or autonomous behavior among preschool-aged

children, mention was previously made that in using the Autonomy Ranking Scale, Cooper's definition of independent or autonomous behavior included the concept of sociability. Such a concept consisted of characteristics of individuals including conformity and intolerance to disorder. A review of the literature regarding creativity suggests that these non-aptitude personality traits are not necessarily descriptive of creative individuals (Torrance, 1962; Guilford, 1965; Barron, 1958; Ward, 1969; and Getzel and Jackson, 1962). If this is the case, then indeed, we would have expected as Cooper (1968) found that no significant relationship exists between creativity and independent or autonomous behavior among preschool-aged children.

In the present study, Beller's Scale of Independence or Autonomy Among Children (Beller, 1957) was used to assess the subjects' independent or autonomous behavior. In this scale, independent or autonomous behavior was defined in terms of the concepts of work satisfaction, self-confidence, self-sufficiency, initiative and perseverance. A review of the literature regarding creativity indicates that these non-aptitude personality traits are descriptive of creative individuals (Torrance, 1962; Guilford, 1965; Barron, 1958; Ward, 1969; Getzel and Jackson, 1962). In the present study, therefore, we would have expected creativity to be positively related to independent or autonomous behavior among preschool-aged children. Results obtained indicated such a relationship was found for all but one of the creativity subscales, penetration.

Relationship of Results to Guilford's and Torrance's Theoretical Approaches to Creativity

As indicated in the review of literature section of this thesis, Guilford's and Torrance's theoretical approaches to creativity were used as the theoretical framework for this study. According to Guilford (Guilford and Hoephner, 1971), the structure of the intellect is a cross-classification of cognitive abilities including three interrelated parameters: content, products and operations. Of primary interest in this study were aspects of the operations and content parameters of the structure of the intellect. Cognitive operations in the operational parameter describes the process of creativity and its outcomes. These operations include: (1) divergent production, (2) convergent production, (3) cognition, (4) memory and (5) evaluation (Guilford, 1965; Guilford and Hoephner, 1971). Of these, aspects of divergent production, convergent production and cognition were the three operations investigated in this study.

Divergent production, according to Guilford (Guilford and Hoephner, 1971) is the central operational area of creativity. Divergent production emphasizes the development of new products, variety, quantity of ideas and relevance of the solution of a given situation. Some of the cognitive activities which occur during divergent production include the aptitude traits of originality, fluency and elaboration. The individual with significant levels of these aptitude traits has a higher capacity to process information into different contents and produce this information in a large variety of products. According to Guilford, this ability represents cognitive-aptitude traits of creativity.

Even though divergent production is the major operational area of creativity, other cognitive operations utilize other creative-aptitude traits isolated by Guilford. The operation of cognition and convergent thinking utilizes the aptitude trait of penetration. This cognitive-aptitude trait was also of interest in this study.

However, as Guilford (1965) realized, creativity involves more than the use of the above mentioned cognitive-aptitude traits. Creative production involves the interaction of the non-aptitude traits of temperament and motivation with the cognitive-aptitude traits. The non-aptitude traits of temperament and motivation, have not been fully described by Guilford (1965). However, Guilford has suggested that part of the interaction of the non-aptitude traits of temperament and motivation occur in the parameter of content. Originally, this parameter had only three factors: figural content, symbolic content and semantic content. Guilford has added the category of behavioral content to allow for the existence of the non-aptitude traits of creativity. Of the non-aptitude traits of creativity focused upon in this study, the characteristic of independent or autonomous behavior among individuals was of primary interest. Such a non-aptitude trait of creativity has been of prime concern to Torrance, whose studies on creativity have added further depth to Guilford's theoretical approach to creativity.

On the basis of Guilford's and Torrance's theoretical approaches to creativity then, we would expect that the cognitive-aptitude traits of creativity, including originality, fluency, elaboration and penetration to be positively related to the non-aptitude trait of creativity, independent or autonomous behavior among preschool-aged children.

An analysis of the results obtained in this study suggests that such a relationship was obtained on all of the above mentioned cognitive-aptitude traits of creativity, except penetration. Generally, therefore, Guilford's and Torrance's theoretical ideas on creativity were supported. However, three possible reasons can be given for the non-significant relationship found between the cognitive-aptitude trait of penetration and the non-aptitude trait of independent or autonomous behavior. These include:

- (1) Scoring Procedures: Problems were encountered in scoring the creativity subscale of penetration in Cooper's Incomplete Figures Task. Inadequate guidelines were present for scoring this section of the test, which made such a task difficult. This may have led the researcher to unnecessarily inflate the penetration scores of subjects, as well as make this scale non-discriminating.
- (2) Developmental Levels: Penetration is not classified in the central operational area of creativity, which is divergent thinking according to Guilford, but rather in the border areas of cognition and convergent production. It is defined as the ability to see more aspects of a problem which enables one to continue working or resist the tendency to close or stop. Guilford's theoretical ideas were primarily developed on the basis of research with adults, and does not provide information concerning the developmental levels of creativity. Due to the preschool-aged child's limited experience with the world, they may not have as yet developed

the cognitive skills necessary to use these border areas of the intellect.

- (3) Definition of Terms: A close examination of the definitions of penetration in Cooper's Incomplete Figures Task and independent or autonomous behavior in Beller's Scale of Independence or Autonomy Among Children, suggest that a positive relationship between these two variables may not be possible. Penetration in Cooper's test is defined as the ability to see more aspects of a problem which enables one to resist the tendency to close or stop, while independent or autonomous behavior in Beller's scale is defined as the ability to complete a task, to concentrate on a single task and to carry out an idea. These two definitions appear to contradict one another, thus, suggest that a positive relationship between these two variables may logically not be possible.

Additional Findings

In this study, the variables of age, sex and I.Q. were used as covariates when applying the regression analysis to the data in examining the relationship between creativity and independent or autonomous behavior among preschool-aged children. Results obtained indicated that none of these variables were significant in explaining such a relationship. Further analysis of the data, however, using descriptive statistics and the t-statistic revealed interesting trends regarding age differences on the creativity subscale of penetration and sex differences in independent or autonomous behavior among the subjects.

Subjects in the youngest age group (3/0-3/6) revealed a range and standard deviation of penetration scores larger than subjects in the three other age groups. Furthermore, girls tended to have higher independent or autonomous behavior scores than boys. These findings suggest that in any future studies regarding the relationship between creativity and independent or autonomous behavior among preschool-aged children, such variables should be studied or controlled.

Limitations of the Study

Although attempts were made to overcome a number of limitations in this study based on the review of literature, other problems were still encountered which may have influenced the results obtained. These limitations were encountered in the areas of the (1) instruments, (2) sample and (3) uncontrolled variables.

Instruments

Reliability and validity problems continue to exist for both Cooper's Incomplete Figures Task and Beller's Scale of Independence or Autonomy Among Children. In addition, Cooper's Incomplete Figures Task included problems in scoring procedures. The creativity subscales of originality and fluency provided scores of subjects which covered a very narrow range and thus, may not be adequately discriminating between varying levels of originality and/or fluency among the subjects. Furthermore, inadequate scoring procedures for the creativity subscale of penetration were evident. No scoring procedures were

present for subjects who repeated the stimulus figure without connecting it to the original figure, and whose drawings consisted of unrelated lines, none of which were closed or touched the original figure. With respect to Beller's Scale of Independence or Autonomy Among Children, the fact that these involved teacher ratings of children's behavior, rather than children's actual behavior may have provided inaccurate and subjective results.

Sample

Major limitations were also present regarding the sample used in this study. The sample size was small and restricted to the middle- and upper socioeconomic classes involving children enrolled in university-oriented laboratory preschools. These limitations greatly limit generalization of the results obtained to a larger more varied population. Any interpretation of the results obtained, therefore, must be made with caution.

Uncontrolled Variables

A variety of limitations due to uncontrolled variables were present. The sample of subjects in this study came from three different preschool programs. The variables of teacher and group influences were left uncontrolled. Furthermore, a number of other variables outside of the preschool setting, such as the social climate of the home, parental attitudes and sibling composition of the family were left uncontrolled. These limitations again indicate that caution must be taken in interpreting the results of this study.

Suggestions for Further Research

The results and limitations encountered in this study suggest that a number of future research possibilities are present. With respect to the instruments used in this study, further reliability and validity studies are needed. In addition, a systematic study of the scoring procedures used in these instruments, particularly Cooper's Incomplete Figures Task should be undertaken. Studies focused on such methodological measurement problems may greatly enhance the ability of the researcher in interpreting the results obtained.

In reference to the sample, a larger, more varied sample should be employed to verify the significant results obtained in this study. This would allow the researcher to generalize his results to a much larger population. Furthermore, with a larger sample size the tendencies obtained regarding age and sex differences in creativity and independent or autonomous behavior may be clarified.

Finally, regarding variables left uncontrolled in this study, future investigations may wish to explore the relationship between creativity and independent or autonomous behavior in light of the variables of teacher personalities, preschool group experiences, social climate of the home, parental attitudes and sibling composition of the family. All these variables may be pertinent in our understanding of creativity among young children.

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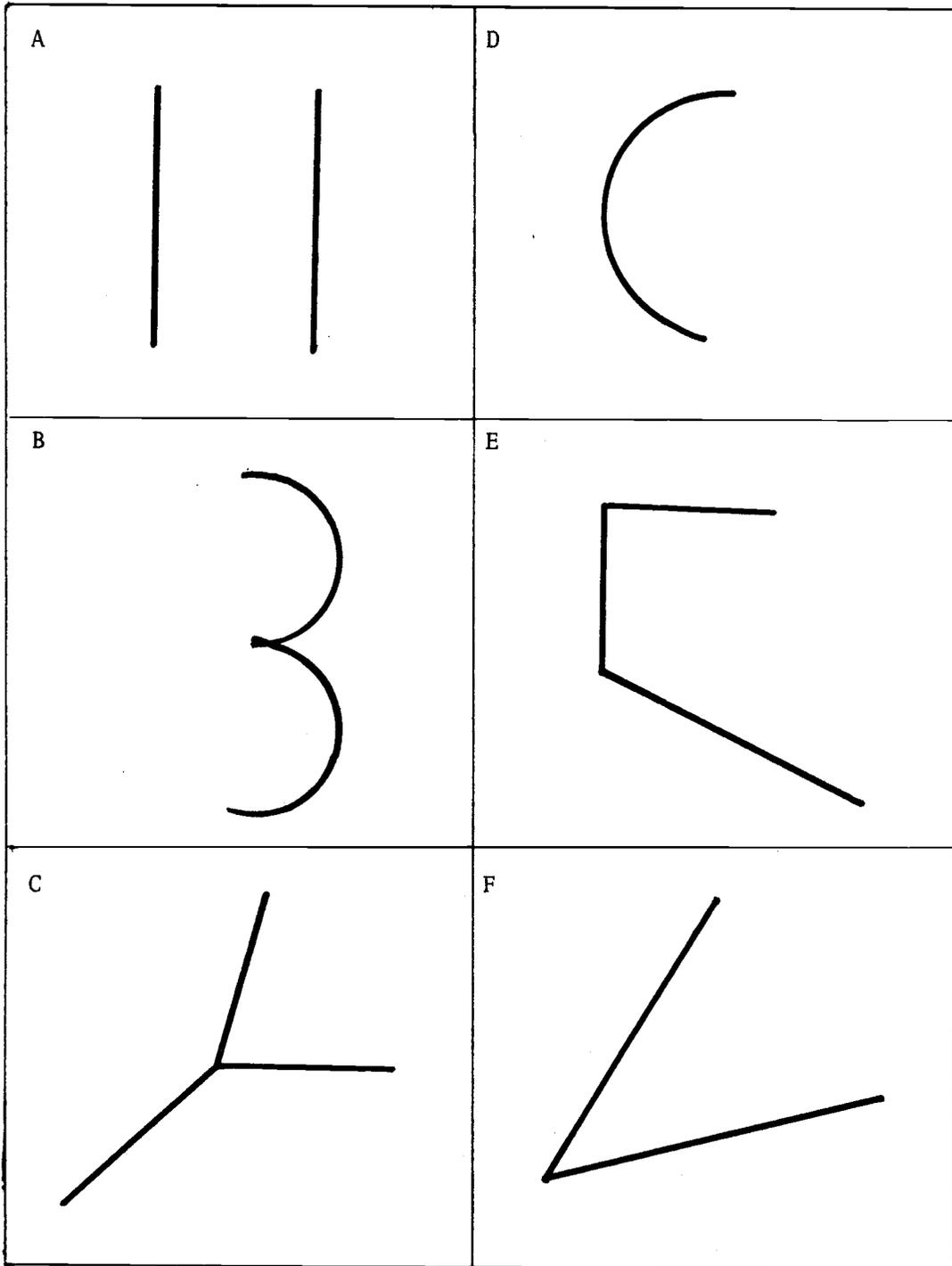
A P P E N D I C E S

Appendix A

A Detailed Description of Subjects According to
Age, Sex and I.Q.

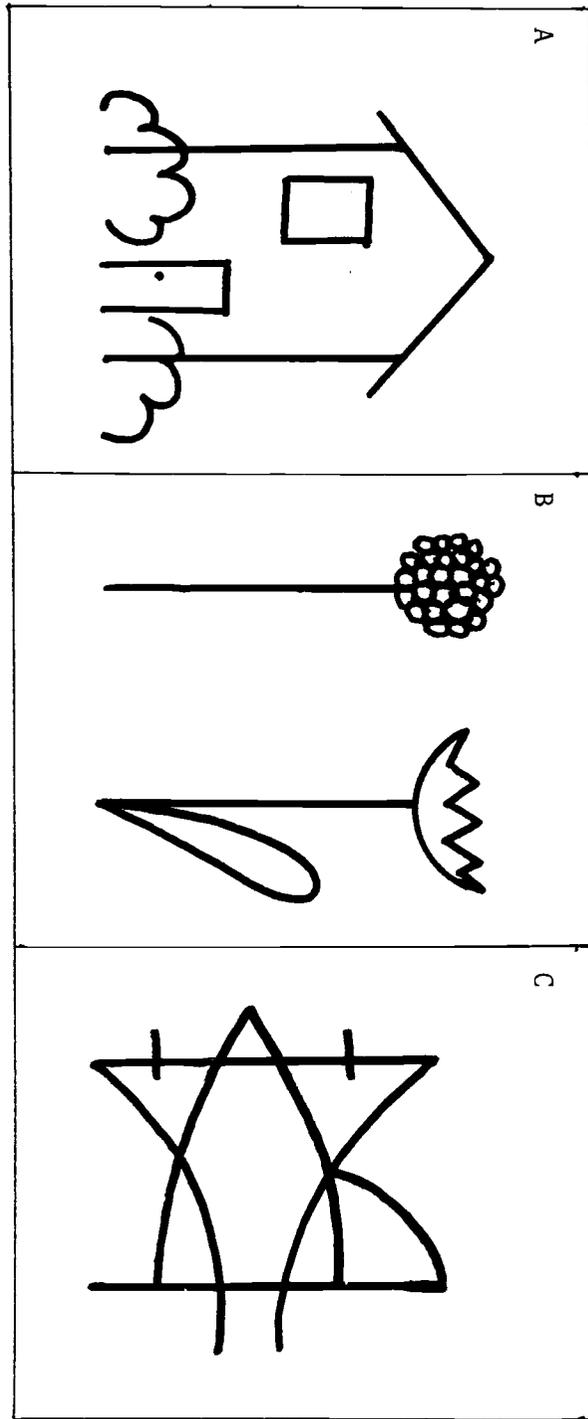
Subject	Age years/months	Age Group	Sex	I.Q.
01	4/5	3	M	106
02	3/9	2	F	128
03	3/7	2	M	122
04	4/5	3	M	108
05	3/4	1	M	134
06	4/2	3	M	100
07	3/4	1	F	120
08	3/8	2	F	108
09	3/8	2	F	124
10	4/4	3	F	103
11	3/6	1	F	123
12	4/0	3	F	124
13	3/6	1	M	107
14	4/3	3	F	109
15	3/5	1	F	101
16	3/5	1	M	117
17	3/4	1	M	99
18	3/8	2	F	121
19	3/9	2	F	96
20	3/10	2	M	96
21	4/0	3	M	133
22	4/2	3	F	124
23	4/3	3	F	102
24	4/4	3	F	117
25	4/4	3	F	122
26	3/6	1	F	91
27	3/9	2	M	102
28	4/10	4	M	118
29	4/9	4	M	98
30	4/5	3	M	116
31	4/4	3	F	106
32	4/5	3	F	109
33	4/5	3	M	92
34	4/8	4	F	123
35	4/9	4	M	127
36	4/10	4	M	132
37	5/0	4	F	103
38	4/9	4	F	141
39	4/7	4	M	119
40	3/5	1	M	125

Appendix B
Stimulus Figures For Cooper's Incomplete Figures Task



Appendix C

Examiner's Examples for Cooper's Incomplete Figures Task



Appendix D

Scoring Procedures for Cooper's (1968)
Incomplete Figures Task

Originality scores are obtained by comparing each response of the subject to all of the responses made by the same subject. The following list is the scoring guide for originality.

- (1) Score of zero: no indication of originality; at least four stimulus figures are treated in the same manner; similarity is found in at least four products even though the subject has given them different names, or the product is an apparent copy of the examiner's examples.
- (2) Score of one: possible indication of originality; at least three stimulus figures display variety of line or at least one instance of a definite object identified by the child and/or identifiable to the adult.
- (3) Score of two: definite indication of originality; at least three instances of different and definite objects and/or production of different and definite designs.

Penetration scores are obtained by the way the subject does or does not close the stimulus figure on the first drawing. The following list is the scoring guide for penetration.

- (1) Score zero: no indication of penetration; the figure is closed with direct straight or curved lines.
- (2) Score one: possible indication of penetration; the figure is enclosed or the figure is closed with:

- (a) a complex line with one or more angles in it.
 - (b) a curve that continues past the stimulus figure.
 - (c) a complex curve.
 - (d) if one or more of the possible angles or openings are closed.
- (3) Score two: definite indication of penetration; the figure is not closed by the drawing made.

Elaboration scores are obtained from the amount of detail, both figurally and verbally, that is added to the basic product in a second drawing. The basic product is the stimulus figure which the subject has left as is. If after completing the drawing the child scribbles it out, the scribbling is not considered elaboration. The scoring of this type of drawing is done on the figure as it was prior to the scribbling. If details outside of the basic product are repeated in three or more figures, they are not considered elaboration. The following list is the guide for scoring elaborations:

- (1) Score zero: no indication of elaboration; lines added by the subject are either imitations of the stimulus figure or are unrelated to the basic product or a copy of an example which has been produced without all of the details. Unrelated lines are usually located outside of the basic product and do not meet or connect with the basic product.
- (2) Score one: possible indication of elaboration; elaboration in terms of meaningless details; solidly filled in or outlined, related lines that have been added inside the basic

product, or a copy of the example which has been reproduced with all or nearly all of the details.

- (3) Score two: definite indication of simple elaboration; addition of simple functional details or a copy of an example which has been reproduced with all or nearly all of the details of the original as well as additional functional details.
- (4) Score three: definite indication of complex elaboration; addition of specific complex details which consists of two or more details that are definitely related to the product that are either named or described by the subject, or are definitely clear to the rater.

The fluency score is the number of figures attempted. If the subject attempts all six figures, he is given six points. If he attempts five, he is given five points, and so forth. There are exceptions which receive one-half point. These are:

- (1) The product drawn is similar to example.
- (2) The figure is closed with a direct line and not added to.
- (3) The product is a repetition of the stimulus figure.
- (4) The product consists of unrelated lines.
- (5) The product is represented in two or more drawings.

Appendix E

Beller's Scale of Independence
or Autonomy Among Children

Name of Child

Name of Rater

Date

1. How often does the child derive satisfaction from his work?

This can be judged from the following behavior: The child finishes its activity, e.g., painting, building, play, etc., without asking teacher for comment; without making derogatory comment on the work of other children; or without showing disturbance or irritation by bullying other children, dashing off wildly, destroying one's own work, etc., but instead moving away from a completed activity and getting ready for a new period.

Very often and very persistently		Often and persistently		Occasionally and little persistence		Very Rarely without persistence	
*	*	*	*	*	*	*	*
7	6	5	4	3	2	1	

2. How often does the child attempt to carry out routine tasks by himself?

Routine tasks: e.g., dressing, washing, eating, toilet behavior, etc. The rater is to put special emphasis on the child's attempts to carry out these routine tasks by himself. The occurrence of such attempts can be observed directly by seeing the child trying to dress

by himself, to dress or undress at the toilet, trying to get the water running for washing, etc., (while the teacher assisted another child), or the child may be found doing any of these in a clumsy way but doing them as best he can. (The rater must be careful to not let their feelings of a self-evident duty to assist the child in all routines when the child needs assistance interfere with an objective appraisal.)

Very Often and very persistently		Often and persistently		Occasionally and little persistence		Very Rarely without persistence
*	*	*	*	*	*	*
7	6	5	4	3	2	1

3. How often does the child attempt to overcome obstacles in the environment by himself?

By obstacle we mean missing a necessary tool or object in play or work, having misplaced a towel, a toy, clothing apparel, etc., desired objects that are placed out of reach, etc. The extent of the child's striving to overcome such obstacles by himself can be seen when, after his turning away from an ongoing activity (play or work), he returns and continues after having overcome the obstacle. This is distinguished from reaction to such obstacles which are characterized by the child's interrupting his play or work to join other children or another child, to scream out loud -- "I need a hammer", "I need another truck" -- to go from child to child begging, demanding, and finally grabbing the desired object, or simply beginning to daydream, wandering off aimlessly or crying. How often does the child seek or

strive to overcome obstacles in the environment on his own without getting distracted from his ongoing activity?

Very often and very persistently		Often and persistently		Occasionally and little persistence		Very Rarely without persistence
*	*	*	*	*	*	*
7	6	5	4	3	2	1

4. How often does the child take initiative in carrying out his own activity?

When the child comes into the playroom, art room, or playground, he knows what he wants to do and proceeds to do so, e.g., sandbox, bicycle, swing, building a ship, or a tunnel with blocks, etc. This can be distinguished from going out into the playground and looking around for someone to join, clinging to the teacher, standing or wandering around aimlessly until teacher takes initiative, asking someone to play with him, or mostly wanting toys or tools which other children have already begun to use. It does not matter whether another child enters his activity occasionally, the main criteria being whether he has his own ideas and proceeds to carry them out.

Very often and very persistently		Often and persistently		Occasionally and little persistence		Very Rarely without persistence
*	*	*	*	*	*	*
7	6	5	4	3	2	1

5. How often does the child complete an activity?

Once the task is set by the teacher or selected by the child, the child carries it out to completion, e.g., construction, play, art, ect. This is to be distinguished from giving up easily, getting bored, disinterested or distracted. It is also to be distinguished from rigid perseveration, i.e., a child just keeping on doing one thing regardless whether it is successful or unsuccessful attack on the task. Use as your basic criterion how often a child carries an activity to its completion.

Very often and very persistently		Often and persistently		Occasionally and little persistence		Very Rarely without persistence	
*	*	*	*	*	*	*	*
7	6	5	4	3	2	1	