

EXPLORING CREATIVE BEHAVIOR IN THREE AND
FOUR YEAR OLD CHILDREN

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BY

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ABSTRACT

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By

Coleen Baird

Available research on the subject of creativity does not give a clear, concise picture of what is meant by the term "creativity". One component however was found in most of the literature reviewed, and that is the concept of uniqueness or innovative behavior. The present research, in an attempt to come up with a workable definition of creativity, focused on this specific area without claiming it to be a totally encompassing view of creativity. In this study, creativity was defined as the exhibition of unique or original behavior in contrast to other children.

The literature reviewed also contained examples of training programs to increase creativity. The success of some of these programs leads to the assumption that creativity can be taught, or at least increased by freeing the individual from some obstructions to creativity.

Before these assumptions could be tested, it was felt it would be necessary to have some measure of creativity. While tests were available for the assessment of creativity in older children, there were no tests for creativity at the preschool level. This project, set up a three task procedure to measure creativity in three and four year old children. The ~~three~~ tasks were "Dog and Bone" which required the children to think of different routes which a dog could use to get his bone, "Blocks" which involved the use of blocks varying in size, shape and color from which

the child was asked to build something, and a picture of the child, drawn by himself. He was given a set of 9 colored markers to use. Each task was then rated for uniqueness.

Substantial congruent validity was found among the three tests for creativity. The difference score for the dog and bone test correlated very highly with the uniqueness scores on the draw a picture of self, and blocks exercise. Therefore the Dog and Bone difference scores were substituted for the Dog and Bone uniqueness score as a measure of uniqueness. When these scores were summed, they formed a highly reliable overall measure of creativity.

A significant difference was not found between the older and younger children tested as to the uniqueness scores. Equal amounts of diversity in both groups were found.

Quantity (number of attempts) did not necessarily predict quality (uniqueness or creativity score). There were significant relationships between quantity scores and quality scores. The relationships however seemed to be dependent on the specific nature of the exercise rather than being constant across exercises.

By reviewing the data, it becomes apparent that there is a component of thinking in young children called creativity, which can be measured and is fairly consistent across exercises. This characteristic of individuals seems to be most transferable through common mediums; i.e., color, line. The implications from these findings are discussed.

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I appreciate the focus which Dr. Melcer brought in on the important role of the family in a study of creativity, and for his suggestions in setting up the tasks.

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	
Need for Further Study into Creativity	1
Purpose	4
Hypotheses	5
Theory	6
Overview	7
CHAPTER 11: REVIEW OF LITERATURE	
Defining Creativity	8
Training Children in Creativity	11
CHAPTER III:METHODS OF PROCEDURES	
Procedures	14
Sample	15
Measures	15
Testable Hypothesis	21
Analysis	21
Summary	22
CHAPTER IV: RESULTS	23
CHAPTER V: DISCUSSION AND IMPLICATIONS	
Summary	34
Conclusions and Discussion	36
Implications for Future Research	40
APPENDICES Appendix A: Letter to Parents	46
Appendix B; Raw Data.	47
Appendix C: Coding Sheet	48
BIBLIOGRAPHY	49

"LIST OF TABLES"

Table 1: Age and Sex Distribution of Children	16
Table 2: Means and Standard Deviations for Measures of Creativity	24
Table 3: Correlations of Uniqueness Scores for the Three Creativity Tests	25
Table 4: Correlations of Quantity and Difference Scores for the Three Creativity Tests	26
Table 5: Analysis of Variance for Younger and Older Children	29
Table 6: Homogeneity of Variances	30
Table 7: Correlations Between Uniqueness and Quantity Scores for the Three Creativity Tests	32

CHAPTER I: INTRODUCTION

For most researchers and educators, creativity seems to have been ignored with the strong emphasis on cognitive development. A few exceptions can be found, however, of researchers who have persevered with the study of creativity over the years (Torrance, 1965, 1965b, 77; Wallach and Kogan, 1965). Recently some researchers and educators have become concerned with this lack of emphasis. Butler (1970) stated that the future of our civilization is largely dependent on the projected creative abilities and imagination of children. Although concern has been expressed, there is little evidence of research which has focused on this need.

Need for further study into creativity

There is a strong justification for research and study into creativity. Creative thinking is a powerful force, and from it we have received great advances both in the sciences and the arts. As Torrance (1962) accumulated research, it became evident that creative thinking had significant value in addition to achievement in arts and sciences. Its importance in mental education, vocational success, and other areas of life are only beginning to be recognized. Torrance stated that perhaps nothing can contribute more to the general welfare of individuals, and their satisfaction and mental health than a general raising of the level of creative behavior. He states:

"There is little doubt but that the prolonged and severe stifling of creative thinking cuts at the very roots of satisfaction in living. This must inevitably create overwhelming tension and breakdown."
(Torrance, 1965)

Torrance also pointed out that as evidence from longitudinal and cross-cultural developmental studies accumulated, it became clearer and clearer that creativity needs to be energized and guided almost from birth. He felt that if it were stifled early, it would only become imitative creative behavior if it survived at all (Torrance, 1965).

Hopefully, with increased research into creativity, we can begin to untangle some of these problems and processes which face us today. The next question becomes, "Are we looking for these answers with the right age group?" While creative needs and creative thinking abilities are universal enough to make creative ways of learning valuable for all children, the great individual differences in the strength of these needs and the nature and degree of these abilities make the problem more complex. Yochim (1967) also contended that creative attitudes established early in childhood appear to influence all subsequent behavior, tend to become personality factors and should be valued as such.

What does this research imply? Some researchers have observed that five year olds lose much of their natural creativity by the time they enter school (Pulsifer, 1963). Elizabeth Andrews did a very careful and systematic study of creative or imaginative functioning and development during the pre-school years (Andrews, 1930) and she found that the total imaginative scores were highest between 4 and 4½ years with a sudden drop at age 5 when the child entered kindergarten. This suggests perhaps that more attention should be given to the productive years before entering school, when creativity appears to be unhampered by later constraints.

Many who have commented on this drop in creative thinking ability and behavior have looked upon it as a purely developmental phenomenon. Torrance (1962) did not accept this. His research pointed out that this developmental curve is cultural rather than developmental and that what he terms "creative thinking" can and should be taught.

But just how early do children exhibit this innovative behavior? And can it be measured? Does the way in which parents work with their 2 year olds influence the development of the child's ability to utilize unique methods. A study by White (1975) focused on the period from 10 months to 3 years and found that a caretaker's actions do more to influence a child's future competence at age 10-18 months than any time before or after this period. White's research found differences appearing among children in intellectual and social skills. Differences might also exist in creative behavior.

Looking at innovative behavior with children 3 and 4 years old, are there some who are exhibiting a greater ability to think or react in more unique ways? A measurement device is needed at an earlier age, an age where unfortunately, many of the tests for creativity are inappropriate. Several tests are available for the assessment of intellectual abilities in nursery school age children, but there are no tests for creativity at this age level.

Research focusing on creativity with young children would hopefully shed new light on several areas of concern and help in our understanding of this complex process. We need research which will help us come to a more complete understanding of a child's abilities. There is more to a child's potential than his IQ, whether it is labelled creativity, innovative behavior, or divergent thinking. Wallach and Kogan (1965),

for example, have found an independence of traditional intelligence measures from indices of associative creativity when the measures were presented in a game-like, nonevaluative context.

Having some measure of creativity would be a means of becoming aware of potentialities that might otherwise go unnoticed in children. This would be valuable in recognizing giftedness in all children, but especially in the culturally disadvantaged child.

A measure of creativity would help make it possible to ascertain at what level children are functioning so as to be able to pinpoint their needs and deficiencies and help them to broaden their frame of reference and open their minds to new avenues of thought. Several programs have been set up with specific goals in mind; to increase creative ability, to increase the spontaneous and free flow of ideas, and to hopefully eliminate some of the blocks to the development of creativity. An appropriate measure would make it possible to evaluate these programs.

Purpose

A number of creativity measures for older children and youth are available. However, there are no tests which measure creativity in pre-school children. If creativity is to be taught and programs developed to guide children in learning, the creation of such a test would appear to be the logical next step. The purpose of this study is to set up a measurement of creativity for children 3 and 4 years of age. One of two strategies could be adopted. The first choice would be to validate for younger children a creativity test developed for older children. The second alternative would be to completely develop new tests for younger children. A combination of these two approaches was adopted for this

study. The Dog and Bone test (Banta, 1969) was validated by comparing it with two new tests which were developed specifically for this study.

These two new measures of creativity which have face validity were structured so that they required cognitive processes analogous to those involved in the creative measures of older children (Getzel and Jackson, 1962; Wallach and Kogan, 1965; Torrance, E.P., 1961; Barron, F., 1958; and others). However, the attempt was to gear the exercises to the conceptual level of the younger child. This was done by dealing with variations in colors and shapes, which would seem to be more congruent with the mental development and interest level of the younger child than the exercises commonly used. The established test for 4-6 year olds which was used was a subtest from the Cincinnati Autonomy Test Battery (Banta, 1969) called the "Dog and Bone Test."

Hypotheses

This research had two objectives which it focused on:

- A. The attempt was made to develop a creativity measure for three and four year olds using a three task procedure.
- B. The research would serve as an exploratory study for future research to build on in an attempt to better understand the creative process.

The paper was designed to investigate the following hypotheses within the context of the objectives:

1. There will be a substantial congruent validity among the three tests for creativity.

2. There will be no difference in the average level of creativity as measured by the three tests between the three and four year olds.
3. There will be equal amounts of diversity among the younger and older children on the measures of creativity.
4. Quantity (number of times tried) will not be correlated with Quality (uniqueness or creativity scores).

Theory

This research presumes that creativity is an individual characteristic and will remain stable across mediums and experiences. If a child is creative in his approach to one problem, he is likely to be creative in his solution of other problems as well. Therefore, it is hypothesized that there will be substantial congruent validity among the various tests for creativity.

Questions have also been raised regarding the stability of creative ability over age classifications. The argument against measurement suggests that at such a young age changes in creativity are a function of the maturation process and nothing else. Therefore, measurement will be a measurement of the speed at which individuals develop and not a measurement of actual individual differences. If this assumption is correct, the older groups of children should have a higher mean value on the creativity measures but should still have comparable diversity, i.e., there should be no differences in the variances. Other research (Kogan and Pankove, 1972) suggests that ideational productivity and uniqueness scores are fairly consistent over different age categories. This would suggest that neither the mean values of the creativity

measures nor the variances should vary across age groups. Hypothesis 2 of the research was directed at determining whether it was correct to assume that there would be no difference in the average level of creativity between the older and younger group of children. In Hypothesis 3, the variances across age groups were analyzed.

A review of the literature on creativity (Roweton, 1972) demonstrated that measures of quality and quantity may be confounded. Research does not make it clear whether quality and quantity are independent measures. The question has been raised as to whether those children who scored high on the tests were scoring high simply because they engaged in more activity. It would be appropriate to investigate whether quantity led to quality and if there would be some correlation. This research hypothesized that quantity and quality would not be correlated.

Overview

In Chapter II, the pertinent literature is reviewed giving some of the definitions for creativity as well as a discussion on training children to be more creative. In Chapter III, procedures are presented, with a description of the sample and the three tests of creativity which were administered. In Chapter IV, the results are described with an explanation of the relevance of each hypothesis.

In beginning any type of study of creativity, the first step must be to come to some sort of definition of creativity. At the beginning of Chapter II, a review of some of the researchers' definitions of creativity are presented; after which there is a statement of the definition of creativity which this study has used.

CHAPTER II: REVIEW OF LITERATURE

Defining Creativity

Many researchers have questioned the use of the word creativity in dealing with anything concrete. They feel that creativity is infinite and its possibilities can never be exhausted; and, therefore, it is impossible to measure. Others feel that the term is too value laden and cannot be used effectively.

The "creativity" research which is available is somewhat confusing. The dimensions studies are so varied that it is difficult to determine which, if any, appropriately define creativity. Getzel and Jackson (1962) refer to creativity as a cognitive ability which can best be tested in a written manner. They describe it as the "ability to deal inventively with verbal and numerical symbol systems and with object-space relations based on the novelty, variety, and amount of adaptive responses to the task given them." From this, they proposed five creativity indicators.

Cline, Richards, and Needham (1963) explored seven presumed measures of creativity. These measures included word associations given in response to various stimulus words, atypical drawings, infrequent uses for familiar objects, and a composition looking at uniqueness of overall work and cleverness of plot title.

Torrance has been involved in the study of creativity for many years. Torrance defined creativity as the process of sensing difficulties, problems, gaps in information and missing components, and bringing currently existing information together into new relationships. According to Torrance, creativity is involved in making guesses about the

deficiencies noted, testing these guesses and perhaps revising them, and then communicating the results.

A battery of tests has evolved from the years of studying which Torrance has done. These tests identify creative elementary school children and compare them with their classmates on certain variables. Such measures include the inventive manipulation of toys, alternative solutions to frustrating situations in well-known children's stories, and the Ask and Guess Test for eliciting creative thinking (Torrance, 1959). Using these exercises, Torrance and Gowan (1963) found that visual and verbal measures of creativity are largely independent of each other.

Guilford and his associates (1968) have also investigated creativity. Guilford has dealt with a concept called "divergent thinking" and stated that this type of thinking is an indication of creativity. He categorized specific processes under the heading "divergent thinking." The areas he covered are: word fluency, associational fluency, ideational fluency, spontaneous flexibility, adaptive flexibility, redefinition, and originality.

Much of the literature seems to equate divergent thinking and creativity, but Lytton (1972) brought out that there is little evidence to suggest that scores from such tests have much relation to concrete creative performance. The relationship between divergent thinking and the creative domain, especially in regard to science and technology, are a great deal more complex, according to Lytton, than many researchers explore.

Auerbach (1972) stated that a creative act marked a change; a new, unique, and original development for an individual. Koestler (1967) described creativity as a pyramid-like hierarchy where simultaneous

activities occurring at several levels are brought together. Starkweather (Butler, 1970) described several intellectual factors which he felt are part of the creative domain. Thinking in such a way as to produce a variety of responses, transformations; being able to manipulate or toy with ideas, and the ability to sense ambiguities are some of the factors he mentioned.

Lytton (1972) discussed two types of creativity: subjective and objective. According to Lytton, objective creativity is composed of appropriateness, novelty, and power to transform the traditional constraints of reality and yield radically new perspectives. It can be part of any human activity and can be present at different levels of intelligence or ability. Subjective creativity is when a person combines or groups stimuli in a way which is new or novel to his previous experiences, although others may have done it prior to his attempt.

Subjective creativity presumably takes place in young children in developing a sense of competence and learning new skills. Although children may lack the mastery or differentiation necessary to exhibit the highest level of objective creativity, it would appear that they are involved with objective creativity at some level.

Summary

In summary, the literature cited does not give a clear, concise picture of creativity. Researchers have dealt with highly specific traits and used unique definitions. There is no agreed upon definition. However, all have some aspects in common. One component which is found in all of them is the concept of uniqueness or innovative behavior. The present research focuses on this specific area or ability, without

any claim that it is a totally encompassing view of creativity, but recognizing it as an important component of creativity. Therefore, creativity will be defined in the present research as the exhibition of unique or original behavior.

Training Children in Creativity

The literature reviewed also contained programs set up to increase creativity in children. Attempts have been made to teach children to think creatively, and Torrance studied 142 different methods (Torrance, 1972). From this, he found that those which had the highest percentages of success were those that emphasize the Osborne-Parnes training program, other disciplined approaches, the creative arts, and media-oriented programs. One thing that he felt his investigation established was that children can be taught to think creatively. The most successful approaches seem to be those that involve both cognitive and emotional functioning, provide adequate structure and motivation, and give opportunities for involvement, practice, and interaction with teachers and other children. Motivating and facilitating conditions certainly make a difference in creative functioning, but differences seem to be greatest and most predictable when deliberate teaching is involved.

The concept that teaching creativity can be accomplished has been discussed in several other articles (DeVito, 1976; Baroody, Brumley, Hocesvar and Ripple, 1976). Torrance and Fortson (1968) reported a study attempting to assess the creative growth that occurred among the children participating in a program entitled a "Creative Aesthetic Approach to School Readiness and Beginning Reading and Mathematics" which was formulated and elaborated by Laura R. Fortson. The results indicated that as

a result of attending this school, the children showed significant gains in several areas; with verbal and figural originality being two of the areas.

The Creative Studies Project (Parnes and Noller, 1971) is an interdisciplinary effort to conduct research into the nature and nurture of creative behavior, and to take these findings and build them into an educational program at the university level.

Another example of a training procedure is that of Covington, Crutchfield, and Davies (1969). The objective of the program is to enhance effective problem-solving skills in 10-11 year old children.

A college course is taught at Buffalo, New York in learning how to think creatively and utilize brainstorming (Lytton, 1972). Another sophisticated approach to creative production has been labelled "synectics" and is a technique which involves working in groups to increase creative output (Gordon, 1961). Starkweather (Butler, 1970) stated that certain intellectual factors are thought to directly contribute to creative power. She saw the challenge as one of finding which sequence of learning activities would help the child relate his fantasies to reality, and eventually learn to represent his internal feelings and experiences by externalizing them through drawing, words, and numbers.

Torrance (1965a) also felt that much could be done to increase creative performance. He felt that by rewarding creative thinking, and utilizing creative activities, creative growth could be fostered. However, he admitted that the provision of such exercises or activities does not guarantee creative growth. He pointed out that it is obvious that other factors must be present for such growth to take place. He maintained that it is quite likely that one important condition is a "larger

environment which values creativity."

Since our abilities constitute, at least to some extent, the basis of needs and motivation, knowledge about a person's creative thinking abilities frequently provides clues about differential preferences for learning, and would thus help us recognize ways in which we can effectively teach and guide children in other aspects of learning besides creativity.

Summary

The concept that teaching creativity can be accomplished in varying degrees has been illustrated. One thing which becomes apparent in reviewing these different methods and approaches of increasing creativity is that most of the programs (Covington, Crutchfield, and Davies, 1969; Parnes, 1963; Osborn, 1953; Parnes and Noller, 1971; and others) are for older children, youth and adults. It is interesting to note the success they have had. However, it would seem that removing some of the blocks to creative expression and helping someone develop the ability to look at things from a variety of angles could be much more effectively accomplished at a younger age, such as three or four years. Although these programs show signs of success, would more effective results be obtained at a younger age? For this reason the present study has focused on three and four year old children.

Thus, based on the above discussion, the present research project had two overall objectives: first, to develop measures of creativity which would be applicable to three and four year olds; second, to gain an initial understanding of uniqueness as one of the most common and generally agreed upon measures of creativity.

CHAPTER III: METHODS OF PROCEDURES

Procedures

Most researchers testing creativity impose definite time limits on the testing. Most researchers administer the tests in groups in a test-like atmosphere. According to Wallach and Kogan (1965), this is in contrast to the very type of concept being sought. They suggest that when testing creativity, it is necessary to have a non-pressured play-type atmosphere, with no time constraints. They basically suggest this because they found that the first answers given were most likely stereotyped, with unique answers, if given at all, being produced after a longer period of time. Within a decreased time, these responses would not have been obtained.

Another study done by Fuqua, Bartsch, and Phye (1975) also found that children who took more time to think things through (they referred to them as reflective children) scored higher than children who acted impulsively on their measures of creativity.

Recognizing these problems, this project used a free-testing atmosphere. This atmosphere was obtained by presenting the exercises as a game, testing each child separately, and removing all time limits.

Before administration of the test, permission was obtained from each of the child's parents. Copies of the letter requesting permission from the parents is included in Appendix A. Over a period of 4 weeks, 3-4 children were tested each day. They were asked by the examiner if they would like to go into the other room to play some games.

Sample

Thirty-three children from whom parental permission had been obtained were asked to participate. Of these children, four initially refused. One child when approached the next day changed his mind and agreed to participate. The ages and sex distribution are included in Table 1. The sample was drawn to include an equal number of boys and girls. Also, there were as many three year olds as there were four year olds. All participants were enrolled in a local nursery school in a suburb of a large eastern city. The sample was drawn from middle to upper-middle class backgrounds. The tests were administered at the nursery school in surroundings that the children were familiar with. The table and chairs were standard nursery equipment, scaled to their small size. The tests were all administered by the author. The children were tested in an atmosphere with ample praise and encouragement. Each child was commended for each response he gave and encouraged to go on. When the child responded that he was done or could think of nothing more to do, the particular test was terminated. With this freedom of time constraint, there was a variation in time for the complete testing from about ten minutes to 40 minutes.

Measures

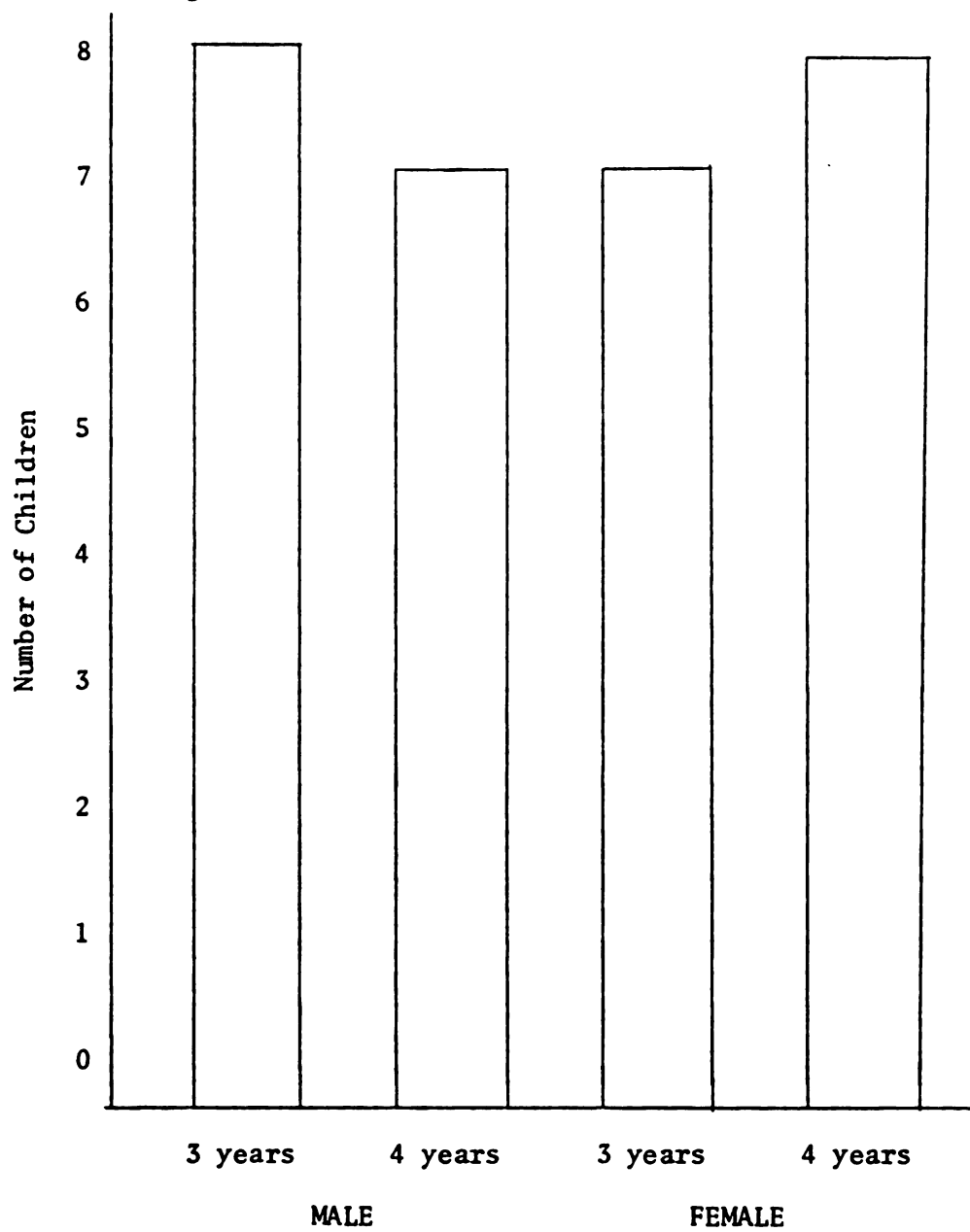
Included below are descriptions of each of the measures. The raw scores are included in Appendix B.

1) Dog and Bone

The Dog and Bone is a measure taken from the Cincinnati Autonomy Test Battery (CATB) which is a general test for autonomy in children four

Table 1

Age and Sex Distribution of Children



to six years old. This particular exercise refers to unique answers or behavior. Materials used are a toy dog, bone, and four dog houses. The experimenter points to the dog and asks the subject what it is. "The dog has a bone, right here, which it wants to get (points to bone). There are four dog houses. One way that the dog can get his bone is to go this way (go directly to bone), but it can also go around this house and get the bone. Can you think of any other ways the dog can get his bone?" The game is continued until the child's actions become completely repetitious (no new routes are used in the ten successive tries) or the child loses interest. Each time the child moved the dog from the beginning position to the bone, the path taken was marked by the examiner on a score sheet (see Appendix C). Three related variables were measured: the number of unique responses produced by the child; the number of different responses produced by the child; and the total number of responses produced by the child.

- a) The total number of responses was determined by the child exhibiting the path the dog could take to get the bone. The examiner would then trace the path on a marking sheet (See Appendix B). Each time the child showed how the dog would go, it was recorded, whether it was repetitious or not. The total number of tries was a score determined by counting the number of attempts the child made. The range varied from 40 tries to 2 tries.
- b) The number of different responses was determined by crossing out the repetitious tries each child made for getting the dog to his bone on the marking sheet. The score was then the total number of tries after subtracting the repetitious ones. The range was from 18 to 2.
- c) The uniqueness of the responses was determined by counting the number

of children who responded in the same way for each different attempt the child made. Thus, a child who has 20 responses but only eight different responses would receive scores for each of the eight different responses. If on the first of the eight responses, 15 other children responded the same way, the child would receive a score of 15 for that particular response. If on the second response there were only two who responded the same way, the child would receive a score of 2 for the second response. For each of the different responses (in this case 8), the child would then have a separate score. Each of these scores would be totaled and then divided by the number of scores being added to obtain an average uniqueness score. This, then, was the uniqueness score for the Dog and Bone measure. The range of scores was from 22 to 4.07, with the lowest score representing the greater uniqueness.

2) Playschool Blocks

The materials used were Playschool blocks varying in size, shape, and color. The experimenter sat down with the child and the blocks. The instructions were: "I can put the blocks on top of each other and build something like this (takes four blocks and stacks them vertically). Or, I can lay them side by side, and build something like this (places them together horizontally). There are many different ways to build things with blocks, can you show me some others?" The game continued until the child lost interest.

- a) The number of blocks used is a total of the number of blocks a child used. There were a total of 66 blocks available. Therefore, the highest score possible for this measure was 66. There was a range

from three to 66.

- b) Different colors. The score for this was a total of the number of different colored blocks the child chose. Six different colors were available, so the highest score a child could obtain was six.
- c) Unique shapes. The same procedures for scoring uniqueness were used. First of all, a list was made of the different shapes of blocks a child could choose from. Each of these blocks was given a corresponding number to identify it. Each shape then received a number which was the total number of children who used that particular shape. Each shape the child chose was given this corresponding number, and all of these numbers were totaled and then divided by the total number of shapes the child has used. This comprised the uniqueness of shapes score for the blocks.
- d) Elaboration of construction. A point system was set up whereby the children received points for the complexity of their construction. The point system was as follows:
 - A) If the child's construction consisted of placing blocks side by side or adjacent to each other, they received one point.
 - B) If, in the context of doing this, they created a box or enclosed area, they received two points.
 - C) If they put one or more blocks on top of another block, they received two points.
 - D) If they build something by using two blocks to support a third in some type of arch pattern, they received three points.
 - E) If they developed a clear pattern such as alternating the block direction while building vertically, they received three points.

All of these points which a child received were then added to

obtain his total uniqueness score for construction. In this measure, opposite from the others, the more elaborate the construction, the higher the score. The range was from 11 to one.

3) Drawing of Self

The materials used were a white sheet of paper and a set of colored markers with a choice of nine colors. At the completion of the previous two exercises, the child was asked to draw a picture of himself. The markers were placed in front of him, out of their container, and the experimenter began by saying, "Use any of the colors you like, and take as much time as you want. I would like you to draw a picture of yourself. Put into the picture anything else you would like to." This exercise continues until the child feels that he is done. There were three scores to this measure: One for uniqueness of colors chosen, one for the number of distinct lines, and a third was a uniqueness score for unusual aspects of the person.

- a) The number of colors used is a total of the number of colors a child used. There were nine markers offered to each child--making the highest score possible for this measure a nine.
- b) The uniqueness of colors used in the child's picture was obtained by counting how many children used each of the colors. Each color a child used was then given this number. These numbers were added for each child and then divided by the number of colors the child used.
- c) Distinct lines is a total of distinct or separate lines in the child's picture. This score was somewhat subjective in that the examiner decided what constituted a distinct part or line.
- d) Uniqueness was arrived at in the following way. The examiner made a

list of all the recognizable body parts in all of the childrens' pictures. After this list was compiled, each item on the list was given a number. This number consisted of the total number of children that had this particular item in their picture. Each item that a child had in his picture from this list was then given the appropriate number which corresponded with that item. These numbers were added up for each child and divided by the number of items. This score then constituted the uniqueness score. Again the lower the score the more unique the drawing.

Testable Hypotheses

- Hypothesis 1: There will be a substantial congruent validity among the three tests for creativity.
- Hypothesis 2: There will be no difference in the average level of creativity as measured by the three tests between the older and younger group of children.
- Hypothesis 3: There will be equal amounts of diversity among the younger and older children.
- Hypothesis 4: Quantity will not be correlated with quality.

Analysis

In order to investigate the research questions the following analyses were done. In order to test Hypothesis 1, the congruent validity of the tests was determined by analyzing the correlations among the measures. The concern was the extent to which quality and quantity measures tended to transfer from one activity and medium to another. This will be indicated by the extent to which the measures correlate with each other.

Differences between older and younger children in Hypothesis 2 were determined by using analysis of variance procedures. This statis-

tical technique was chosen because it made it possible to do multi as well as univariant analysis. Thus it was possible to test the additive as well as the individual affect of the creativity measures. The older and younger age groups were established by splitting the group in the middle. Those who were three years old were in one group and the four year olds were in the second group. The differences in means for the two groups were tested using the standard F test of the Analysis of variance. In order to test Hypothesis 3, the differences in variances were tested by using the Hartley procedure (Weiner, 1971) for testing homogeneity of variances.

Lastly, the relationship between quality and quantity hypothesized was investigated by again considering the correlations among and within the tests for these two types of measures.

Summary

In a play-like atmosphere, with no time constraints, 30 children between the ages of 3 and 4 were tested. A design was set up to study the uniqueness of children's responses across a range of three tasks. The first procedure was the "dog and bone" which required the children to think of different routes which a dog could use to get his bone. The second test involved the use of blocks varying in size, shape and color. The children were asked to build something with the blocks. The last test required the child to draw a picture of himself with a set of nine colored markers. Each task was then rated for uniqueness.

CHAPTER IV: RESULTS

Means and standard deviations for the measures are presented in Table 2.

Hypothesis 1: There will be a substantial congruent validity among the three tests for creativity.

The results of the analysis for congruent validity of the tests is presented in Tables 3 and 4. Multitrait-multimethod techniques of analysis can be modified to analyze the results (see Campbell and Fiske, 1959 for a full explanation of the procedures.) Using this method, portions of two different tests designed to measure the same theoretical construct should correlate highly. Separate portions designed to measure different theoretical constructs should not correlate.

In the correlations among uniqueness scores for the three tests there seem to be some of these trends (see Table 3 and 4). The first thing that is evident from Table 3 is the complete lack of any significant correlations for the Dog and Bone uniqueness score with any of the other scores. The lack of correlation is surprising and would indicate that the uniqueness scores of the Dog and Bone when compared to the others is not measuring the same conceptual dimensions. Perhaps a higher level of creativity is being tapped. In the other two measures, the external cues are provided and the child responds. In the Dog and Bone, the child internally visualizes his actions. This is perhaps a more difficult level of creativity.

Significant correlations were found among measures from the Picture of Self measure and the Blocks measure (see Table 3). There seems to be high transferability of what might be called the content of crea-

tivity. Shapes from the blocks exercise and lines from the picture exercise were highly correlated. They were both also significantly related to the colors uniqueness score from the picture exercise. A negative relationship seems to exist between what has been referred to as the elaboration score and all other scores.

It must be remembered that for all uniqueness scores the lower the number, the greater the uniqueness. For the elaboration score in the construction, the higher the number, the more positive the score. A positive correlation between these two sets of measures would indicate a negative relationship. Thus the elaboration score, conceptually, was positively related to all scores.

Table 2

Means and Standard Deviations for Measures of Creativity

n = 30

	Mean	Standard Deviation
Dog & Bone/Quantity	15.1	10.4
Dog & Bone/Difference	9.7	10.3
Dog & Bone/Uniqueness	11.8	14.1
Picture/Colors/Quantity	4.3	3.2
Picture/Colors/Uniqueness	19.4	7.3
Picture/Lines/Quantity	30.0	25.3
Picture/Lines/Uniqueness	18.6	13.2
Block/Quantity	24.9	25.1
Block/Colors/Difference	4.0	1.6
Block/Colors/Uniqueness	2.3	.3
Block/Construction/Uniqueness	10.8	17.3

Table 3

Correlations of Uniqueness
Scores for the Three Creativity Tests

n=30

Uniqueness Score	(1)	(2)	(3)	(4)	(5)
Dog & Bone (1)	1				
Picture/Colors (2)	.15	1			
Picture/Lines (3)	-.15	.29	1		
Blocks/Shapes (4)	-.04	.36*	.86**	1	
Blocks/Elaboration (5)	.03	-.83***	-.32*	-.40**	1

*p < .05
 **p < .01
 ***p < .001

Table 4

Correlations of Quantity and Difference
Scores for the Three Creativity Tests
n=30

Quantity Score	(1)	(2)	(3)	(4)	(5)	(6)
Dog & Bone/Quantity (1)	1					
Dog & Bone/Difference (2)	.71***	1				
Picture/Colors/Quantity (3)	-.08	-.23	1			
Picture/Lines/Quantity (4)	.32*	.38*	.24	1		
Blocks/Quantity (5)	.30*	.46**	.08	.34*	1	
Blocks/Colors/Difference (6)	.20	-.18	.36	.04	.03	1

*P < .05

**p < .01

***p < .001

The correlations among the quantity and difference measures yielded slightly different results (see Table 4). Significant correlations exist across what seem to be common media, i.e. number of colors in the picture was significantly positively related to number of colors used in the blocks. Number of lines in the picture was related to number of blocks used in the block construction. Relationships were not found among the different media within the same exercise. Number of colors used in the blocks did not predict the number of blocks chosen. Number of colors in the picture was not at all related to number of lines in the picture. Overall no real relationship between quantity measures and difference measures were visible. Only in the dog and bone was there a relation between the number of attempts and the uniqueness of these attempts. Evidently on that exercise the more times the child tried the more likely he was either by chance or skill to discover different routes to the dog house. The fact is that on the other two exercises the quantity scores did not predict the difference scores. This would indicate that it may well have been just chance and the structure of the exercise on the dog and bone exercise which allowed quantity to predict difference. That is, the more times that the child tried the more different routes he/she tried. In fact these were the instructions of the exercise. "Are there any other different ways the dog can get his bone?"

Dog and Bone quantity and difference scores were related to the number of lines in the picture and the number of blocks in the block construction exercise. This again seems to support the concept of transferability of different media orientations. Across exercises,

lines, shape of blocks, and paths seem to relate together and come from perhaps the same content orientation. They are highly correlated across the exercises. On the other hand colors on one exercise relates to colors on another exercise. What is also interesting is that these two groups of factors do not relate together. For example, someone may be very prone to use numerous paths but that doesn't necessarily mean that they will also vary along the dimensions of color and construction. Hypothesis 1 was partially accepted. With the substitution of Dog & Bone difference score for Dog & Bone uniqueness scores -- an overall creativity score was developed and accepted.

Hypothesis 2: There will be no difference in the average level of creativity as measured by the three tests between the older and younger group of children.

Hypothesis 3: There will be equal amounts of diversity among the younger and older children.

The analysis of differences in the age groupings yielded no significant results. None of the mean values for the measures of either quantity or quality were different for the two age groups (see Table 5). Also as would be expected with these results the multivariant F was not significant ($F = .50, p < .88, n.s.$). The older group of children were simply not any more creative in the uniqueness categories nor did they make any more attempts than the younger group of children.

In general, no differences between the variance for the two groups were found (see Table 6). This would indicate that there still exists the same amount of variation at the older as the younger age.

Perhaps this is in part due to the small sample size created by splitting the original sample. Therefore Hypotheses 2 and 3 were supported.

Table 5

Analysis of Variance for Younger
and Older Children
n=30

	Younger Group	Older Group	MS	F
Dog & Bone/Quantity	17.07	13.33	104.53	.75
Dog & Bone/Difference	-13.20	6.27	360.53	1.44
Dog & Bone/Uniqueness	14.77	18.88	126.61	.65
Picture/Colors/Quantity	4.47	4.27	0.30	.02
Picture/Colors/Uniqueness	22.35	16.57	251.02	2.41
Picture/Lines/Quantity	-36.87	23.37	1387.20	1.86
Picture/Lines/Uniqueness	17.88	19.49	19.44	.09
Block/Quantity	26.20	23.80	43.20	.06
Block/Colors/Difference	4.07	4.00	0.03	.01
Block/Colors/Uniqueness	2.34	2.38	0.01	.06
Block/Construction/Uniqueness	-13.93	7.87	276.03	.69

*p < 3.60

**p < .01

***p < .001

Multivariate F = F .50, p < .88

Table 6

Homogeneity of Variances
n=30

	<u>Younger</u>	<u>Older</u>
Dog Bone/Quantity	190.99	85.75
Dog Bone/Difference	489.29	13.18
Dog Bone/Uniqueness	110.25	276.89
Picture/Color/Quantity	11.16	9.35
Picture/Color/Uniqueness	20.07	1.56
Picture/Lines/Quantity	866.12	6.23
Picture/Lines/Unique	106.05	311.52
Blocks/Quantity	709.16	607.62
Blocks/Difference/Colors	2.62	2.56
Blocks/Uniqueness/Shapes	.08	.24
Blocks/Uniqueness/Elaboration	580.87	213.16

Hypothesis 4: Quantity (number of times tried) will not be correlated with quality (uniqueness or creativity scores).

In order to investigate whether quantity led to quality, correlations between the two types of measures were developed for each of the tests (see Table 7).

Interestingly, the dog and bone difference score seems to be the most related of all the quality (uniqueness) measures. However, consistent with other results reported, the dog and bone quantity score does not predict its own uniqueness score. The only other consistent positive predictor of uniqueness is the quantity measure for the lines in the picture exercise.

Two measures which were consistently negatively related to the uniqueness scores were the quantity measure for colors in the picture and the difference score for the blocks and colors. Again they were totally unrelated to the uniqueness score for the dog and bone exercise. These results suggest that the dog and bone difference score is perhaps the more congruent measure of creativity.

If the dog and bone difference score is substituted for the dog and bone uniqueness score and added to the rest of the uniqueness scores, an overall creativity score can be developed. The reliability of this score can be assessed by applying the Spearman-Brown Prophecy formula to the mean inter-item correlation. Using this procedure the reliability of the combined measure for creativity is .88. This more than adequately demonstrates the congruent validity of the scores.

Table 7

Correlations Between Uniqueness and Quantity

Scores for the Three Creativity Tests

n=30

Quantity Score	Uniqueness Score				
	Dog&Bone Unique- ness	Picture Color Uniqueness	Picture Lines Uniqueness	Blocks Shapes	Blocks Construc- tion
Dog & Bone/ Quantity	.02	.50**	.16	.01	-.38*
Dog & Bone/ Difference	-.10	.82***	.39*	.32*	-.77*
Picture/Color/ Quantity	.02	-.36*	-.31*	-.39*	+.35*
Picture/Lines/ Quantity	-.06	.39*	.43**	.35*	-.33*
Blocks/Quantity	.08	.54***	.27	.26	-.72***
Blocks/Colors/ Difference	-.06	-.36*	-.33*	-.55***	+.41*

*p < .05

**p < .01

***p < .001

This would suggest that from an empirical basis it is entirely acceptable to combine the scores from the three tests to develop an overall score of creativity. It would however also suggest that if from a theoretical basis it was desirable to deal with the two scores separately, this would also be acceptable. Support for Hypothesis 1 is thus provided.

Summary

The following results were obtained from the study:

1. The Dog and Bone uniqueness score did not measure the same conceptual uniqueness dimensions as the other two tests.
2. a) There were high correlations between shapes from the blocks exercise and lines from the picture exercise.
b) Significant relationships between the number of colors used in the picture and the number of colors used in choosing the blocks was evident. These results suggest a transferability of creativity across tests.
3. Because of reverse scoring methods, a negative relationship between the elaboration score from the blocks and uniqueness scores on the other measures was present.
4. The quantity of attempts was correlated to the uniqueness or creativity score. For lines, paths and shapes, there was a positive correlation. For elaboration and colors, there was a negative correlation.
5. No differences in average level of creativity between the older and the younger group of children was found.
6. Equal amounts of diversity were seen among the younger children and the older children (possibly in part due to the small sample size).

CHAPTER V: DISCUSSION AND IMPLICATIONS

Summary

The literature reviewed for this study did not give a clear, concise picture of creativity. However, one component which was found in all of the definitions cited was the concept of uniqueness or innovative behavior. The present research focused on this specific area or ability, without any claim that it is a totally encompassing view of creativity. Therefore, creativity was defined in this study as the exhibition of unique or original behavior in contrast to other children.

The literature reviewed also contained examples of training programs to increase creativity. The success of some of these programs led to the assumption that creativity can be taught, or at least increased by freeing the individual from some of the obstructions to it.

Before these assumptions could be tested, it was felt it would be necessary to have some measure of creativity. While there are several tests available for the assessment of creativity for older children and youth, no tests for creativity at the pre-school level are available. This project, although not constituting a comprehensive battery of tests for creativity, was a three task procedure to measure creativity in three and four year old children. The three tasks are first, "Dog and Bone" which required the children to think of different routes which a dog could use to get his bone. The second test was labelled "blocks" and involved the use of blocks varying in size,

shape and color. The children were asked to build something with the blocks. The third measure was a picture of the child, drawn by himself. He was given a set of nine colored markers to use. Each task was then rated for uniqueness.

Four hypotheses were proposed. First, it was hypothesized that there would be substantial congruent validity among the three tests for creativity. This hypothesis was partially accepted. It was found that the difference score for the Dog and Bone test correlated very highly with the uniqueness scores on the draw a picture of self and the blocks exercise. In fact, when these scores were summed they formed a highly reliable measure of creativity.

The second hypothesis was that there would be no significant difference between the uniqueness scores of the older and younger children. Third, it was hypothesized that there would be equal amounts of diversity among the younger and older children on the measures of creativity. Both hypotheses were accepted. No differences between the older and younger groups of children were indicated.

The fourth hypothesis was that quantity (number of attempts) would not correlate with quality (uniqueness or creative score). This hypothesis was not accepted. Significant relationships were indicated between quantity scores and quality scores. Sometimes the correlation was negative and sometimes it was positive. The relationship seemed to be dependent on the specific nature of the exercise rather than being constant across exercises.

Conclusions and Discussion

The Dog and Bone was the only exercise where uniqueness and quantity were not in some way correlated. This would tend to indicate that there was no sequence to the components of mental activity that the Dog and Bone exercise was measuring. However, on the other exercises there was evidently a definite ordering. A brief explanation of this conclusion is perhaps appropriate. The positive relationship between uniqueness and quantity in the draw a picture of self exercise indicate a definite ordering of uniqueness. For example, on the draw a picture of self exercise, assume the subject started with the simplest picture and then added those facial characteristics which would not only increase the quality score for lines, but also the uniqueness scores. If a subject were to include only a few lines, they would most likely be the simplest, most common lines. This action would naturally also lead to a low uniqueness score.

Conversely, a negative correlation would indicate that the tendency was for those that were only going to do a very few things to do the most complex. It is interesting that the color quantity component is always negatively related to uniqueness. Evidently subjects tend to be attracted to certain unique colors early in their construction. Only those who used many colors, started using the mundane, often used colors, thus lowering their creativity uniqueness score. Considering these results in general, they would tend to indicate that for lines and shapes, what has been referred to as the content of creativity, individuals evidently move from the simple to the complex. The creativity starts from a common base and then builds. For what has been referred to as elaboration, creativity

is reversed. Subjects started with the more complex and worked toward the simpler. The next question which naturally occurs is whether there are different components to the creativity measure as applied to young children. The initial analysis tended to indicate that what have been referred to as content and elaboration measures display different characteristics and operate independently. One way to analyze this possibility is to consider the summed scores for an overall measure of content and elaboration. The reliabilities of the score can then be compared to the reliability of the overall measure of creativity. If the reliability were higher it would suggest that it is more valid to consider the two scores independently.

So far the discussion has dealt totally with the reliability of the measures. Also of importance is the validity of the measures. Congruent validity has been analyzed in these exercises. The analysis suggests that the Dog and Bone uniqueness measure does not deal with an ability which is common to the other tests. Evidently the structure of the test limits the expression and measurement of creativity. There is the problem of not enough alternatives to choose from, whereas in the other tests, the alternatives are virtually unlimited. Given this limitation, it is thus more appropriate to use the different number of paths taken as the measure of creativity. That particular measure does relate to all other uniqueness scores. Considering the quantity scores, the same result was obtained. The relationship between elaboration and any of the other measures, either quantity or quality, was exactly the reverse of the general relationships. This is caused by the reverse scoring of the elaboration measure.

The correlations considering the quantity scores are the most supportive of the interpretation that there are multi-dimensions of creativity which transfer across exercises. However, the results are not exactly as theorized. The commonality and transferability was related to different mediums and not necessarily different components of creativity. Instead of there being multi-dimensions to creativity it appears more likely that an overall concept called creativity exists which manifests itself in specific ways - depending on the child. One child might be very much oriented towards color, and the child's manifestation towards creativity consistently is through the variations and usage of color. Another child might be oriented towards lines and shapes, which would result in very different scores on components of the test, but when they were summed it would yield a very similar overall creativity score. This approach would suggest that the child, through various experiences could be oriented towards color. Thus the child's creativity would manifest itself through a different medium, but would still be creativity. Also, presumably none of these children had been given specific training in creativity, so the results cannot be explained by training. Thus the distributions represented the result of individual characteristics and socialization experiences up to this point in the child's life. This research cannot determine whether individual children change or whether training would have an impact. It does however suggest that without training there are no giant leaps in creative ability. Without continuous monitoring and teaching, creativity may not undergo much change. Perhaps what is likely to happen is that the child shifts to different mediums to

manifest creativity. Because there is no particular pattern in the shifting it does not show up whenever means and variances are used as the basis of analysis. It would be necessary to conduct longitudinal studies to fully investigate these possibilities. Because of the correlational analysis a larger sample size would be beneficial.

In general, the analysis suggests that empirically there is a component of thinking in young children called creativity which can be measured and is fairly consistent across exercises. This characteristic of individuals seems to be most transferable through common mediums, i.e. color, lines, paths.

Creativity, at least as defined and measured in this research, does not seem to vary with age in young children. Nor does it seem to be manifest in different mediums. Children instead seem to be more oriented toward specific mediums rather than varying across mediums. Different children do seem to be oriented towards different mediums, but this variance cannot be explained by any of the variables included in this study. The importance of including family and socialization variables in further studies of creativity is evident.

A final observation would be that quantity correlated with uniqueness, although it was not always a positive correlation. The relationship between quantity and uniqueness that does exist seems to be more a function of the nature of the exercise than any inherent relationships among the characteristics. On some exercises, children can be very creative and not engage in a lot of activity or production. On other exercises, as would be expected, some children seem to engage in a lot of activity and produce a large amount of work, none of which is very creative.

Implications for future research

This research was set up mainly as an exploratory study for further research to build on. However, as a tool itself it might be helpful for practitioners in gaining more insight into a child's abilities. A teacher might recognize potentialities in a child that might otherwise go unnoticed. On the other hand, a teacher might also see ways in which a child might be having difficulties and work toward helping him be aware of other alternatives available to him. Recognizing a child's strengths (perhaps in the use of color) and being able to build on them would perhaps prove beneficial.

This project could be enhanced in the following ways: The first is to add several other probable tests of creativity to this measure to form a more comprehensive measurement and see how it correlated with the three which were studied here. There is still an obvious need for some means to adequately evaluate a child's creative abilities. Although this measure does give us some insight into this area, it is by no means a complete measurement.

The other possibility would be to do longitudinal studies with this measure to determine whether children shift in the mediums they use to manifest creativity. Does the school system channel it away from certain areas and focus it upon others? Would those children who appeared to be oriented towards color at age 3 still show the same inclination at age 8?

It should also be pointed out that because of the small sample size and the limited socio-economic status represented in the sample, generalizations are limited. Future research should expand

sample size and include other socio-economic groups.

Several new possibilities for research were stimulated by this study. Kogan and Pankove (1972) studied creativity over a five year span (from 5th grade to 10th grade). They found evidence pointing to long-term stability of creativity (at least when assessed under specific conditions). This was an overall creativity measure, and did not focus upon specific areas or mediums. Although they did not claim conclusive predictive power, they found evidence suggesting that performance on creativity measures in the fifth grade had an influence not only on creativity measures at age 15 or 16, but also in certain cases on the accomplishments outside of the classroom at this age. Using the two measures of creativity established for preschool children, it would also be interesting to set up a longitudinal study to determine the stability of creativity in general when assessed at such a young age. Are the same children reacting in more unique ways when looked at 5 years later?

Also of critical importance would be an analysis of the changing role of the family over time. Studies have not yet been done which specifically looked at the socialization experience of the child and how that affected creativity over a period of time. Cross-sectional studies are available from which viable hypotheses could be developed for such a longitudinal study.

For example, a number of studies have looked into the type of homes which produce creative children. MacKinnon, (1962), and Schaefer and Anastasi, (1968) found that creative children have someone close to them (a parent or other relative) who provides a model of effectiveness

and resourcefulness, and also people in their environment who share their field of interest. Another factor which the research brought out was that the parents of creative children show a great deal of respect for them as individuals and have confidence in their abilities. They allow them to explore their environment and encourage them in independent, mature activities. MacKinnon, (1962), Drevdahl, (1964), and Nichols and Holland, (1963) found that parents of creative children show a high level of tolerance and a low level of control. This very likely contributed to their later autonomy and independence.

In a detailed study by Weisberg and Springer (1961) where they looked at the families of 32 very gifted nine year olds (selected from a population of 7,000), they were given criterion tests of divergent thinking. The parents of high-divergers showed expressiveness along with a lack of domination of their children. They were also very tolerant of any regressive tendencies in their children. Another association they found (at a lower level of significance) was that the fathers had a closer relationship with their children (than non-divergers) and the mothers displayed little evidence of compulsive behavior.

One of the negative effects of the parent's non-involvement in the child's private life in granting him more independence and autonomy was that one or both parents were more distant and removed. This may have some bearing on the observation that creative children engage in more solitary activities than others (MacKinnon, 1962, Stein, 1963, Drevdahl, 1964). Divergers tend to come from middle or upper middle class backgrounds. Mackinnon (1962) observed that there were no financial difficulties in the homes of the divergers.

Weisberg and Springer (1961) found a significant association between the degree to which the father was professionally autonomous and the child's divergent ability.

MacKinnon (1962) also found that mobile families of the more creative architects moved quite often. While this would offer a greater amount of stimulation and experiences, it would also hinder strong social integration into a neighborhood or community. This might also have some bearing on the diverger's preference for solitary activities, mentioned previously.

Another finding which was observed repeatedly by Roe (1952) is the fact that eminent men are the first child in the family more often than chance would permit. A study by Brown (1970) also pointed this out.

These studies provide some idea of the type of home from which creative children come. There seemed to be negative as well as positive factors. These views help us avoid the mistake of imagining that creative children are blessed with the ideal home and a perfect balance of activities and encouragement to not only produce creative abilities but also a blissful existence. It becomes obvious that there was some trade-off of experiences. The child's autonomy may have been purchased at the expense of close, warm family relations. The open expressions of feelings and disagreement would indicate that the family atmosphere was not necessarily entirely harmonious.

The idea that we can take the traits which we see emerging from the families of divergers and compile them into a list and exhort parents to follow them is seen as an erroneous one. However, are there some of these traits which could be incorporated with little

danger to existing family relationships? For example, parents could be urged to share the interests of their children and to make an effort towards becoming avenues of resource for further involvement into the area of the child's interest or involvement.

It would also seem safe to encourage parents to develop a confidence in their children's abilities and to encourage the children in exploring their world to an increased level, but not one beyond which the parents are comfortable.

Providing materials and new opportunities, without the extreme of moving frequently, would perhaps aid in the development of creativity with children.

Although parent education programs will not change to any great degree the life style of the individual families, it may enlighten them into more productive use of time and facilities. Knowing what things contribute to creativity would perhaps help a parent come closer to meeting goals for the nurturance of creativity.

This job is not the responsibility of families alone. Research has pointed out the drop in creativity as children enter school. What responsibility then does the school system have in fostering and helping to maintain the creative abilities of children? Here again there is some compromising which needs to be done. Where programs can be set up to encourage the development of creativity without giving up other important aspects of the school systems is of course the idea. Perhaps there would need to be some revision of the objectives of elementary schools to provide a responsive environment with opportunities for self-initiated learning, being careful not to eliminate fantasy prematurely,

or overemphasize verbal skills related to reading and correct grammar. According to Torrance (Rice, 1973) the school setting needs to provide learning experiences where the child can search for self-identification, uniqueness, and a sense of his own talents. Teachers need to be respectful of unusual questions and ideas and show children that their ideas have value. Where credit is given for self-initiated learning, this type of learning will increase.

Some programs are having success in increasing creative ability (Torrance and Fortson, 1968, Covington, Crutchfield, Davies, 1969). Utilizing the knowledge gained by these and other researchers, it would seem profitable to do a study involving children in the nursery school over a nine month period of time. The first step would be to compile a list of guidelines from researchers as to the nurturants of creativity. The next step would be to set up a program, utilizing the guidelines mentioned previously, to increase creativity and help children solve problems more effectively. If the experimental group showed significant gains, a follow-up study could be done several years later to determine if their increased ability to solve problems and react to challenges in a creative manner remained stable, increased with years of practice in acting innovatively, or dropped off when the stimulus to act creatively was removed. Hopefully, with increased research and study we will be able to refine our knowledge about and nurturance of creativity and increase in children those positive aspects of creativity which will help them experience life more fully and competently.

"APPENDIX"

APPENDIX A

Letter to Parents

Dear Parent,

I am presently completing work on my Masters Degree. Because of an interest in art and child development, I am doing my thesis on the nature of creativity in young children. With your permission, I would like to involve your child in three different creative exercises. These exercises will take place at the nursery school during nursery school time.

- 1) Dog and Bone: The children are shown a dog, a bone, and four dog houses. They are then asked to find as many ways as possible for the dog to get his bone.
- 2) Blocks: The children are asked to build whatever they would like with the blocks provided.
- 3) Drawing: The children are asked to draw pictures of themselves.

Each task is then rated for creativity. The purpose of the exercises is to see whether children are consistent in their creativity or only with certain experiences. There is absolutely no deception involved in the research and the results of the total research, and for your child individually, will be made available.

I'm sure your child will enjoy this experience, and I am looking forward to working with him/her. Could you please indicate below your willingness to have your child participate and mail it back to me in the self-addressed envelope enclosed.

Sincerely,

I am willing to have _____ participate in this project. I understand that participation is voluntary and that I may withdraw my child at any time.

I would be interested in a copy of the results.

Yes ☐ No ☐

Signed _____

APPENDIX B

Raw Data													
Birth Order	Sex	Dog and Bone			Picture of Self				Blocks				Birthdate
		Times Tried	Different Ways	Uniqueness	Colors Used	Uniqueness	Distinct Lines	Uniqueness	Blocks Used	Different Colors	Uniqueness (Shapes)	Uniqueness (Elaboration)	
1	2	5	4	16.5	9	15.5	28	13	3	2	26.5	5	3/19/71
2	1	12	12	4.91	9	15.5	45	21	6	4	22.5	5	4/4/71
3	1	8	5	17.2	3	18	11	17.4	4	3	23.6	2	4/9/71
4	2	40	8	14.75	9	15.5	98	10.7	42	6	21	6	6/8/71
5	2	14	9	13.7	1	20	22	14.4	4	2	22.5	3	6/10/71
6	1	5	5	11.8	2	16.5	15	15.7	12	4	22.6	9	7/4/71
7	1	15	9	10.22	3	16	39	15.3	8	4	23.2	9	8/19/71
8	1	29	18	4.07	4	17.75	19	18.75	25	6	21	6	10/1/71
9	1	15	4	11.7	7	16.8	42	23	66	6	21	3	10/10/71
10	2	2	2	15.5	9	15.5	47	21	5	3	22	6	11/5/71
11	2	3	3	18	3	17	39	12	7	4	24.3	6	11/26/71
12	2	8	5	13.8	9	15.5	65	12.5	27	6	21	6	2/4/72
13	1	17	8	8.5	2	16	7	20.3	6	5	23.7	3	3/30/72
14	2	19	8	11.37	6	16.16	13	15.5	9	5	21.4	3	3/30/72
15	1	20	8	13.38	1	20	4	20	35	5	24	11	4/15/72
16	2	5	5	17.2	2	17.5	41	23	11	4	22.6	3	4/17/72
17	2	29	14	7.71	6	17.5	11	13.1	23	5	21	6	4/23/72
18	1	30	9	11.77	2	15	25	15.4	16	5	23.2	3	4/29/72
19	1	16	12	8.83	8	15.8	4	23	40	6	23.2	3	5/27/72
20	1	8	3	18.33	1	18	8	18.3	4	3	24	1	6/5/72
21	2	3	3	1.66	4	14.7	11	18.6	4	3	23.3	5	7/18/72
22	1	20	9	7.33	4	17	20	16.7	9	2	20	6	8/17/72
23	2	19	8	13.6	5	17	16	14.7	6	6	21	6	8/19/72
24	2	3	2	22	8	16	10	23	66	6	21	5	9/25/72
25	1	3	3	16	1	18	5	23	8	6	22.5	6	9/27/72
26	1	4	2	22	1	15	1	23	3	2	28	1	11/6/72
27	1	17	5	14.8	9	15.5	32	23	6	3	24.3	3	11/16/72
28	2	8	5	15.6	9	15.5	76	23	20	4	21	3	11/25/72
29	2	20	7	18.28	3	18	6	18.6	8	4	22.6	1	12/2/72
30	2	15	7	14.7	1	18	10	14.3	16	6	21	3	12/23/72

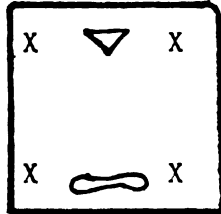
APPENDIX C

Coding Sheet

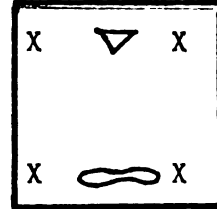
Child's Name _____

Response Variability - "Dog and Bone"

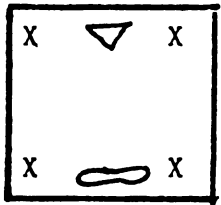
1



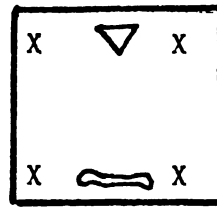
6



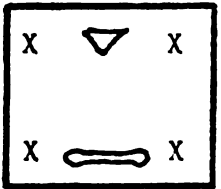
2



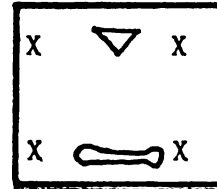
7



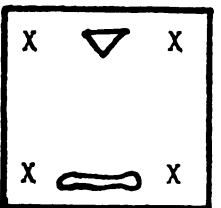
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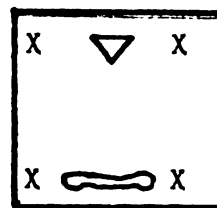
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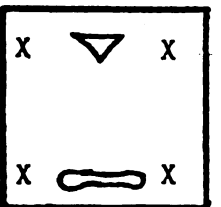
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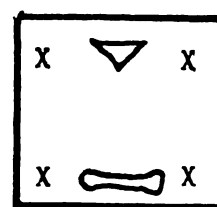
9



5



10



Score _____

Number of
Different
Ways _____

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