THE EFFECTS OF STRUCTURE IN INSTRUCTIONS AND MATERIALS
ON MONTESSORI AND TRADITIONAL PRESCHOOL CHILDREN'S CREATIVITY

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(ABSTRACT)

The purpose of this study was to assess the effects of structure in instructions and materials on preschool children's creativity as measured by a drawing task. Subjects were twenty children from a traditional laboratory preschool, and twenty from a Montessori program. The children, ranging in age from forty-eight months old to seventy-one months old, were assigned to four experimental groups (A/B/C/D). Each group was exposed to four treatments consisting of: Structured Instructions-Structured Materials; Structured Instructions-Unstructured Materials; Unstructured Instructions-Structured Materials; Unstructured Instructions-Unstructured Materials. The order of treatment was determined by group. The results indicated that the Montessori and Laboratory subjects differed significantly on baseline originality, \(\text{Montessori, } M = 2.1, \text{ SD } = 1.61; \text{ Laboratory, } M = 5.25, \text{ SD } = 2.09\), thus baseline originality scores served as a covariate. Results indicated no significant differences for treatment between children from the two schools, or between the groups on originality scores. Results indicated an order effect for treatment for Montessori group B, which had a significantly higher mean.
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Chapter 1

Introduction

In the past, creativity research has focused on school age children and adults (Edwards & Tyler, 1965; Haddon & Lytton, 1968; Ramey & Piper, 1974). More recently, researchers have been studying creativity in preschool age children (Dansky & Silverman, 1975; Moran, Sawyers, Fu & Milgram, 1988; Pepler & Ross, 1981; Smith & Dutton, 1979). This information has been helpful in understanding children's capacity to think creatively, as well as identifying what factors foster or hinder creative thought.

Creative thinking has been thought to be essential in producing inventions and solving problems. The understanding of creativity in children has been important in order to encourage creative thinking and problem solving at a young age. Starkweather (1971) cited one of the first studies of children's creativity in which the researchers attempted to identify children who were potentially creative. She then stated:

If one assumes that every child is born with some potential for expressing himself freely, then one must assume that this first exploratory study included children in whom this freedom had been encouraged and other children in whom this freedom still lay dormant and stifled. These findings
suggest that this encouragement or stifling can occur before a child is five years of age, and therefore a search for the factors which influence the development of creative ability should start with infants and preschoolers. (p. 245-246)

There has been an interest in the amount of structure in the environment and its effect on creativity. Miller and Dwyer (1975) extensively compared four preschool curricula and found children attending a Montessori or DARCEE program performed significantly better on the Dog and Bone test of innovative behavior than children from a Traditional or a Bereiter-Engleman preschool program. In contrast, Chattin-McNichols (1981) found that children attending a traditional nursery school did better on Torrance Tests of Creative Thinking than preschoolers attending a Montessori school. Ogilvie (1974) asserted that the most conducive environment for children’s creativity may be mid-road between a structured and an unstructured environment. Ogilvie studied the creativity of fourth graders from five different schools with varying curriculum structures. The schools were ordered on the structural dimension as follows: A - Highly Structured, B - Midroad I, C - Midroad II, D - Unstructured, and E - Indeterminate. The results indicated that neither of the least structured environments produced children with higher scores on the creativity tests, and the most
uncertain classroom organization (E) gave rise to the lowest creativity scores. According to Ogilvie the midroad environments were best in general terms not because of positive contributions to developing creative potential, but rather due to the mid-road environments not suppressing creative potential.

Two factors on which curricula have widely differed on are the type of instructional methods employed and the materials available to the children. A concern of creativity researchers has been whether teacher instruction and materials in a Montessori classroom stifles creativity. Montessori believed creativity to be a cognitive process which can be aided by instruction (Berliner, 1977). There have been a variety of applications of the Montessori Method but the didactic materials and instructional methods are viewed as highly structured (Feeney, 1979). In contrast, "Traditional," "Open," and "Informal" classrooms have been viewed as employing less structured materials and methods (Chattin-McNichols, 1981; Miller & Dryer, 1975). Research results from studies of creativity and structure across different preschool curricula have been inconsistent (Chattin-McNichols, 1981).

Powell (1986) noted that a major limitation in curriculum comparison studies is that they have confounded content, materials, and activities with the teaching
techniques. In an attempt to overcome this weakness, Moran, Sawyers, and Moore (1988) examined the effects of structure in materials and instructions on preschoolers' creativity in a within subjects design in an experimental study. Based on an intelligence score, a baseline creativity score, and age of the child, the children were assigned to one of four groups: structured instructions with structured materials or unstructured materials, and unstructured instructions with structured materials or unstructured materials.

The first session consisted of conducting the intelligence and creativity tests. In the second session, the children received either the structured or unstructured instructions and either the structured or unstructured materials depending upon their group assignment. In the third session, the children received the same instructions as in session two and the opposite materials. The structured and unstructured materials both consisted of seven lego building blocks with the structured materials also including four wheels. The structured instructions included telling the child what lego kit they would be working with (truck or airplane), showing the child how to build the lego truck or airplane, and asking the child to build the same object. The unstructured instructions did not include telling the child what specific lego kit they would be working with, a building demonstration, or asking
the child to build a specific object. When the structured instructions were combined with the structured materials, the children were less flexible in ideational fluency. According to Torrance (1974), the flexibility score represents the child's ability to produce a variety of ideas, to shift approach, or to use different strategies with the same stimulus. These researchers speculated that the limited exposure to the structure in instructions and materials was not sufficient to bring about the expected decrease in ideational fluency.

To minimize problems of controlling for confounding factors involved in studies comparing program models, the present study will use a Montessori sample and a traditional preschool sample in a within subjects design, focusing on the factors of structured and unstructured instructions and materials using a methodology similar to Moran, Sawyers, and Moore (1988). The purpose of this study is to evaluate the effects of structured instructions and materials on preschoolers' creativity, as measured by ideational fluency. **Specific Hypotheses**

1) It was expected that children attending a Laboratory preschool would have higher original scores as measured by the drawing task, than children attending a Montessori program.
2) It was expected that the order of treatment would have an effect on originality scores namely those receiving structured instructions first (Group A: SI-SM, SI-UM; Group B: SI-UM, SI-SM) prior to receiving unstructured instructions (Group C: UI-UM, UI-SM; Group D: UI-SM, UI-UM) would have lower originality scores as measured by the drawing task.

3) It was expected that the combined effects of the treatment of structured instructions-structured materials would be greater than either alone (SI-UM or UI-SM) as evidenced by lower creativity scores.
Chapter 2

Review of Literature

Problems in Defining Creativity

Creativity has been defined and studied from three major perspectives: as a personality trait, as a process, or as a product. They are not mutually exclusive. Barron and Harrington (1981) described creativity as an attitude or disposition. Torrance (1962) defined creativity as, "the process of sensing gaps or disturbing missing elements; forming new hypotheses concerning them; testing new hypotheses and communicating the results, possibly modifying and restoring the hypotheses" (p. 16). This definition focuses on the process of thinking, and emphasizes the communication of the result; or the product of the process.

When creativity has been considered to be a personality trait it becomes difficult to distinguish whether the creative characteristics are innate, learned, or spontaneous reactions to the environment. From a developmental perspective, research findings on creativity as a personality trait have been inconsistent. This means either the social expectations for creativity change with age or the nature of creativity changes with age. Children who are creative have been described as more open-minded, responsive to stimuli, independent and nonconforming in thought and behavior, and more sociable and easygoing compared to other
children. Creative graduate students, as rated by faculty, revealed themselves to be more withdrawn, rigid, and anxious than their peers (Arastah, 1968).

Getzels and Csikszentmihalyi (1966) studied the creative process in college art students. They found the relationships between various criteria of creativity depended on the gender and field of specialization of the subjects. They determined the "process of creative thinking cannot be studied aside from the specific field in which the particular achievement selected as the criterion manifests itself," (p. 366). They recommended, "the most effective understanding of creative achievement will have to come from the study of the reciprocal interaction of the person, the process, and the product," (p. 366).

When regarding creativity as a product there has been a question regarding the degree to which creativity is expressed, and who is qualified to judge it (Arastah, 1968). Evaluating children’s responses on creativity tests has been further complicated by adults’ difficulties in evaluating objectively the meaning of children’s behavior (Starkweather, 1964). Thus it appears, creativity as a product, must be measured and defined differently for adults and children. An adult product may be the generation of an object which is unusual, of high quality, and socially useful (Ward, 1974). Ward (1974) suggested not focusing on
trying to predict adult accomplishment in children, and to be content with what we can measure in children. Moran, Sawyers, Fu, and Milgram (1988) stated that if creativity is defined in terms of socially useful products, we must take into consideration the social realm of comparison. Children's creativity may be confirmed within the child's social environment, while we may demand a product which contributes to society as a whole from adults. The definition of creativity has been bound by measurable areas. The majority of tests have defined creativity as a product and measure it by the number of responses.

Problems in Distinguishing Creativity from Intelligence

A contributing problem in trying to define creativity is the lack of distinction between intelligence and creativity. Guilford (1956) attempted to distinguish creativity from intelligence. He focused on two major groups of intellectual factors: thinking and memory. He separated the thinking factors into three categories: cognitive (discovery) factors, evaluation factors, and production factors. He then subdivided the production category into convergent thinking and divergent thinking factors. This research has influenced studies on divergent thinking. Guilford (1956) defined divergent thinking as occurring when there is much searching in various directions as opposed to convergent thinking which he defined as being channeled or
controlled into one direction.

Guilford (1962) divided divergent thinking into three components: flexibility, fluency, and originality. Of these three measures fluency, or ideational fluency, defined as the total number of ideas generated, has emerged as the best single predictor of the measurement of creativity.

Mednick (1962), in discussing the Associationist Theory of Creativity, affirmed that creativity depends on the size and quality of a person's association reservoir in addition to the interrelationship of a person's creative ability with the specific environment influencing that person. Mednick found the strong associates (common answers) occur at the beginning of a response series while the most original responses are more likely to occur at the end of the series. Wallach expanded upon Mednick's theory and stated, "the more plentiful the person's flow of ideas, the more likely he is to hit upon original ones" (Wallach, 1970, p. 1223). Moran, Milgram, Sawyers, and Fu (1983) found an overall effect of popular responses emerging early and original responses emerging later in children's response sequence. The order effect existed more dramatically in children who were high in ideational fluency. The popular responses were related to intelligence scores, but the original scores were not related to intelligence. When popular responses are the only responses measured, the distinction between
intelligence and creativity is lost. The number of high quality original responses has been related to the total number of responses, so it is important to obtain as many responses as possible. Wallach (1970) cited a number of studies which supported a distinction between intelligence and creativity. Wallach (1970) asserted that intelligence is best measured by convergent thinking and that creativity can be measured by divergent thinking. To illustrate a creativity distinction, Torrance (1962) differentiated a group of elementary school children as highly creative (using the Minnesota Creative Thinking Test) and as highly intelligent (using the Stanford-Binet). He found:

the highly intelligent group ranked in the upper twenty percent on intelligence, but not creativity; and the highly creative group ranked in the upper twenty percent on creative thinking, but not on intelligence. Those children in the upper twenty percent on both measures were a small amount. If creativity were identified on the basis of intelligence tests, we would eliminate from consideration approximately seventy percent of the most creative children. This percentage holds fairly well no matter what measure of intelligence we use, and no matter what educational level studied, kindergarten through graduate school. (p. 4-5)

The lack of complete overlap between the highly creative
children and the highly intelligent children provides evidence for a distinction between creativity and intelligence.

Problems in Researching Factors Influencing Creativity

According to Starkweather (1964) conformity, curiosity, freedom of response, and willingness to try a difficult task are all intellectual and motivational factors that affect creativity. Arastah (1968) has listed gender, age, birth order, cultural influences, and parent-child relationships as factors that have been studied in relation to creativity. Torrance (1962) asserted that for children to develop creative thinking, they must be encouraged to manipulate and to play imaginatively with objects as much as possible.

Opportunity to interact/play with materials. The handling of objects in an unrestricted play setting has appeared to allow children greater access to creativity. Torrance (1963) has observed that creative elementary school children were "manipulators" in the sense that they handle, and scrutinize the objects they deal with. Dansky (1980) concluded that merely providing children with play materials and encouraging them to play did not necessarily enhance creativity; but creativity could be enhanced by the freely assimilative character of make believe. Dansky and Silverman (1975) and Goodnow (1969) stated that creative process in young children is affected by the opportunity to
interact with the materials. Dansky and Silverman (1975) found preschoolers who were given a play condition (free play with the materials) produced significantly more standard and nonstandard uses for various objects than preschoolers in an intellectual condition (asked to listen to verbal cues given by the researcher and then choose the object the researcher was thinking of) or an imitation condition (asked to use the materials exactly as shown). Goodnow (1969) found that kindergarten children who handled the materials were able to give significantly more nonstandard uses for a Kleenex, a paper clip, and a screw driver than children who had only viewed each object.

Sylva, Bruner, and Genova (1976) measured creativity by studying the problem-solving abilities of three to five year old children. They compared the effects of having a play condition, an observation condition, and a no treatment condition. The children in the play condition required fewer hints and had more goal directed responses than the children in either the observation or no treatment conditions. When Vandenberg (1981) examined a broader age range and used tasks of varying difficulty, he found differences in task performance similar to those reported by Sylva et al. (1976). The play condition group scored higher than a group receiving the instruction condition. Smith and Dutton (1979) found that on a task requiring innovative
transfer, children in a play group performed better than both the training and control groups. The results of these studies provided support for the idea that children with play experience exhibit superior problem solving skills.

**Type of materials and environment.** Pepler and Ross (1981) studied the type of materials children play with in relation to creativity. They looked at three- and four-year-olds and the effects of convergent and divergent materials. The divergent materials group had a superior performance on a divergent problem solving task than the convergent group. The children in the divergent group generalized their problem solving to other situations while the convergent materials group did not generalize; rather, they applied their experience only to very similar convergent problems. Materials used in this study were similar to the cognitive material designed by Montessori (Montessori, 1965). This provided evidence that creativity is affected by the structure built in the materials.

Haddon and Lytton (1968) used eleven and twelve year old subjects to study the effects of a structured environment versus a nonstructured environment. They contrasted the development of divergent thinking abilities in English students from formal and informal schools. The definition they used for an informal school was "a progressive school where the emphasis is on self-initiated learning and
creative activities." A formal school was described as "a traditional school which emphasizes convergent thinking" (p. 172). Their subjects were matched on intelligence and socioeconomic status. Each subject completed the verbal and non-verbal tests from the Minnesota Tests of Creative Thinking by Torrance. The informal school environment students displayed a significant superiority in divergent thinking compared to students from the formal school environment. A follow-up study conducted four years later revealed the informal primary school children retained their superior performance on divergent thinking tests regardless of their current secondary school environment (1971).

Ramey and Piper (1974) found different results in a study with open and traditional schools for grades 1, 4, and 8 and the effects on creativity. They operationally defined an open classroom environment as one which claims to "not only amass knowledge, but also develop critical techniques of inquiry" and a traditional classroom environment as one which "stresses competence, obedience, and hard work" (p. 558). They used both verbal and figural creativity measures from Torrance’s Test of Creative Thinking. The children in open classrooms for grades 1, 4, and 8 showed figural superiority. Ramey and Piper (1974) explained this by the differences in each curriculum model. The traditional classroom stresses individual assignments and verbal
interactions with the teacher. The open classroom emphasizes peer interactions and so provides less advanced language models.

Brophy and Choquette (cited in Chattin-McNichols, 1981) compared Montessori children and children from a traditional preschool. They found no significant difference between the two schools on ability to produce verbal responses regarding divergent uses for objects. The majority of the significant comparisons favored Montessori children. McMorrow, Miezitis, and Rudominer (cited in Chattin-McNichols, 1981) examined the performance of divergent thinking for a Montessori school, a child-directed play nursery school, and a public kindergarten. They found no significant differences among them. Dreyer and Rigler (1969) found preschoolers, matched on income and intelligence, from a traditional school did better on the Torrance Picture Construction Test, a non-verbal measure, than Montessori preschoolers.

Andalman (1977) found sociodramatic play differences between three types of preschool curriculum. Children from unstructured environments were role-oriented, highly imaginative, argumentative, idiosyncratic, and unconstrained by external demands. Children from structured environments were task-oriented, imitative, cooperative, goal-oriented, and anxious to please. Montessori groups were prop-
oriented, cooperative, creative on a reality based level, and extremely verbal. These differences in sociodramatic play reflected the behavioral expectations and reinforcement systems of each environment. The extent to which the classroom environments were structured affected role play and creative response to the task. Thomas and Berk (1981) explored effects of varying school environments on the development of creativity over the course of one year using first and second grade children in formal, informal, and intermediate classrooms. The greatest increase in creativity resulted from the environments labeled intermediate, and the girls profited more than the boys from intermediate and informal environments.

**Structure in instructions and materials.** Moran, Sawyers, and Moore (1988) investigated the effects of structured or unstructured instructions and structured or unstructured materials on creativity scores of children enrolled in a traditional (child-directed, play-oriented) laboratory preschool. They found unstructured instructions promoted more flexibility than structured instructions. Flexibility decreased when children given structured instructions were given unstructured materials before structured material; and flexibility increased when the order of materials was reversed. The data indicated the structure in materials was more influential in altering
creativity scores than structure in instructions. Therefore, the evidence suggested that creativity is influenced by the amount of structure in the environment.

The present study expanded on the research by Moran, Sawyers, and Moore (1988) in two ways. In the Moran et al. study, participants were recruited from one traditional preschool in which the use of structured instructions and structured materials contradicted the philosophy of the program. The brief experimental sessions of exposure to structured instructions and structured materials may not have been enough exposure to override the length of time the children had been in attendance at the traditional preschool. The present study recruited children from the same preschool used in the Moran et al. study, and also from a Montessori preschool where the children have been exposed daily to structured instructions and structured materials. In the Moran et al. study, the children were exposed to only one of the two types of instructions and to both types of materials so that each child was exposed to two combinations. The present study exposed all children to both types of instructions and both types of materials for a total of four different combinations. This different procedure allowed for comparison of groups receiving structured instructions before unstructured instructions to groups receiving unstructured instructions before structured
instructions.

The traditional laboratory preschool in this study is child and play oriented. The laboratory preschool uses a curriculum which emphasizes that play may be the most important process through which children learn to adapt to the world and become more mature. Play, in the laboratory classroom is considered to influence every aspect of development and learning (Rogers & Sawyers, 1988). The Montessori Method was developed by Maria Montessori who originally worked with handicapped children. The Montessori environment provides opportunities for children to practice skills for daily living, so that they can become independent. In Montessori’s viewpoint, the only forms of play that are acceptable are those with an adaptive, preparatory function. The teacher in the laboratory classroom emphasizes process over product, guiding and facilitating the children’s explanation of their own ideas and their ability to think through solutions to problems. The laboratory preschool offers a variety of unstructured, open-ended materials that provide the opportunity for multiple uses. The Montessori teacher gives demonstrations of how to use the materials and gives assistance when necessary. The materials available in a Montessori classroom are highly structured and children are instructed on the specific ways intended for their use.
Art in the Preschool Classroom

Universals in shape, designs, and symbols have been found in children’s art work (Kellogg & O’Dell, 1967). Children’s art expression develops through a series of stages. In the first stage, children scribble spontaneously with no plan in mind. The scribbles begin to take on a definite pattern. Around the age of three, children begin to make recognizable shapes and then later combine those shapes. When a child has reached four or five years of age, the drawings begin to look like objects adults can recognize. The first sign of pictorial drawings has been drawings of people.

As children progress through different art stages, gender differences become more evident yet, "up to and including the age of five, children’s drawings are very much alike. Even the drawings of boys cannot be told from the girls," (Kellogg, 1967, p. 45). One of the most striking differences between the drawings of boys and girls is that when given free choice, boys almost never draw women and girls rarely draw men (Lark-Horovitz, Lewis, & Luca, 1967). Rhoda Kellogg an internationally known researcher on children’s art stated, "children who are left alone to draw what they like develop a store of knowledge which enables them to reach their final stage of self-taught art," (p. 17).
Different art curriculums. Art activities in the laboratory preschool classroom allow for free expression of the child's individuality. The activities are process oriented and take into consideration the stage of art expression the child is in. Teachers do not demonstrate or correct children's drawings, and the children are not exposed to stereotyped outlines in which to color.

A Montessori classroom uses metal geometric insets to help the child develop pencil control for writing and drawing by filling in the outlines. "The insets are didactic art materials for the education of the senses," (Gitter, 1973, p. 17). Like other Montessori equipment, the teacher demonstrates the correct way to use the insets. According to Montessori (1917) the insets, along with paper and colored pencils "lend themselves to beautiful combinations.... the children make real creations and often follow out their artistic ideas for weeks," (p. 306).

The Montessori insets may have been intended to be used to help a child develop pencil control from an adult perspective, but children may interpret this activity differently. Coloring in the metal inset outlines is similar to coloring in workbooks, which has been considered to inhibit to children's developing creativity. "The prestige attached to drawing in the workbook can and does persuade many children to abandon their own schemata and to
draw the work book way. In doing so, they may end the search for more satisfactory symbolization and be cut off from further creative development," (Lark-Horovitz, Lewis, & Luca, 1967, p. 182). Montessori children consistently exposed to these structured outlines may come to rely on the forms for drawing instead of creating shapes on their own. The present study used a shape adapted from Starkweather’s (1964, 1971) material. The shape and its formboard were similar to the Montessori geometric insets in size (see Appendix A). This study used the shape inset, colored pencils, and blank paper for the structured materials to determine if children, when given the opportunity, draw freely or use the shape inset.

If Montessori children score lower than traditional preschool children on ideational fluency in this study, we cannot be absolutely positive this was completely due to a Montessori environment, because of extraneous variables. However, we do know the Montessori children have been exposed to structured materials and structured instructions on a daily basis as part of their normal curriculum; and the traditional preschool children have been exposed to curriculum which offers unstructured, open ended materials.

**Summary**

Currently, creativity research has been made difficult due to the lack of a specific definition and an
understanding of influencing factors. Studies have included a wide variety of ages and various curricula, but few studies have focused on a specific aspect of the curriculum model on creativity. The need for more research evaluating the specific differences in curriculum models and the subsequent effect on creativity has been recognized in the literature (Moran, Sawyers, & Moore 1988).
Chapter 3

Methodology

Pilot Study

As noted in previous studies (Mednick 1962; Moran et al. 1983) the best measures of creativity have been ones which elicit the most responses, given that original responses occur later in the response hierarchy. A pilot study was conducted to refine the drawing task, and to develop a scoring method for the drawings. Three children who had attended the laboratory preschool during the school year were the pilot subjects. The three children included one female age 5 years 4 months; one female age 3 years 11 months; and one male age 4 years 4 months. The five year old girl received Structured Instructions and Unstructured Materials first and then Unstructured Instructions and Structured Materials. The four year old boy received Structured Instructions and Structured Materials first and then Unstructured Instructions and Structured Materials. The three year old girl received Structured Instructions and Unstructured Materials.

The pilot study gave insight to the researcher on several points. The children were offered 12 different colored pencils and spent a considerable amount of time deciding which colors to use. To eliminate this distraction, it was determined that only six basic colors
(red, blue, yellow, violet, orange, and green) would be used in the experimental sessions. Children wanted to keep their drawings therefore, in the experimental sessions if a child asked to keep the drawings, he/she was told that the drawings would be returned after the study was over.

During the pilot study when the children paused during a drawing the researcher asked, "Is there anything else you would like to draw?" After this question the children usually added something to their drawings. During the actual experimental sessions when the children paused during a drawing the researcher asked, "Are you finished?" if the child responded, "No" the researcher let the child continue until another pause. If the child responded "Yes", the researcher asked the child, "Tell me about this picture" and then gave the child a blank sheet of paper and say, "Is there anything else you would like to draw?" The researcher asked the child to tell the experimenter about the picture in attempt to clarify the scoring (in case of scribbling or unclear drawings).

During the pilot study a question arose: whether to score three small shapes drawn on one page of paper as one drawing or as three? The experimenter decided to tell the children to draw as many pictures as he/she would like but, to draw only one picture on each sheet of paper. Each page of drawing or verbal response would be scored "1" toward the
child's total ideational fluency score.

To deal with the possibility of the children experiencing a fatigue factor toward the end of the session, it was determined that verbal responses would be accepted and scored. Each experimental session was audio taped to be sure all the child's verbal responses were recorded and scored.

**Sample**

The sample for this study was composed of forty children who ranged in age from forty-eight months to seventy-one months old as of July 1, 1992. Twenty of the volunteer participants were enrolled in a summer laboratory school program at Virginia Polytechnic Institute and State University, or had attended during the last school year. The other twenty volunteer subjects were enrolled in a Montessori preschool summer program located in Liberty, a suburb of Kansas City, Missouri. All the subjects representing the schools attended the preschools for one year prior to the summer sessions. The children representing the Montessori school had attended only Montessori schools; and the children representing the Laboratory school had never attended a Montessori school.
Instrumentation

Baseline measure. To assess baseline originality an item from the pattern meanings task in the Multidimensional Stimulus Fluency Measure (MSFM) was used to measure ideational fluency (Moran, Milgram, Sawyers, & Fu, 1983). To obtain a measure of intelligence the Information Task from the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) was used (Wechsler, 1967). The scores obtained from the measures administered in the baseline session were used to insure there were no significant differences among any of the eight groups on intelligence, age, or originality.

Creativity Measures. The shape inset (adapted from materials of Starkweather 1964, 1971), blank paper, and colored pencils were used to assess originality as affected by the specific experimental design. Structured Materials included the shape inset, blank paper, and colored pencils. The Unstructured Materials consisted of blank paper and colored pencils. It was assumed that when the materials included the shape inset the child would be led to draw using the inset (structured materials); whereas the materials without the inset would not imply a specific way to draw or a specific shape to draw.

Experimental Groups and Sessions

The 20 children from the traditional Laboratory
preschool and the 20 children from the Montessori preschool were randomly assigned to one of four groups (A/B/C/D). Each group was exposed to all four treatment conditions: Structured Instructions-Structured Materials, Structured Instructions-Unstructured Materials, Unstructured Instructions-Structured Materials, and Unstructured Instructions-Unstructured Materials as shown in Table 1, the order each child was exposed to the conditions was determined by the child's group assignment. The treatment conditions were counter balanced to control for possible fatigue effect.

**Procedure**

Prior to data collection, the experimenter became familiar with the children. All the children were tested individually in a room adjacent to their classroom, or in a quiet room in their home. There was a minimum of one full day between each session; and the most time between sessions was four days.

The Pattern Meanings Task and the WPPSI were administered before the experimental sessions and the scores were used as baseline scores. In the baseline session the children were administered the Pattern Meanings Task of the MSFM followed by the Information Task of the WPPSI, these two tests were always given in this order. For the Pattern Meaning Task of the MSFM the experimenter gave the child a
three-dimensional piece of styrofoam (see Appendix A) and said, "Here is a shape. You can turn it anyway you'd like. Tell me what you think it could be." The experimenter recorded all the responses. When the child no longer responded, the experimenter asked, "What else can you think of?" and "Is there anything else you can think of?" The session continued with no time restraints until the child no longer responded.

The Information Task of the WPPSI consists of 23 questions. The examiner first asked the subject his/her last name as a buffer question as suggested by the Wechsler manual (Wechsler, 1967). This question was not scored. The experimenter then proceeded with the actual questions. During questioning if the child’s response was not clear the experimenter said, "What do you mean?" or "Tell me more."

For sessions one, two, three, and four the children were taken, individually, to a testing room, or seen at home. As shown in Table 1 each group received the same 4 experimental conditions, but received the conditions in a different order.

Structured Instructions-Structured Materials. When a child received the SI-SM condition, he/she was shown the shape inset, blank paper, and colored pencils and given these instructions, "Here are a shape inset, colored pencils, and paper. Watch me draw this shape."
### Table 1

Experimental Conditions for Subject Groups:

Montessori and Laboratory Preschools

<table>
<thead>
<tr>
<th>Group</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SI-SM</td>
<td>SI-UM</td>
<td>UI-SM</td>
<td>UI-UM</td>
</tr>
<tr>
<td>B</td>
<td>SI-UM</td>
<td>SI-SM</td>
<td>UI-UM</td>
<td>UI-SM</td>
</tr>
<tr>
<td>C</td>
<td>UI-SM</td>
<td>UI-UM</td>
<td>SI-SM</td>
<td>SI-UM</td>
</tr>
<tr>
<td>D</td>
<td>UI-UM</td>
<td>UI-SM</td>
<td>SI-UM</td>
<td>SI-SM</td>
</tr>
</tbody>
</table>

**Note.** The following abbreviations have been used in Table 1:

- **SI** = Structured Instructions
- **UI** = Unstructured Instructions
- **SM** = Structured Materials
- **UM** = Unstructured Materials
experimenter then demonstrated how to use the shape inset by using it to draw, then replaced the inset. The experimenter then removed the sheet of paper the shape had been drawn on, gave the child a blank piece of paper, and said, "Now I want you to draw the shape using the shape inset." After the child had completed the task the experimenter said, "Draw as many pictures as you can, but use a different piece of paper for each drawing. What can you draw?" Each time the child stopped drawing, the experimenter asked, "Are you finished?" If the child was not finished the experimenter made no further comments until the child came to another pause then the experimenter again asked the child if he/she was finished. When the child was finished with the drawing, the experimenter said, "Tell me about this picture." All the responses were recorded by the experimenter. After the child was finished speaking, the experimenter gave the child another blank piece of paper and asked, "What else can you draw?" The session continued with no time constraints until the child would not draw any more pictures.

**Structured Instructions-Unstructured Materials.** When a child received the SI-UM condition he/she was shown blank paper, and colored pencils and given these instructions, "Here are some colored pencils and paper. Watch me draw a shape." The experimenter then demonstrated how to draw the shape (of the inset) free handed. The experimenter then
removed the sheet of paper the shape had been drawn on, gave the child a blank piece of paper, and said, "Now I want you to draw the shape." After the child had completed the task, the experimenter said, "Draw as many pictures as you can, but use a different piece of paper for each drawing. What can you draw?" Each time the child stopped drawing, the experimenter asked, "Are you finished?" If the child was not finished the experimenter made no further comments until the child came to another pause then the experimenter again asked if he/she was finished. When the child was finished with the drawing, the experimenter said, "Tell me about this picture." All the responses were recorded by the experimenter. After the child finished speaking, the experimenter gave the child another blank piece of paper and asked, "What else can you draw?" The session continued with no time constraints until the child would not draw any more pictures.

**Unstructured Instructions-Structured Materials.** When a child received the condition of UI-SM he/she was shown the shape inset, blank paper, and colored pencils and given these instructions, "Here are some drawing materials. Draw as many pictures as you can, but use a different piece of paper for each drawing. What can you draw?" Each time the child stopped drawing, the experimenter asked, "Are you finished?" If the child was not finished, the experimenter
made no further comments until the child came to another
pause, then the experimenter again asked the child if he/she
was finished. When the child was finished with the drawing,
the experimenter said, "Tell me about this picture." All
the responses were recorded by the experimenter. After the
child finished speaking the experimenter gave the child
another blank piece of paper and asked, "What else can you
draw?" The session continued with no time constraints until
the child would not draw any more pictures.

Unstructured Instructions-Unstructured Materials. When
a child received the UI-UM condition he/she was shown blank
paper and colored pencils and told given these instructions,
"Here are some drawing materials. Draw as many pictures as
you can, but use a different piece of paper for each
drawing. What can you draw?" Each time the child stopped
drawing the experimenter said, "Are you finished?" If the
child was not finished, the experimenter made no further
comments until the child came to another pause, then the
experimenter again asked the child if he/she was finished.
When the child was finished the experimenter said, "Tell me
about this picture." All the responses were recorded by the
experimenter. After the child finished speaking, the
experimenter gave the child another blank piece of paper and
asked, "What else can you draw?" The session continued with
no time constraints until the child would not draw any more
pictures.

Scoring

The intelligence score was derived from the Information Task. The Information Task scaled score and the full-scale intelligence score have a .71 correlation according to the WPPSI manual (Wechsler, 1967). Scoring for the Information Task was completed using the standard scoring procedure to determine raw scores. The raw scores were then converted to the scaled scores.

For this study ideational fluency was operationally defined as the total number of responses made by the child minus repeats and irrelevant responses. The baseline originality score was derived from one task, the Patterns Meaning Task, from the MSFM. To score the MSFM every response from all 40 children was alphabetized. A response was scored as popular if more than one child gave it. An original response was a response given by only one child.

The scoring method used for the session drawings was similar to the scoring method of the MSFM. Ideational fluency was defined as the total number of drawn responses (verbal responses that did not have a corresponding picture did not occur) made by the child minus repeats and irrelevant responses. A response was considered to be repeated when two or more pictures were described by the child as the same thing drawn during the same session.
For each session separately, the children’s responses were alphabetized. A response was scored as original (occurring as a response from only one child) or scored as popular (occurring as a response from more than one child). This study operationally defined originality by the statistical infrequency of a score based on Wallach and Kogan’s (1965) model of scoring. They view an original response as one which is statistically uncommon in the population; the statistical frequency is calculated by using the populations’ total number of responses. A drawing was seen as popular (5% or greater) if it was drawn by more than one child during the same session and original if it was drawn by only one child, the verbal responses for the MSFM task were scored identically.
Chapter 4

Results

The purpose of this study was to assess the influence of structure in instructions and materials on Montessori and Traditional preschool children’s creativity. To be sure the groups were equal on age, intelligence, and originality, three, $2 \times 2$ ANOVAS were conducted with school (Laboratory/Montessori) and group (A/B/C/D) as the independent variables. The means and standard deviations for age, intelligence, and originality are shown in Table 2. Results of the ANOVAS indicated no main effect by school $F(1, 32) = 3.65, p > .05$ or by group $F(3, 32) = 1.06, p > .05$ on intelligence. The results of the ANOVAS indicated no main effect on age by school $F(1, 32) = .734, p > .05$ or by group $F(3, 32) = .679, p > .05$. Results of the ANOVAS indicated no main effect on baseline originality by group $F(3, 32) = .80, p > .05$; but a main effect on baseline originality by school $F(1, 32) = 7.20, p < .05$.

Intercorrelations between the independent variables are shown in Table 3. As shown, four of the six possible intercorrelations between the originality scores in the four treatment conditions reached statistical significance. Treatment 1 (SI-SM) originality scores were related to treatment 2 (SI-UM) scores, and treatment 3 (UI-SM) scores, but not to treatment 4 (UI-UM) scores. Treatment 2 scores
Table 2

Group Means and Standard Deviations for Age, Intelligence, and Originality

<table>
<thead>
<tr>
<th>Group</th>
<th>Age M</th>
<th>SD</th>
<th>IQ M</th>
<th>SD</th>
<th>Originality M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A L</td>
<td>58.4</td>
<td>6.80</td>
<td>11.0</td>
<td>1.73</td>
<td>6.2</td>
<td>6.98</td>
</tr>
<tr>
<td>M</td>
<td>55.8</td>
<td>5.54</td>
<td>11.0</td>
<td>1.87</td>
<td>.4</td>
<td>.89</td>
</tr>
<tr>
<td>T</td>
<td>57.1</td>
<td>6.01</td>
<td>11.0</td>
<td>1.70</td>
<td>3.3</td>
<td>5.60</td>
</tr>
<tr>
<td>B L</td>
<td>56.8</td>
<td>4.60</td>
<td>12.0</td>
<td>2.00</td>
<td>7.6</td>
<td>2.97</td>
</tr>
<tr>
<td>M</td>
<td>61.8</td>
<td>4.55</td>
<td>12.2</td>
<td>1.30</td>
<td>2.8</td>
<td>2.17</td>
</tr>
<tr>
<td>T</td>
<td>59.3</td>
<td>5.06</td>
<td>12.1</td>
<td>1.60</td>
<td>5.2</td>
<td>3.52</td>
</tr>
<tr>
<td>C L</td>
<td>58.0</td>
<td>8.49</td>
<td>13.8</td>
<td>1.48</td>
<td>2.8</td>
<td>1.92</td>
</tr>
<tr>
<td>M</td>
<td>63.2</td>
<td>3.56</td>
<td>9.4</td>
<td>1.95</td>
<td>4.0</td>
<td>5.05</td>
</tr>
<tr>
<td>T</td>
<td>60.6</td>
<td>6.72</td>
<td>11.6</td>
<td>2.84</td>
<td>3.4</td>
<td>3.66</td>
</tr>
<tr>
<td>D L</td>
<td>57.6</td>
<td>6.19</td>
<td>12.8</td>
<td>2.59</td>
<td>4.4</td>
<td>3.65</td>
</tr>
<tr>
<td>M</td>
<td>57.4</td>
<td>7.13</td>
<td>12.2</td>
<td>2.59</td>
<td>1.2</td>
<td>2.17</td>
</tr>
<tr>
<td>T</td>
<td>57.5</td>
<td>6.29</td>
<td>12.5</td>
<td>2.46</td>
<td>2.8</td>
<td>3.29</td>
</tr>
</tbody>
</table>

Note. The following abbreviations have been used in Table 2:

L = Laboratory preschool
M = Montessori preschool
T = Total sample
Table 3

Intercorrelations for the Total Group of Children

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>IO</th>
<th>BO</th>
<th>T10</th>
<th>T20</th>
<th>T30</th>
<th>T40</th>
<th>I1</th>
<th>I3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.17</td>
<td>.01</td>
<td>-.05</td>
<td>-.12</td>
<td>-.07</td>
<td>.02</td>
<td>-.17</td>
<td>-.05</td>
<td></td>
</tr>
<tr>
<td>IQ</td>
<td>.04</td>
<td>.02</td>
<td>.09</td>
<td>.07</td>
<td>.04</td>
<td>-.15</td>
<td>-.32*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BO</td>
<td>.00</td>
<td>.24</td>
<td>.04</td>
<td>.07</td>
<td>.31*</td>
<td>.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T10</td>
<td></td>
<td></td>
<td></td>
<td>.69*</td>
<td>.37*</td>
<td>.04</td>
<td>-.23</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>T20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.44*</td>
<td>.21</td>
<td>-.26</td>
<td>-.09</td>
<td></td>
</tr>
<tr>
<td>T30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.51*</td>
<td>-.16</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>T40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.00</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>I1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.50*</td>
</tr>
</tbody>
</table>

* p < .05

Note. The following abbreviations have been used in Table 3:

IQ = Baseline intelligence scores

BO = Baseline originality scores

T10 = Treatment 1 (SI-SM) originality scores

T20 = Treatment 2 (SI-UN) originality scores

T30 = Treatment 3 (UI-SM) originality scores

T40 = Treatment 4 (UI-UM) originality scores

I1 = Inset use scores during treatment 1 (SI-SM)

I3 = Inset use scores during treatment 3 (UI-SM)
(SI-UM) were related to scores in treatment 3 (UI-SM), but not treatment 4 (UI-UM) scores. Treatment 3 (UI-SM) scores were related to treatment 4 (UI-UM) scores. These results indicate that originality scores obtained in the condition with Unstructured Instructions and Unstructured Materials differed significantly from those with Structured Instructions and Structured Materials with the condition of treatment 3 (UI-SM).

It is interesting to note that baseline originality was not related to originality scores obtained in the treatment conditions indicating that variations in structure and materials did not have a differential effect on children with significantly different levels of originality as measured by the Patterns Meanings Task.

As expected, intelligence was not related to baseline originality scores \( r = .04, p > .05 \). The correlation between intelligence and inset use was of interest given the finding in previous studies (Moran, Milgram, Sawyers, & Fu, 1983) that intelligence had a low correlation with popular responses on the MSFM. It was thought that inset use might be similar to popular or common responses. The findings were that children scoring high on intelligence tended not to use the inset in the treatment 1 (SI-SM) \( r = -.15, p > .05 \), and also tended not to use it in treatment 3 (UI-SM) \( r = -.32, p > .05 \). Inset use in treatment 3 (UI-SM) was
significantly negatively correlated with intelligence; but
inset use in treatment 1 (SI-SM) and intelligence were not
significantly correlated. For all children, their inset use
during treatment 1 (SI-SM) was significantly correlated to
inset use in treatment 3 (UI-SM) \( r = .47, p < .05 \).

The first research question tested was that Laboratory
school children would have higher originality scores than
Montessori school children. Table 4 presents the means and
standard deviations for originality scores by treatment
groups. Results of the ANCOVAs indicated there was no
significant difference between Montessori and Laboratory
school children's originality scores during the treatment
conditions \( F (3, 155) = .059, p > .05 \).

The second research question tested was that originality
scores of groups A and B would be significantly lower than
originality scores of groups C and D. Table 5 presents the
means and standard deviations for originality scores by
order of treatment. ANCOVAs were conducted to test for an
order affect of the treatment conditions. When the schools
were combined, there was a main affect by group \( F (3, 155) = 
3.79, p < .05 \). A Newman Keuls Multiple Comparison test was
conducted to identify which means differed significantly.
It was determined that group B's mean (3.58) was
significantly greater than group D's mean (1.65) (\( df = 155, 
p = .05 \)). When the Laboratory school was analyzed alone,

40
Table 4
Means and Standard Deviations for Originality Scores by Treatment Groups

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>SI-SM</th>
<th>SI-UM</th>
<th>UI-SM</th>
<th>UI-UM</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>L</td>
<td>2.05</td>
<td>1.04</td>
<td>2.45</td>
<td>8.40</td>
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<tr>
<td>A</td>
<td>.80</td>
<td>1.30</td>
<td>2.40</td>
<td>1.34</td>
</tr>
<tr>
<td>B</td>
<td>2.80</td>
<td>1.10</td>
<td>3.60</td>
<td>.55</td>
</tr>
<tr>
<td>C</td>
<td>3.00</td>
<td>2.55</td>
<td>2.20</td>
<td>.84</td>
</tr>
<tr>
<td>D</td>
<td>1.60</td>
<td>1.14</td>
<td>1.60</td>
<td>1.34</td>
</tr>
<tr>
<td>M</td>
<td>3.25</td>
<td>1.91</td>
<td>2.70</td>
<td>1.29</td>
</tr>
<tr>
<td>A</td>
<td>2.60</td>
<td>3.21</td>
<td>1.80</td>
<td>2.05</td>
</tr>
<tr>
<td>B</td>
<td>6.00</td>
<td>3.39</td>
<td>4.60</td>
<td>2.28</td>
</tr>
<tr>
<td>C</td>
<td>2.80</td>
<td>2.28</td>
<td>2.40</td>
<td>2.30</td>
</tr>
<tr>
<td>D</td>
<td>1.60</td>
<td>2.07</td>
<td>2.00</td>
<td>1.41</td>
</tr>
<tr>
<td>T</td>
<td>2.65</td>
<td>2.55</td>
<td>2.58</td>
<td>1.04</td>
</tr>
<tr>
<td>A</td>
<td>1.70</td>
<td>2.50</td>
<td>2.10</td>
<td>1.66</td>
</tr>
<tr>
<td>B</td>
<td>4.40</td>
<td>2.91</td>
<td>4.10</td>
<td>2.03</td>
</tr>
<tr>
<td>C</td>
<td>2.90</td>
<td>2.28</td>
<td>2.30</td>
<td>1.64</td>
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<tr>
<td>D</td>
<td>1.60</td>
<td>1.58</td>
<td>1.80</td>
<td>1.32</td>
</tr>
</tbody>
</table>
### Table 5

Group Means and Standard Deviations for Originality Scores by Order of Treatment

<table>
<thead>
<tr>
<th>Group</th>
<th>Laboratory M</th>
<th>Laboratory SD</th>
<th>Montessori M</th>
<th>Montessori SD</th>
<th>Total Sample M</th>
<th>Total Sample SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.80</td>
<td>1.91</td>
<td>2.15</td>
<td>.34</td>
<td>2.57</td>
<td>.87</td>
</tr>
<tr>
<td>B</td>
<td>2.65</td>
<td>1.02</td>
<td>4.50</td>
<td>1.09</td>
<td>3.58</td>
<td>.89</td>
</tr>
<tr>
<td>C</td>
<td>3.05</td>
<td>.74</td>
<td>2.80</td>
<td>.57</td>
<td>2.93</td>
<td>.45</td>
</tr>
<tr>
<td>D</td>
<td>1.70</td>
<td>.12</td>
<td>1.60</td>
<td>.43</td>
<td>1.65</td>
<td>.19</td>
</tr>
</tbody>
</table>

**Note.** The groups received treatment in the following order:

- **Group A:** SI-SM, SI-UM, UI-SM, UI-UM
- **Group B:** SI-UM, SI-SM, UI-UM, UI-SM
- **Group C:** UI-SM, UI-UM, SI-SM, SI-UM
- **Group D:** UI-UM, UI-SM, SI-UM, SI-SM
the results of the ANCOVAS indicated no main affect by
group, $F (3, 75) = .96, p > .05$. When the Montessori school
was analyzed alone, the results of the ANCOVAS indicated a
main affect for group $F (3, 75) = 5.12, p < .05$. A Newman
Keuls Multiple Comparison Test was conducted to identify
which means differed significantly. It was determined that

group B's mean (4.5) was significantly greater than group
A's mean (2.15), group C's mean (2.8), and group D's mean
(1.6) ($df = 75, p = .05$).

The final research question tested was that the combined
affect of Structured Instructions-Structured Materials would
be greater than either alone as evidenced by lower
originality scores. Table 4 presents the means and standard
deviations for originality scores by treatment. ANCOVAS
were conducted to test for a treatment affect. When the
schools were combined, results of the ANCOVAS indicated no
main affect $F (3, 155) = .059, p > .05$. When the Laboratory
school was analyzed alone, the ANCOVAS indicated no main
affect $F (3, 75) = .389, p > .05$. When the Montessori
school was analyzed alone, the ANCOVAS indicated no main
affect $F (3, 75) = .436, p > .05$. 

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Chapter 5

Discussion

Similar to findings in previous research (Moran, Sawyers, & Moore, 1988) originality as measured by an item from the Patterns Meanings Task of the MSFM was distinct from intelligence, and not related to age. The means and standard deviations for the baseline originality was also similar to earlier findings (Moran et al., 1988). The baseline originality scores were equal among the eight groups, but were significantly different between the two schools. The Laboratory children scored higher on baseline originality than the Montessori children. There were no differences between schools or groups for age or intelligence, thus baseline originality was the only covariate.

There were seven significant correlations. It is interesting to know that if a child used the inset often the first time it was available, he/she used the inset often the second time it was available also. Both treatments with identical instructions (treatments 1 and 2; and treatments 3 and 4) were significantly correlated. Treatment 4, the least structured condition, was only significantly correlated with treatment 3, the second least structured condition.

It was expected that Laboratory children exposed to a
curriculum with limited structure in instructions and materials would score higher on originality than children in a Montessori program which is based on structure in instructions and materials. The results were mixed. Although a significant difference on baseline originality was found between the schools with the Laboratory school children scoring higher, the originality scores obtained in the treatment sessions did not differ by school. One possible explanation is that the drawing task did not tap the entire hierarchy of possible responses and as such did not differentiate between the high and low creative children. Because the drawing task took longer than the MSFM verbal responses and original responses come at the end of the response series, all original responses may not have been obtained. It is also possible that the length of the treatment sessions was not sufficient to fully test for the effects of structure in instructions and materials on originality scores.

The second research question tested was that of an order affect. It was expected that children in group A and group B who received structured instructions before unstructured instructions (SI-SM, SI-UM; SI-UM, SI-SM) would have significantly lower originality scores than children in group C and group D who received unstructured instructions before structured instructions (UI-UM, UI-SM; UI-SM, UI-UM).
An order affect for group was found for the total sample. Group B had a higher mean than group D. There was no significant order affect when the Laboratory school was analyzed alone. When the Montessori school was analyzed alone, group B had a significantly higher mean than groups A, C, and D. Thus, it appears that the significant order affect found for the total sample was due to the Montessori group B which received SI-UM, SI-SM, UI-UM, UI-SM. The 8 groups did not differ on intelligence or age and the difference in baseline originality was controlled for through covariance. The obvious explanation is that the combined treatment affect of structured instructions and materials was expected and familiar by Montessori children, and so it did not suppress their originality scores. However, the mean originality scores for group A Montessori children who also received instructions in the same order, was significantly lower than group B and more similar to groups C and D. No other obvious explanation can be drawn from the data.

Based on the Moran et al. (1988) study, it was expected that the combined affect of structured instructions and materials would be greater than either alone as evidenced in lower originality scores. The third research question was testing for a treatment affect. No significant differences were found among groups. As discussed previously, this may
have been due to the measure of originality which required
the children to make numerous drawings. There did not
appear to be a fatigue factor present because the means did
not decrease across the sessions. Possibly, the fact that 4
and 5-year-old children are still improving on fine motor
skills required for pencil control may have influenced the
amount of pictures they produced.

There are numerous reasons why the hypotheses may not
have been supported. One reason may be that although
baseline originality was controlled, there may be other
variables that affected children's originality. It is
possible that the child's home environment and the parent's
parenting style may affect the children's originality and
these factors were not taken into consideration.

Although the treatment condition scores did not reflect
differences between Laboratory school children and
Montessori school children's originality, the baseline
originality scores did reflect a significant difference.
This is evidence that constant exposure to structure does
affect children's originality as measured an item from the
MSFM. Several Laboratory school children asked about the
shape inset during treatment sessions: but, a Montessori
child said, "I don't know what to draw. I need a circle to
trace with," (female, group C, session 1, treatment 3, UI-
SM). This child had obviously been affected by the constant
exposure to structure outlines in the Montessori classroom and had come to rely on the outlines for drawing instead of creating her own shapes, this generalized beyond the Montessori classroom.
References


APPENDIX A

Multidimensional Stimulus Fluency Measure

Pattern Meanings Task
"Here is a shape. You can turn it anyway you'd like. Tell me what you think it could be."
APPENDIX B

Stimuli Used with Structured Materials
APPENDIX C

Parent Information Sheet and Consent Form
June 3, 1992

Dear Parents,

In partial fulfillment of the requirements for my Master's degree in Family and Child Development, I am conducting a research project on how creativity is influenced by various verbal instructions in preschool-aged children. I would like to ask your cooperation in permitting your child to participate.

Your child will be audio-taped while working with various art materials. Your child will be given the opportunity to work freely with these materials. No child will be forced to participate if he or she does not want to. Each child will be seen individually in the school building. All information will be kept confidential. After data is collected and analyzed the results will be made available to parents.

Please complete the attached form and return it to your child's school director. If you have any questions please contact the researchers. Thank you.

Sincerely,

Ann E. Valentine-Casertano
Graduate Student
951-2240

Dr. Janet Sawyers
Professor
231-5148
CONSENT FORM

I have received an explanation of the nature of this study and I understand that I may withdraw my child from the study at any time. I understand that all information collected in this study will remain confidential.

I give permission for my child to participate in this study.

Name of child:________________________________________
Child's gender:____________
Child's birthday: month____ day____ year____
Date child began school he/she is currently attending:
month____ year____
Name of parent or guardian:___________________________
Signature of parent or guardian:______________________

____ Yes, I am willing to have my child participate
____ No, I do not wish to have my child participate
APPENDIX D

Parent Letter Written by Montessori School Director
Dear Parents,

The young lady who is requesting your help with her Masters work is a very special person to all of us at CMC. She began her career in child development in our school when she was a teenager working as our very first teacher's aide. Her interest in children and the ways they learned and grew were a pleasure for all of us. She continued her work with and about children as she herself grew and matured.

Please give Ann's project your serious consideration and if you have questions about the project and its administration, about Ann, or about anything else, please call Kathie (781-7997).

Thank you for your help and cooperation.

Sincerely,

Kathie

Kathie Carpenter
Vita

Ann Elizabeth Valentine-Casertano was born in Rhinelander, Wisconsin on August 9, 1966. She graduated from Liberty High School in Liberty, Missouri in 1984. She received a Bachelor of Arts degree in Child Development and Psychology from the University of Kansas in 1988.

Ann began graduate work at VPI & SU in the department of Family and Child Development with a concentration in Child Development in August 1990. She was awarded a graduate assistantship as head teacher for the three and four year old class for the school year 1990-1991 and in 1991-1992 as the head teacher for the infant class.

Ann is an alumni member of the social sorority, Alpha Omicron Pi. She is a member of Psi Chi, the national honor society in psychology.

Ann met Mark Casertano her first year at Virginia Tech and they were married August 10, 1991 in Mission, Kansas. The first year of their marriage they worked together as head teachers in the infant-toddler room at the Lab School.

Ann Valentine-Casertano