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The Effects of Training Parents in Divergent Questioning on the Creativity of the Pre-School Child

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THE EFFECTS OF TRAINING PARENTS
IN DIVERGENT QUESTIONING ON THE
CREATIVITY OF THE PRE-SCHOOL CHILD

Judith E. Brown

Education Faculty

Judith E. Brown

By
Judith E. Brown

Submitted in partial fulfillment of the requirements
for the Master of Arts in Education degree
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Jeanne Donovan
Faculty Tutor

Education Faculty

Nancy Polette

ABSTRACT

This study was designed to investigate whether teaching mothers to ask divergent questions would have a direct effect on their four year old child's creativity. It was hypothesized that children whose mothers received the training in divergent questioning techniques would do better on a test of creativity than children whose mothers did not receive the training.

Twenty mother and child groups were included in the study. The twenty were divided randomly into two groups, ten groups to receive the treatment and ten to receive no treatment. Six treatment sheets were then administered in the homes to the experimental group and both groups were tested at the conclusion of the treatment using E. Paul Torrance's test of creativity, "Thinking Creatively in Action and Movement."

The data was analyzed by a single-tailed t-test and no significant differences were found between the creativity scores of four year olds whose mothers received the treatment and those whose mothers did not.

Though the null hypothesis was not disproved this author feels the hypothesis is still of value. In future research the variability of the follow-up by mothers being

trained with the treatment sheets needs to be controlled for in a more consistent manner. It also appears as if the time allotted for the study needs to be increased.

The self-confidence of both mothers and children is an area that requires further study concerning its effect on creativity.

The home environment appeared to have a greater influence on the total creativity score than originally supposed.

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Appendix A: Parental Involvement in Children's Education

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It seems clear to begin to the

CHAPTER I

HISTORICAL BACKGROUND

The consequences on the future of mankind of present and future efforts to gain understanding and control of creative performances are uncalculable. It is apparent that the solutions to numerous human problems are dependent upon the education of the world's population, both extensively and intensively, and informed people with skills in using its information is a creative problem-solving people. Creative education aims at a self-starting resourceful and confident person ready to face personal, interpersonal and other kinds of problems. Because he is confident, he is also tolerant where there should be tolerance. A world of tolerant people would be a peaceful and cooperative people. Thus, creativity is the key to education in its fullest sense and to the solution of mankind's most serious problem.¹

Guilford's statement emphasizes the importance of creativity and creative education. The author shares Guilford's view of that importance. Guilford visualizes the ideal, the end result of a creative society, but the problem of how to move from a global definition of "what could be" to the specifics of "how can you accomplish this" is a complicated one. How do we begin?

It makes sense to begin in the earliest years in a child's life. According to Alice Yardley learning takes place more rapidly between birth and four years than during any other comparable period of time.² Growth rate both

physically and mentally starts fast, reaches mid-point between four and five and then begins to slow down. Between birth and four, fifty percent of general intelligence develops; thirty percent between four and eight, and twenty percent between eight and seventeen.³

If one begins to tackle the problems of creativity in the earliest years of life, the parents of the young child must be involved. How to involve parents in nurturing their child's creativity is a question the author will attempt to answer. Can young children really think creatively, and if they can how do you know they can? What are the behaviors associated with creativity? Can you teach a child to think creatively? In considering the involvement of parents, their impact on the child in various ways must be examined. What effect do parents have on the home environment, and how does parenting style affect the child's creativity are two areas to consider. Further, the methods used in involving parents in fostering creative development are important.

Creativity is a complicated subject. In order for it to be understood, it must be examined in different contexts. We can then better use it to effect some change in the creativity of young children. One of the valuable ways we have of understanding creativity is to look

historically at a general overview of the research which has already been done in the general area of creativity. Then, more specifically, we can look at some of the kinds of research that were attempted dealing with the pre-school child.

Galton (1869) was the first natural scientist to try to understand the hereditary determination of creative performances. His study, a classic one looking at men of genius, failed to reach uncontestable conclusions.⁴

Early psychologists were having so much difficulty with the more simple mental events, such as sensation and memory, that they did not involve themselves with the problems of creativity.

In the 1930's through the 1950's behaviorism swept the field of psychology and few psychologists with the exception of Schoen and Guilford had much to say about creativity.⁵

While psychologists were doing very little to attempt to understand creative people and creative production, others recorded anecdotal studies of creative performance. These men like Wallas, Hadamard, Ghiselin, and Rossman gathered the output of creative genius in science and literature.⁶ The most fruitful outcome of this was a list of the stages of thinking that a creator exhibits in the total process. The steps proposed by Wallas were preparation, incubation, illumination and elaboration.⁷

Anna Roe investigated the characteristics of people of recognized creative performance while at the University of California in Berkeley. MacKinnon in 1960 looked at creative writers, architects, and mathematicians. Both studies emphasized motivation and temperamental characteristics. They found highly creative persons are inclined to be strongly interested in aesthetics and theoretical matters, highly intuitive and introverted.⁸ Their studies gave some basic research on the nature of creativity.

Guilford states that:

Another major approach which has emphasized the intellectual qualities that might contribute to creative thinking and creative performance has been made through application of the multivariate methods of factor analysis. Rejecting the prevailing doctrine that intelligence is a single, monolithic ability, and also the view that creative talents are something outside the realm of intelligence, the studies began with the assumption that there are several, perhaps many, distinguishable abilities involved. It was also assumed that creative abilities are not confined to a favored few individuals, but are probably widely distributed to different degrees throughout the population.⁹

Using the results of factor analysis [as of the distinctions to be found among abilities relevant to creative performance], a general theory of intelligence and its components known as the structure of the intellect was developed by Guilford.

In the 1960's many researchers looked at some of the conditions of creativity and how to develop it. E. Paul Torrance, while examining the question of how creative

potential changes with age in children and adolescents, found that development does not occur at a uniform rate. He further found the most significant departure is the "fourth-grade slump" at about age nine. Other researchers, Trembly and Lehman, found the quality of creative production reaches its maximum in the early thirties.¹⁰

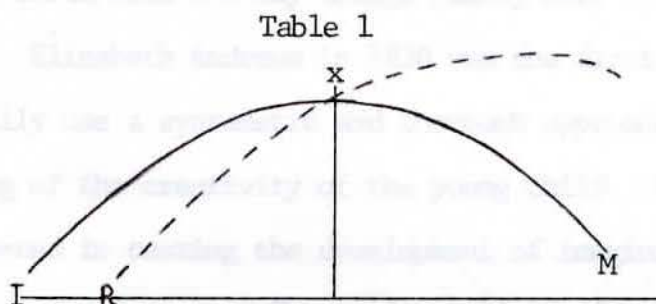
Another general trend in the 1960's was studies designed to improve creative abilities through favorable environmental conditions and exercises of appropriate kinds. Sidney Parnes and his associates at S.U.N.Y. - Buffalo and Irving Maltzman at U.S.C.- Los Angeles were two researchers who worked on this problem. For example, Sidney Parnes developed a training program emphasizing creative problem solving procedures. Based on researchers like Parnes, E. Paul Torrance examined 142 studies completed in the late 1960's through the 1970's designed to teach children to think creatively. The studies using the Parnes training program and other disciplined approaches, showed the highest percentage of success.¹¹ Torrance concluded on the basis of the studies he had reviewed, spanning the 1960's and 1970's, that it was possible to teach children to think creatively.

Considerable momentum has been generated in investigation of creativity thus far. Researchers have examined the problem of what constitutes creativity and tried to dissect it into more manageable parts for the purpose of study.

As each decade passed the researchers were becoming more and more specific about their findings and how to apply them.

One more specific area of research in creativity, that was continuing along side the other studies, was the development of creativity in the young child.

E. Paul Torrance in his book, Guiding Creative Talent, looked at some of the research of early investigators. Ribot in 1906, using the term imagination, shows the growth and rivalry of the imagination and reason in most individuals.



In Table 1 the line "IM" stands for the growth of the imagination through the period of childhood and youth. The line "R" represents Reason. Reason begins later and grows more slowly than the others. At "X" the two faculties are at the same level and stand in antagonism to one another. After this, reason fights, or seems to fight, a winning battle. According to Ribot, imagination gives way or at least provides nothing new, in most people, after the period of youth is over. This seemed to be validated by the 1960's studies mentioned previously by Tremblay and Lehman.¹²

MacMillan was another major researcher looking into the creativity of the young child. In 1924 three stages in the development of the imagination were listed. During the first stage the young child has a rainbow-hued view of the world. Fairy castles and always blue skies are real to the child at this stage. In the second stage the child comes to grips with reality and begins to look at stormy skies and the cause and effect of "what makes the streets so dirty." During the third stage he begins to work out by small degrees the ideal of his first version of the world with the way things really are.¹³

Elizabeth Andrews in 1930 was the first researcher to really use a systematic and thorough approach to the testing of the creativity of the young child. She was very interested in testing the development of imagination during the pre-school years. She used a variety of methods and observations in order to study several types of imaginative and creative activity. Three of her tests were presented tachistoscopically with the task of forming new products (transformations). The following kinds of observations were made of the imaginative play of children: transformation of objects, transformation of animals, acts of sympathy, dramatizations, imaginary playmates, fanciful explanations, fantastic stories, new uses of stories, constructions of new games, extensions of language, appropriate quotations, leadership with plan, and aesthetic appreciation.

Andrews also discovered that in the development of creativity the total creative imagination scores were highest between four years and four years six months with a sudden drop at about age five when the child enters kindergarten. Ability to redefine, restructure, or recombine reached a peak between three and four years and from then on decreased. Analogy reached a height during the fourth year and declined during the fifth. 'Don't know' responses decreased steadily with chronological age up to five years and then increased somewhat. The more creative types of imagination reached a high point between ages three years six months, and their lowest ebb during the fifth year.¹⁴

F. V. Mackey in 1945 found the total amount of imaginative behavior increased with age during the pre-school period.¹⁵

In 1957 E. M. Ligon attempted to establish age level characteristics for the development of the imagination from birth to age sixteen. From this very extensive project he also lists methods for developing dimensions of character. A summary of his age-level characteristics (birth to age 6) suggested and the methods follow:

Birth to Age Two

- The child develops imagination in the first year.
- When he creates something he usually names it when completed, not before.
- Child is eager to experience everything through taste, touch and sight.

Two to Four

- The child learns about his world through direct experience and repetition of this experience in verbal and imaginative play.
- His curiosity about the world continues.
- He begins to develop a sense of autonomy and wants to do things for himself.
- To develop his creativity he should be provided with toys which can "become" a variety of things, i.e., blocks or balls of clay. Parents should encourage children to do things for themselves and be patient when a child is slow or imperfect at a task. He needs many opportunities to explore and do things.

Four to Six

- The child has a good imagination. (There is no mention of a lessening of imagination which others had found in the middle of this period.)
- The child learns the skill of planning for the first time.
- He searches for truth and right even in areas embarrassing to adults.
- He becomes aware of the feelings of others.
- To develop creativity the creations of 4-6's should not be evaluated by adult standards.
- They should be involved in contributing their ideas to planning.
- Children's questions should be honored and answered with simple direct answers. This is a good age to encourage imagination in creative surprises for the family.¹⁶

Dr. E. Paul Torrance began to initiate efforts in 1958 to develop tests of creative thinking that would extend downward to five-year olds and these efforts were finally integrated into the Torrance Tests of Creative Thinking in 1966 and in 1974, but these tests were only marginally suitable at age five and certainly not suitable for three and four year olds.

In 1966 at the University of Georgia, Torrance

made serious efforts to test the creativity of the pre-school child with an instrument called the Mother Goose Problems Test, a construction test involving lego blocks; an originality test calling for unusual images associated with different shaped wooden blocks; a question asking test calling for questioning responses to Mother Goose prints, stories, and toys; and a Just Suppose test based on original drawings of unlikely situations. The Just Suppose, developed between 1968 through 1970, relied heavily on verbal responses from young children and were generally disappointing in results.¹⁷

The preceding sequence of testing experiences with the young child generated the ideas Torrance used to create a new test, finished in 1980, for young children called, "Thinking Creatively in Action and Movement," the instrument chosen by this author to assess creativity in the young child.

As Torrance was working through some of the problems of testing young children, Elizabeth K. Starkweather was also. Starkweather tried to assess the conformity - non-conformity of young children with a Starkweather Form Boards Test. In this test a child had an opportunity to make a choice based on his own preferences or to follow a model.

The conformity - non-conformity tests were designed to meet the following criteria:

- a) The compulsive quality and conforming quality of a child's behavior must be measured independently. The

child who is a compulsive non-conformist is just as rigid as the child who is a compulsive conformist.

b) The tests must be adjustable in order that the opportunity to conform be of similar potency for all children. Conforming behavior is common when a child has an opportunity to conform to persons he likes, whereas the reverse is true in case of persons he dislikes. Similarly conforming behavior is to be expected when it involves the choice of preferred object.¹⁸

The Starkweather Target Game was designed to measure the young child's willingness to try difficult tasks, to accept the challenge of a calculated risk. It consists of a box shaped target which responds somewhat like a Jack-in-the-Box. When a bull's eye at the front of the target is hit, the lid opens and a surprise picture appears. The ability of each child is pre-tested to determine what is difficult for each child. On each trial the child must make a choice between an easy task and a difficult one.

Finally Starkweather developed the Starkweather Originality Test to assess originality of thinking. It consists of a pre-test or warm-up session in which the examiner encourages the child to think of a variety of responses, and the test proper during which the child's responses to additional shapes are accepted without question.

The pre-test consists of eight plastic foam pieces and the test proper consists of 40 pieces, 4 each of ten different shapes.¹⁹ Starkweather's Originality Test appears to be the most valid when teachers' judgments of child's originality was compared to test scores.

Torrance has stated that you can teach children to think creatively by changing something in their environment. Based on the 142 studies assessed by Torrance, Starkweather and Torrance, along with Guilford, believe you can isolate areas of creativity and test to see if people or children are creative.

The research in the past has shown that there are many ways of looking at creativity and of defining it. Some of the researchers (like MacKinnon and Roe) have looked at the products of the works of creative people. Others like Torrance have chosen to define creativity as a process.

Definition of Creativity

Because there is not universally agreed on definition of creativity, there are no measures of it which are as widely accepted or used as the IQ score is for intelligence.²⁰ In the historical review of the research, different studies have viewed creativity as process, as product, or as experience. This author defines creativity as a process and agrees with E. Paul Torrance's definition in Felice Haufman's book, The Gifted Child and You:

...becoming sensitive to or aware of problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; bringing together available information, defining the difficulty or identifying the missing elements, searching for the solutions, making guesses or formulating hypothesis about the deficiencies; testing and retesting those hypotheses and modifying and restating them and finally communicating the results.²¹

Mayesky and Nueman state:

Creativity is also a way of thinking or acting or making something that is original for the individual and valued by that person or others.²²

Looking at the definition of creativity as a process seems to give a better handle in its use in specific instances with young children. Leif Fearn of San Diego State University states it this way:

The few rigorous scholars working on creativity research have managed to introduce the moon, leaving the remainder of a possible creativity universe to hypothesis, supposition, magic, and a smattering of middle ages divining - rod thinking that survives only because it fills an evidential void. I encourage the work of scholars because they provide shoulders on which to stand. Right now, however, there are thousands of teachers who would like to have a handle on creativity. This model, the individual development creativity model, is here for that purpose. The model is defined thusly:

1. Creativity is a process that may or may not result in a product, but in any case, product is not a test of creative value or an indicator of creative behavior.
2. Creativity does not occur in a vacuum. It is the use, the management, the manipulation of knows.
3. Neither the creative process nor the creative product results from magic. Both can be largely explained in terms of creator behaviors.

4. The creative process relates to an intellectual factor, if at all, only by a criterion or sophistication not by a criterion of essence.
5. None of the above convictions discount inspiration, insight or the seemingly fantastic gifts of "creative geniuses."²³

Daniel S. P. Schubert, M.D. and Angelo M. Biondi

looked at defining two major categories of creativity based on their review of past literature, the first culminating in tangible products such as art, literature, scientific theories, music and inventions and the other resulting in new and applicable responses to daily challenges whether they be tangible or not.

Schubert and Biondi felt that early investigations focused on the first type of product oriented creativity as they explored the behavior patterns of practitioners in the arts and sciences. With such a focus creativity was thought of as being limited to the fortunate few who were recognized in their field of endeavor.

The emergence of the second definition of creativity held more meaning for educators. Viewed as a process, creativity becomes an art, a workable art, a teachable art, a learnable art, by which people can become more proficient in handling day to day challenges.²⁴

Torrance, Fearn, Schubert and Biondi believe that creativity can be a process that is learnable and teachable. It is not the sole property of the talented but a quality that can be nurtured by all.

Footnotes

¹J. P. Guilford, Intelligence, Creativity and their Educational Implications, (San Diego, Calif.: Robert R. Knapp, 1968) p. 146-147.

²Alice Yardley, Young Children Thinking, (New York: Citation Press, 1973) p. 11.

³Ibid., p. 12.

⁴F. Galton, 'Hereditary Genius: An Inquiry into its Laws and Consequences,' quoted in J. P. Guilford, Intelligence, Creativity and their Educational Implications, (San Diego, Calif.: Robert R. Knapp, 1968) p. 138.

⁵J. P. Guilford, Intelligence, Creativity and their Educational Implications, p. 138.

⁶Ibid., p. 139.

⁷Ibid., p. 140.

⁸Anna Roe, 'The Making of a Scientist,' cited in J. P. Guilford, Intelligence, Creativity and their Educational Implications, p. 141.

⁹Ibid., p. 142.

¹⁰Ibid., p. 143.

¹¹E. Paul Torrance, 'Can We Teach Children to Think Creatively,' paper presented at the April, 1972, meeting of the American Educational Research Association in Chicago, cited in Angelo N. Biondi and Sidney J. Parnes, Assessing Creative Growth, (Great Neck, New York: Creative Synergetic Associates, Ltd., 1976), p. 131.

¹²E. Paul Torrance, Guiding Creative Talent, (Englewood Cliffs, N.J.: Prentice Hall Inc., 1962) p. 85-86.

¹³Ibid., p. 86.

¹⁴E. G. Andrews, 'The Development of Imagination in the Pre-School Child,' University of Iowa Studies in Character, 1930, Vol. 3, p. 64.

¹⁵E. Paul Torrance, Guiding Creative Talent, (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1962) p. 87.

¹⁶E. M. Ligon, "The Growth and Development of the Christian Personality," (Schenectady, N.Y.: The Union College Character Research Project, 1957) cited in E. Paul Torrance, Guiding Creative Talent, p. 88-89.

¹⁷E. Paul Torrance, "Thinking Creatively in Action and Movement," (The University of Georgia: Department of Educational Psychology, May, 1980) Fifth Revision, p. 8.

¹⁸Elizabeth K. Starkweather, "Creativity Research Instruments Designed for Use With Pre-School Children," in A. N. Biondi and S. J. Parnes, Eds. Assessing Creative Growth: The Tests - Book One, (Buffalo: The Creative Education Foundation, 1976), p. 81.

¹⁹Ibid., p. 84-86.

²⁰Robert Travers, The Second Handbook on Research and Teaching, (Chicago: Rand McNally College Publishing Co., 1973) p. 698.

²¹Felice Kaufman, Your Gifted Child and You, The Council for Exceptional Children, 1976) p. 20.

²²M. Mayesky and I. Nueman and P. Lodkowski, Creative Activities for Young Children, (Albany, N.Y.: Delman Publishing, 1975) p. 2.

²³Leif Fearn, "Individual Development, a Process Model in Creativity," The Journal of Creative Behavior, Vol. 10, No. 1, First Quarter, 1976, p. 55-63.

²⁴Daniel S. P. Schubert, M.D. and Angelo M. Biondi, "Creativity and Mental Health: Part II - Types of Creativity," The Journal of Creative Behavior, Vol. 10, No. 1, First Quarter, 1976, p. 67-68.

CHAPTER II

INTRODUCTION TO THE STUDY

Behavior Associated with Creativity

Any discussion of the behaviors associated with creativity must begin with J. P. Guilford. As more and more knowledge about human intelligence became known, and because of the discovery of the components of intelligence by means of factor analysis, Guilford was able to construct a model of how individuals think. This model was called the "Structure of the Intellect." Guilford reasoned that the identified factors themselves could be classified according to the basic kind of process or operation they performed:

This kind of classification gives us five major groups of intellectual abilities: factors of cognition, memory, convergent thinking, divergent thinking, and evaluation. Cognition means discovery or rediscovery or recognition. Memory means retention of what is cognized. Two kinds of productive thinking operations generate new information from known and remembered information. In divergent thinking operations we think in different directions sometimes searching, sometimes seeking variety. In convergent thinking the information leads to one right answer. In evaluation we reach decisions as to goodness, correctness and suitability or adequacy of what we know, what we remember and what we produce in productive thinking.¹

The divergent thinking operation is the one most commonly associated with creativity. In researching the divergent production operation, Guilford was led to

abilities that had to do with fluency of thinking, flexibility of thinking and originality of thinking.²

Flexibility is defined by Guilford as a change of some kind -- a change in measuring interpretation, use of something, a change in the understanding of a task, a change in the strategy of doing the task or a change in the direction of thinking, which may mean a new interpretation of the goal.

Fluency is shown in tests by presenting simple tasks and determining the quantity of the output of the responses.

Originality means the production of unusual, far-fetched, remote, or clever responses. Further it is better to say a novel idea is a new one so far as that particular individual is concerned.³

E. Paul Torrance looked at many empirical studies such as the one by Stein and Heinze in 1960 in which individuals identified as highly creative on some criterion were contrasted with comparable individuals on personality measures derived from traditional personality tests. Some of these tests included the Minnesota Multiphasic Personality Inventory, Thematic Apperception Test, the Rorschach and others. After surveying the studies, he compiled a list of 84 characteristics that seemed to differentiate highly creative people from less creative ones:

1. Accepts disorder.
2. Adventurous.
3. Strong affection.
4. Altruistic.
5. Awareness of others.
6. Always baffled by something.
7. Attracted to disorder.
8. Attracted to mysterious.
9. Attempts difficult jobs (sometimes too difficult).
10. Bashful outwardly.

11. Constructive in criticism.
12. Courageous.
13. Deep and conscientious conventions.
14. Defies conventions of courtesy.
15. Defies conventions of health.
16. Desires to excel.
17. Determination.
18. Differentiated value-hierarchy.
19. Discontented.
20. Disturbs organization.
21. Dominant (not in power sense).
22. Emotional.
23. Emotionally sensitive.
24. Energetic.
25. A fault-finder.
26. Doesn't fear being thought "different".
27. Feels whole parade is out of step.
28. Full of curiosity.
29. Appears haughty and self-satisfied at times.
30. Likes solitude.
31. Independence in judgment.
32. Independent in thinking.
33. Individualistic.
34. Intuitive.
35. Industrious.
36. Introversive.
37. Keeps unusual hours.
38. Lacks business ability.
39. Makes mistakes.
40. Never bored.
41. Non-conforming.
42. Not hostile or negativistic.
43. Not popular.
44. Oddities of habit.
45. Persistent.
46. Becomes preoccupied with a problem.
47. Preference for complex ideas.
48. Questioning.
49. Radical.
50. Receptive to external stimuli.
51. Receptive to ideas of others.
52. Regresses occasionally.
53. Rejection of suppression as a mechanism of impulse control.
54. Rejection of repression.
55. Reserved.
56. Resolute.
57. Self-assertive.
58. Self-starter.
59. Self-aware.
60. Self-confident.

61. Self-sufficient.
62. Sense of destiny.
63. Sense of humor.
64. Sensitive to beauty.
65. Shuns power.
66. Sincere.
67. Not interested in small details.
68. Speculative.
69. Spirited in disagreement.
70. Strives for distant goals.
71. Stubborn.
72. Temperamental.
73. Tenacious.
74. Tender emotions.
75. Timid.
76. Thorough.
77. Unconcerned about power.
78. Somewhat uncultured, primitive.
79. Unsophisticated, naive.
80. Unwilling to accept anything on mere say-so.
81. Visionary.
82. Versatile.
83. Willing to take risks.
84. Somewhat withdrawn and quiescent.⁴

Torrance, in the test he designed for young children, "Thinking Creatively in Action and Movement," looks at the behaviors of flexibility, originality and imagination. The first two behaviors are in agreement with Guilford. Torrance defines imagination as the ability to empathize, fantasize and assume unaccustomed roles.⁵ The definition that Torrance uses for imagination could also fit into Guilford's definition of flexibility. Torrance is very similar to Guilford in his definitions of three kinds of behaviors he will attempt to sample.

Elizabeth Starkweather studied the creative behaviors of the young child in terms of originality, willingness to try the difficult, and conforming and non-conforming behavior.⁶

Starkweather, Torrance and Guilford all cite originality as one of the behaviors that designates the production of divergent thinking. Starkweather further concurs with Torrance on willingness to take risks and conforming and non-conforming behaviors, as these are two of the behaviors that were listed in Torrance's 84 traits of creative persons.

In his model of the creative process, Leif Fearn classifies creative behaviors as: gathering and/or isolating data, doing things with data, and doing things differently. Under gathering and/or isolating data, Fearn feels fluency, flexibility and another quality, awareness, generate divergent thinking which is creative.

Awareness is explained as follows:

If creativity in the sense of absolute newness ever occurred, most dimensions of theological drama would say it occurred only once. After that, what has been defined as creative has occurred with things that already exist. That means that creativity does not occur in a vacuum, it occurs within the context of some things the creator already knows or at least suspects. Creative behavior is based upon some degree of knowing, perception or cognitive history. One pre-requisite is awareness.⁷

When Fearn looked at the second designation of behaviors, doing things with or manipulating the collected data, he cited behaviors involved in discipline, elaboration and managing chaos.

Fearn defines discipline as an internal control that helps us behave without outside reinforcement and to remain

at a task and see it through to some self-selected conclusion and to suffer the open-endedness of being one's own judge.

Elaboration, according to Fearn, is the extension of an idea, the behavior of building upon, the development of a notion beyond its typical boundaries. Fearn's definition of elaboration is different from Guilford's definition of flexibility to the extent that the latter demands a change of set, a change of perspective, while the former can be manifest by extending within the traditional perspective.

Managing chaos can be described using the term, "preference for complexity," a willingness, a preference for getting involved with complicated problems. To make order out of chaos requires immersion in chaos.

Behaviors that involve doing things differently are curiosity, imagination, and originality. These last are behaviors that seem to appear in most of the researchers' sets of behaviors that develop divergent thinking.

Curiosity is process bound. It is engaged, not so much for finding answers or solutions, but for the consideration or possibilities.

Imagination is the generation of ideas, perceptions, possibilities and so on that need not have a foundation in reality. Most typical of imaginative behavior is the processing of problems that begin, What if...?

Originality is associated with the novel or unique idea.⁸

According to the "Structure of the Intellect" developed by Guilford, the operation of most creative thought takes place in the divergent production part of the intellectual model. There are many and varied ways of looking at the behaviors generated by divergent thinking. The behaviors of fluency, imagination, and originality are the ones which will be tested in this study, mainly because they are the ones Torrance has designated as important in his test, "Thinking Creatively in Action and Movement."

Parent-Child Interaction--Its Effects on Creativity

Anytime you examine and try to influence the behavior of the preschool child, you must work with his parents in order to be effective.

After an in-depth study of the effects of a variety of intervention programs, some with and some without parent participation, Bronfenbrenner strongly concluded:

The evidence indicates that the family is the most effective and economical system for fostering and sustaining the development of the child. The evidence indicates further that the involvement of the child's family as an active participant is critical to the success of any intervention program. Without such family involvement, any effects of intervention, at least in the cognitive sphere, are likely to erode rapidly once the program ends. In contrast the involvement of the parents as partners in the enterprise provides an on-going system which can reinforce the effects of the program while it is in operation and help sustain them after the program ends.⁹

A number of intervention programs have successfully trained parents to foster the intellectual development and academic achievement of their children. Klaus and Gray used home visitors to engage parents in the education of their children to supplement activities in a preschool program. The results showed significant differences in mental test scores between the control children and those in both the preschool and home visitor programs. These differences persisted into the first year of elementary school.¹⁰

Further, one of the main catalysts of the idea that young children's intelligence and development could be enhanced before school was J. McVicker Hunt. In 1961 he produced a revolutionary book called, Intelligence and Experience. Hunt pulled together all the evidence showing intelligence was not fixed but depended heavily on one's early encounters with one's environment. This placed an entirely new burden on parents and placed greater importance on preschool education.¹¹

According to Bronfenbrenner, Klaus and Gray, and J. McVicker Hunt, it makes sense to involve the parents of young children in the development of their child.

If parents become involved, they add another factor to be considered in the effect creativity has on the young child. The environmental background of the home has a direct effect on creativity.

The kind of home that parents provide a young child is of prime importance. Alice Yardley in her book, Senses and Sensibility, states that because it is in childhood that the powers of creative communication begin, we must provide children with the opportunities to experience in depth and to provide a range of materials which will enable them to express the effects of those experiences.¹²

One method for determining what factors are critical to the development of creative children is to study the homes of both the creative and non-creative and to isolate those things that differentiate the homes. Some of the important research directed to this problem has been done by Ira Gordon and Robert Hess.

Gordon in his own research and reviewing the research of others identified nineteen factors in parent behavior which are related to child performance. They are also important as to the degree to which they operate. Of the nineteen critical factors, nine are cognitive and ten are emotional or affective:

- 1) Academic guidance. The parents interest their children in learning and exploring activities and encourage them to ask questions and seek answers. They encourage their children to take the initiative and praise them for their efforts.
- 2) Cognitive operational level and style. The parents encourage their children to reason and solve problems and test their ideas with actions. The parents use this cognitive style themselves and provide a model of approach and style.

- 3) Cultural activities planned. The parents structure plans for their children to have cultural experiences and expose them to a large variety of such activities. "Let's go to the zoo." "Let's attend the children's concert." "Let's watch this television show." These are some of the planning strategies.
- 4) Direction instruction of the child. The parents teach their children how to do a task, how to solve a problem, how to make choices, and how to assess results. In addition, the parents observe their children as they are learning and offer appropriate suggestions and encouragements.
- 5) Educational aspirations. The parents place high value on education and either actively encourage their children to participate in educational activities and goals or simply assume the children will place value on education because they themselves do. This is generally a valid assumption.
- 6) Use of external resources. The parents have their children attend nursery school or kindergarten or they may place them in special summer activity programs, such as day camp. Many children learn to love books not only because their parents tend to love books but also because their parents have encouraged them to participate in "the children's hour" at many libraries.
- 7) Intellectuality of the homes. The parents have books and magazines around the home and usually have dictionaries and encyclopedias. The parents are seen reading these books and using them as references. They are also heard discussing what they have read.
- 8) Verbal facility. The parents use their vocabularies effectively to help their children learn. They do not need large or elaborate vocabularies; they need to use them to clarify expectations and guide progress.
- 9) Verbal frequency. The parents engage their children in conversation during mealtime or on car trips or at family gatherings. There is more use of words and universal language than nonverbal signals and contextual language.

- 10) Consistency of management. The parents maintain a consistent and, therefore, predictable style of management or discipline so that the children know what is expected of them and what kinds of limits are clearly established. There are no shocking surprises or uncertainties.
- 11) Differentiation of Self. The parents do not confuse themselves with their children. They know where their personality ends and another's begins.
- 12) Disciplinary pattern. The parents behave in their own lives with a sense of self-discipline and an expression of this in their daily performance. The children accept patterns of behavior expressive of this discipline and imitate the models.
- 13) Emotional security, self-esteem. The parents feel safe and loved and respect themselves as significant individuals. They thus have emotional energy available to provide emotional security to their children and opportunities for the children to develop self-esteem.
- 14) Impulsivity. The parents do not engage in erratic, unpredictable behavior, but rather have their behavior under some rational control without repressing creative thoughts and feelings.
- 15) Belief in internal control. The parents stress the importance of building internal controls rather than relying on external controls. Closely allied to this is the belief in assuming responsibility for their own behavior.
- 16) Protectiveness, babying of child. The parents recognize the dependency of their children and are willing to permit them to act out that dependency. The parents provide the protective, nurturing behavior necessary for children to feel protected.
- 17) Trusting attitude. The parents trust each other and their children. They encourage their children to trust others and to be receptive to learning experiences others might provide. Children who distrust others learn in a distorted way.
- 18) Willingness to devote time to the children. The parents plan activities for their children

and enjoy spending time carrying out these activities. Parents need to communicate their pleasure in spending time with their children.

- 19) Work habits. The parents demonstrate to their children that they have developed work habits which permit the acceptance and completion of an activity. The parents also place value on a high level of performance and quality work. They, in effect, respect what they do.¹³

Hess identified nine categories of parent behavior which influence the child's development:

- 1) Independence training.
- 2) Warmth and high emotional involvement.
- 3) Consistency of discipline.
- 4) Explanatory control.
- 5) Expectation for success.
- 6) Parent's sense of control.
- 7) The verbalness in the home.
- 8) Parents' direct teaching.
- 9) Parental self esteem.¹⁴

In looking at a group of studies that examined the home background of the creative person, contradictory information seems to have developed.

Various claims have been made by researchers as to the birth order and family size of the creative person. MacKinnon in 1960 reports that his groups of highly effective individuals had more than the average number of siblings with whom they were more friendly than usual,¹⁵ while Circirelle in 1967 found no relationship between family size and tested creativity but did find the performance on verbal creativity tests was enhanced for those with a single sibling of like sex.¹⁶ Roe in 1953 notes a greater than chance incidence of first born children among her sample of sixty-four scientists.¹⁷

Looking at the effect of parental education on the creative child, Weisberg and Springer in 1961, in a sample study of thirty-two public school children, found a positive relationship between a child's tested creativity and the father's occupational autonomy.¹⁸ In a study by Oden forty percent of the successful group came from a professional background where father and even grandfather had some college education, where books were valued, and where fathers had positions of honor and trust in the neighborhood.¹⁹

While researchers like Gordon looked at the parents' interaction with the child in terms of nineteen cognitive and affective areas, and others looked at the education of parents and birth order and their effect on the creative child, Bettye Caldwell tried to look at the total home environment. In the late 60's and 70's, she developed a Home Inventory or "Home Observation for the Measurement of the Environment." On the birth-age three inventory she looked at 11 items under emotional and verbal responsivity of the mother, eight behaviors under avoidance of restriction and punishment, six items under organization of physical and temporal environment, nine items under provision of appropriate play materials, six items under maternal involvement with the child, and five items under opportunities for variety in daily stimulation.

On the home inventory for children 3-6, Caldwell considered 24 items under provision of stimulation through equipment, toys, experiences:

- 12 items under stimulation of mature behavior
- 12 items under providing a stimulating physical and language environment
- 7 items under avoidance of restriction and punishment
- 16 items under pride, affection and thoughtfulness
- 6 items under masculine stimulation
- 7 items under independence from parental control.²⁰

By having trained home observers fill out this observation list she was able to predict with some degree of accuracy how well the child from that particular family would succeed in school.

She adds further weight to the idea that the home, parent, and parental interaction patterns with the child are all crucial to his intellectual and also his creative development.

To look further at parental control patterns and interactions, MacKinnon in 1962 reports that on the whole,

What appears to have characterized the parents of future creative architects was an extraordinary respect for the child and confidence in his ability to do what was appropriate. Thus they did not hesitate to grant him rather unusual freedom in exploring his universe and in making decisions for himself and this early as well as late.²¹

This freedom to explore by the child was substantiated by Burton White in his book, The First Three Years of Life. White tried to determine what made some babies grow into brighter young children than a group who were matched by socio-economic environment. He found the mother provided the difference. If mothers provided a safe home with a

few stimulating materials and "let the child explore and find things that interest and excite him," the child would be more successful, especially in learning.²²

Caldwell values independence for the child to seek and explore also, as she lists independence from parental control as part of the total look at the home environment for the young child. Gordon, in The Traits of Creative Children and Their Interaction With Parents, stresses the belief in internal control, which is closely allied to the opportunity for the child to make choices about his behavior and assume responsibility for his behavior. Hess echoes Gordon as he stressed independence training as one of his parental behaviors that nurture creative talents.

It also appears from the research that a child from a higher socio-economic background has a better chance at being creative because of the rich environment provided and increased interaction with parents.

Methods to Facilitate Involvement of Parents In Developing Their Child's Creativity

The research has shown the value of involving parents in their child's development. Just as Guilford's definition of the importance of creativity begins with the global and leaves the problems of finding out how to implement the ideal of a creative society, so too must we address the problem of how to involve parents.

It makes sense to begin with something parents are familiar with and do all the time. They ask their children questions. The only problem with this approach is that most of the questions parents ask come from that section of Guilford's model called convergent questions, which usually require a yes or no answer and for which there is usually only one right answer.

This author reasoned that if we can teach parents to frequently phrase their questions so that they would be inviting a variety of responses, the divergent thinking behaviors in Guilford's model would be tapped. Children would then be required to respond with fluency, flexibility and originality.

Robert Sund felt this was possible not only for parents but for teachers. He felt that if we can increase the teacher's use of divergent questions, we can provide for wider responses plus more critical thinking.²³

Questions are regarded as a patent means of developing creative thinking in learners. Monson in 1970, Suchman in 1967, Taba in 1964 and Torrance in 1970 have all testified to that effect in studies they have completed. Questions are a major force in shaping the nature of a student's thoughts and the methods of inquiry.²⁴

Torrance and Meyer in their book Creative Learning and Teaching explore the many kinds of questioning skills that develop creative thinking: interpretative questions, comparison questions, questions requiring synthesis, divergent questions and the pros and cons of each questioning approach.²⁵

The section about divergent questions provides good models for the kinds of questions parents can share with their children in developing creative thinking.

Providing the parents with the models for asking divergent kinds of questions is only part of the questioning process. In order to be a good questioner, one has to become a good listener.

Robert Sund states:

Krisnamurti, the Indian philosopher, has observed that Americans do not truly listen. We are always judging, he says, composing our thoughts or preparing salvos for reacting during the time a speaker is discoursing. A person who truly listens in an open non-judgmental way, may be a rarity in any culture. The nature of our listening skills is related to how we perceive our roles. Teachers who see their function as mainly that of developing subject matter concept or principle will naturally focus on its achievement. If, however, we perceive our major role to be assisting in the process of human development we will tend to focus on children first and on content second. We will seek to listen intently to what the child has to say, and only when he is finished, will proceed to formulate questions designed to help him make further discoveries and use his thought processes.²⁶

Robert Sund thought that being a good listener yourself helped model that behavior for the young child, so that when the parent asks a divergent question the child will be listening and attending. He also felt there were techniques that you could use to show you were a good listener:

- 1) Focus on the speaker and what he is saying.
- 2) Give nonverbal signals to indicate your active interest by

-maintaining eye contact

- showing a concerned posture--e.g., turning your body toward the speaker.
 - using appropriate gesture--e.g., nodding to indicate understanding, stroking your forehead, etc., smiling and offering other supportive reactions.
- 3) Be alert for indicators that children may wish to respond, such as
 - raising their arms
 - rising up in their seats
 - glancing at you or the speaker
 - pressing lips as if to say something
 - mumbling.
 - 4) Develop silent-time. This term refers to a period of calm silence after a speaker has apparently finished, to prevent cutting off a child's statements and to allow others to interject their ideas without interference. It helps indicate trust in children's abilities to make thoughtful contributions.
 - 5) Do not interrupt, not even for purposes of clarification, until the child has completed his message.
 - 6) Invite participation ("John, did you want to say something?") Avoid taking the discussion away from the children.²⁷

Besides stressing the need for a good model for listening, Mary Budd Rowe found the wait time after asking a question to be significant to creative thinking. In her study of teacher questioning skills, she found that most teachers waited only one second for a response to a question. When the teachers were encouraged to wait an average of three seconds for the pupils to answer, the following occurred:

- The length of response increased
- Number of unsolicited responses increased
- Failure to respond decreased
- Confidence of children increased
- The incidence of speculative creative thinking increased
- Teaching centered teaching decreases and student centered inter-action increased²⁸

The ability to ask divergent questions generates more creative thinking on the part of the child. The ability to be a patient good listener appears to instill confidence in the child and gives him more time to think. As a result, his answers are more elaborate and more fluent.

Providing parents with the ability to be a good listener, more patience in waiting for answers, and the knowledge of what makes a divergent question, can be a beginning in helping them nurture their child's creative potential.

Explanation of the Parent-Child Early Education Program

The Parent-Child Early Education Program is a program for preschool children age four and their parents in the Ferguson-Florissant School District.²⁹ The author teaches in this program and the study to be described was designed to fit into the workings of this program. It is important, therefore, to know what the Parent-Child Early Education Program is and how it functions.

All four year olds living in the district are eligible to enroll, including children with special problems.

The philosophy of the program states that the parent is the child's first and most important teacher. The program tries to equip the parents to succeed in that role.

How and why the school district decided to begin such a program is explained by Dr. Brown, the school district superintendent, in this way:

The Early Education program we started in 1968 was a specific response to some instructional needs which became apparent in the late 1960's. Those were the years when our academic program in grades K through 12 was extremely strong, yet many graduates had difficulty adapting to the vocational and personal challenges of adult living. Some of the most promising students passed up leadership positions for which they were eminently qualified. Concern with this led to an analysis of total instructional offerings. It became apparent that the problem stemmed from attitudinal sets rather than academic deficiencies.

About the same time, a substantial body of research became available indicating the importance of the early years of life in the total development of each human being. It showed that the basic personality structure is developed prior to the eighth year of life. These insights highlighted the pre-kindergarten and primary years as crucial to the wholesome development of each child. We determined to strengthen the educational experiences in the early grades, and to add new programs which would initiate contacts between school and family before the child reached age five. We thought that by establishing a warm relationship and action communication between home and school AS EARLY AS POSSIBLE, we could improve a student's chances of succeeding in school. Through contacts with parents of pre-school children we could identify potential learning deficits and begin working on them to insure wholesome growth. We predicted that such early learning experiences for children would preclude much remedial work which has been relatively unproductive in the upper elementary and secondary years.

The four part program includes:

- the testing of every enrolled child with appropriate follow up by teacher specialists and program consultants for any child with a detected or suspected problem that could affect their ability to learn and their future success in school.
- a half-day session at school on Saturdays where four year olds participate in small group learning activities designed to develop a list of skills and concepts.
- weekly one-hour home teaching visits with two or three neighboring children and their parents (usually mothers).
- home teaching by parents who receive a weekly home activity guide outlining learning games linked to the skills being taught on Saturdays and in home visits during the week.

It would be helpful to look with more detail at each of the four areas: testing, school on Saturdays, home visit, and the parent follow-up.

An initial evaluation of each child's needs and abilities is made by the teacher and the child's parent before the start of school. The screening includes tests of motor and language development, as well as hearing and vision testing.

These tests are carefully reviewed and those children who evidence a need receive further in-depth diagnosis. Approximately forty percent of the children show a need for further observation or testing, in one or more areas: low intellectual functioning, emotional problems, language difficulties or perceptual disorders.

Between 12 percent - 15 percent of the total number enrolled are deemed to have handicaps or potential learning

problems requiring year-long help by a specialist.

The broad range of services provided by teacher specialists and consultants to children with special needs includes prescribing a personalized program; year-long guidance and counseling with the child, his teacher and parents; one weekly home teaching visit by the teacher specialist (certified in Early Childhood Special Education); and one visit by the child's regular Saturday classroom teacher.

A day at school on Saturday with 20 classmates begins at 8:45 and ends at 11:45. Children from two or three neighboring schools come to one Saturday School Center, where two or three classes of 16-24 students are each staffed by a teacher, parent volunteers, and high school aides.

Teachers meet with each teaching parent before the children arrive to outline and demonstrate their teaching assignment. Parents receive a parent activity card that serves as reference and reassurance. Although most of the parent-teachers are mothers, many fathers participate too. All Centers have an occasional "fathers only" day.

Children with handicaps or special problems are integrated into the regular activities wherever possible. Teacher specialists and teacher-aides provide individualized help as needed.

A typical schedule for the students' three-hour school day includes:

Opening Activities -- The class meets together for brief learning and musical activities centered around a theme, i.e., farming, animals, shapes, etc.

Small group instruction periods -- The children rotate in small groups to four learning centers. A permanently stationed parent or teacher conducts the 20-minute activity periods for each group.

One activity may be in language development - another in math concepts, another gross motor, another a creative experience. These activities provide flexibility for the individual differences in children.

Creative Play -- an independent play period.

Closing Activities -- The children reassemble for a song and story.

Parent's participation affords them a unique opportunity to see their child perform in relation to others his own age.

The home visit involves parent and teacher in a teaching partnership. Direct involvement of parents in the program has increased their awareness of many ways in which the home is a learning center and the parent a teacher.

Regularly scheduled home teaching visits, with one child or a few neighboring children, include the parents as well. During the one-hour visit the teacher discusses the previous week's progress; involves the child and parent in four to seven learning activities; and lets the four year old select a book or toy from the lending library.

Home visits provide teachers with an opportunity

to individualize the program to meet each student's needs and to know the child in a way classroom contact alone would not permit.

Four to seven different activities are usually taught involving all areas of a child's development -- Language, Math, Science, Motor, Fine Motor, Creative.

Each home visit a teacher makes is different from the one before because the needs of the children vary.

Parents receive a weekly home activity guide that suggests a broad range of games and activities relating to the skills being taught at school. During home teaching visits, the teachers indicate which activities will most benefit each individual.

Parents are encouraged to "spontaneously" introduce, rather than formally present, the learning activities into their child's daily schedule.

Many parents report that the relationship with their child improves immeasurably during the year because they take more time to talk with, and spontaneously teach, their child.

Parents are also asked to check off the skills they feel the child knows on a space provided on their home activity guide.

Does the early education program make a difference in the abilities of the children and parents enrolled in the program? The students are measured at the beginning and

end of each school year, and then followed through each successive grade. Additionally, they are compared at each of these points with control groups of children with and without preschool experience.

Data from the first three years of the program with seven months between pre and post testing show the total number of students enrolled showed average gains of:

- 16 months in intellectual growth
- 15 months in language development
- 12 months in visual-motor skill development

Even greater gains were made by the third of the children with the lowest entering scores, which included children found to have various problems affecting their learning:

- 17 months in intellectual growth
- 20 months in language development
- 16.5 months in perceptual skill development

The children's feelings about themselves and their relationships with others showed equally significant gains.

Parents show gains as well. There are statistically significant changes in their abilities to interact with their children, in awareness of their child's needs, and their use of more appropriate reinforcement and motivation techniques.

Children with special problems or handicaps progress at particularly significant rates. Many learning difficulties are remedied by the end of the year.

Especially significant gains are made by the children diagnosed as truly learning-disabled, particularly in the areas of language and motor development. By the close of each year an average of 85 percent are functioning at levels commensurate with their chronological age.

Of the students diagnosed as falling within the levels of retardation an average of only 1 in 8 still fall within these levels of retardation at the close of the year.

All pupils identified as having emotional problems show a marked improvement by the end of the year in their behavioral patterns and ability to adjust.

Teachers' competencies improve by the end of each year in all areas, among them: appropriate teaching techniques, awareness of children's needs, relationships with parents, relaying effective teaching methods to parents.

The data so far collected shows evidence of sustained gains. Students, thus far tested through fourth grade, scored significantly higher on all aspects of achievement tests than children with and without other preschool experience.

Of particular note is the finding that those former students with some kind of problem or handicap scored higher than a normal group of children with and without preschool experience, except in the area of spelling and language.

For the first time in follow-up testing, the children with learning problems (now in fourth grade) showed no differences in achievement when compared with

the rest of their classmates, except in spelling.

In the Parent-Child Early Education Program in which this author teaches the philosophy of involving the parents as teaching partners in their child's intellectual, emotional and social development has been successful. Because of the knowledge gained from the research review and from direct experience with children and their parents, the author came to believe there would be value in providing parents with divergent questioning skills. Although many programs, including the Parent-Child Early Education Program have addressed the problem of involving parents to increase the cognitive abilities of their children, none have dealt directly with specifically training parents to nurture their children's creativity. Torrance validates this in his review of 142 studies that dealt with developing creativity in children. Not one program attempted to involve the parents directly as nurturing agents of their child's creativity.³⁰

Design of the Study

Torrance, Fearn, Schubert and Biondi believe that creativity is a process that can be taught. Guilford, Starkweather, Fearn and other researchers have further examined what behaviors constitute creativity. Fluency, flexibility and imagination are three of the behaviors that most of the researchers agree are important components of the creative process. Bronfenbrenner in his studies

along with Gordon, Hess and Caldwell have all verified the importance of the home environment of the young child and the parent's role in nurturing a child's development. Robert Sund, E. Paul Torrance, Suchman, and Taba and Rowe all attest to the importance of asking good questions to stimulate the divergent thinking production found in Guilford's model "The Structure of the Intellect." Guilford has defined that divergent production as part of the creative process.

This author was further impressed with E. Paul Torrance's work with creativity and the young child. His test for 3-4 year olds, "Thinking Creatively in Action and Movement" which is just becoming available in 1981, seemed a good tool to tap the behaviors that Guilford has isolated, namely - fluency, originality, and imagination. Torrance himself had contacted the Early Childhood Program in 1980 and it was part of the original norming sample for the test. This further heightened interest in the testing instrument on the part of the author and made available a testing tool that would have been unknown.

Viewing creativity as a process involving specific behaviors that can be taught, considering the value of parents and their interaction with their children in the home environments, and realizing the importance of asking good questions that tap the divergent question model has prompted this author to design a study to assess the value

of training parents to ask their children divergent questions and the effect such training would have on their child's creativity as measured by Torrance's test "Thinking Creatively in Action and Movement."

The hypothesis for the study was: four year old children whose mothers have had training in divergent question-asking skills will attain higher scores on E. Paul Torrance's test "Thinking Creatively in Action and Movement," than will four year olds whose parents have not had such training.

For statistical analysis the null hypothesis was:

$$H_0 : M_a = M_b$$

where "a" represents the treatment group, "b" represents the control group, and M the mean on the test.

The research hypothesis is:

$$H_1 : M_a > M_b$$

Footnotes

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CHAPTER III

METHOD

Purpose

This study was designed to investigate whether teaching mothers to ask divergent questions would have a direct effect on their four year old child's creativity. The independent variable in the study is the training in questioning skills provided to parents in order for them to ask more divergent questions of their children.

The dependent variable is the creativity of the four year old children as measured by E. Paul Torrance's test, "Thinking Creatively in Action and Movement."

Operational Definitions

Divergent questioning is defined by Torrance as questions which are open ended and have no one right answer, but which invite a diversity of responses.¹ For example, What would you do if there was no water in your house?

Creativity is defined as a process that generates the behaviors of fluency,² flexibility and imagination.

The Treatment Sheets are those given out to parents and developed by the author on the basis of Sund's research in being a good listener, Rowe's research on wait time



after a question is asked, and the research of Torrance and others which dealt with the important models for divergent questions such as, What if...Just Suppose, etc.

Subjects

The children and parents in the study were selected from a class of four year olds who participated in the Parent-Child Early Education Program in the Ferguson-Florissant School District. They made up the class that was assigned to the author. All the subjects were white middle-class families in a school district whose average income is \$15,000 a year. There were 34 children and mothers in the sample size. All the parents volunteered to be part of the Parent-Child Early Education Program.

The children and their mothers were divided into home visit groups. Each group consisted of two or three children, their mothers, and any other (younger) brothers and sisters.

Each home visit group was assigned a number. Using a random number table, each home visit group was then assigned to either the experimental or to the control group. At the beginning of the study there were 22 children in the experimental group and 18 in the control group, but because children moved or mothers went back to work full time and dropped out of the program, the total number in each group became equal.

In addition, two other boys were eliminated from the experimental group because neither mother spoke English and there was a communication problem. This further served to equalize the numbers in each group. The numbers by the end of the study were equal: seventeen children were in the experimental group with their mothers, and seventeen children were in the control group with their mothers.

There were ten home visit groups receiving the treatment and ten home visit groups who were not. A typical home visit is defined as a one hour a week visit to a child's home by the teacher. This visit includes the children (2 or 3) and their mothers comprising the home visit group.

The teacher plans special activities for the needs of the four year old children in the group. The activities cover every area of a child's development: math, language, science, fine motor, gross motor, creative, social. As many as seven to eight different kinds of activities using concrete objects and items found around the home are presented to the child and his mother in each visit.

The teacher models the activity to be taught and then the mother practices the activity with her child.

Usually at the end of the home visit a sheet called the Home Activity Guide is given to the mother so she can continue the learning process with her child in an informal way during the week.

Procedure

The treatment was begun the third week in October at the second group home visit. When the program begins in September, all the children receive individual visits. The first individual visit explains the total program to parents and demonstrates how teacher and parent will be teaching partners. The second individual visit is one in which the teacher explains the child's testing to the parents and points out the strengths and weaknesses of the child. The children are then grouped for the first time with children from their own neighborhood. The author began treatment sheets on the second group home visit.

The treatment materials used consisted of six hand-out sheets developed by the author for the parents' use.

The first sheet deals with developing good listening skills on the part of the parent as a prerequisite for good questioning skills. The parents were asked to stop when their child asked them a question, give him eye contact, get down on his level or lift him to theirs, listen without interrupting and try to restate what the child had said.

Parents were then asked to write down one question their child asked that week and to check off on a checklist how they responded. This sheet, as are all other treatment sheets, was handed back to the teacher the following week. A brief explanation of the treatment sheet was given by the teacher at the end of the home visit.

The second sheet addresses the problem of wait time in asking questions. Parents were given a sheet that explained the importance of waiting at least 3 seconds after asking a question before speaking again or demanding a response. Again at the end of the visit, the sheet was explained. A question was modeled by having the teacher ask the child a question and wait 3 seconds or longer for the response. Mothers were then asked to write down some of the questions they asked their children that week and how long they waited for response.

The third sheet explains to parents an open-ended question and gives the model of a "What if" question. The parent acted as the child's secretary and printed on construction paper with marker what the child said. The "What if" question was modeled by the teacher in the home visit. The parents were told that their child's responses would be gathered together to make a book. This, it was hoped, would be an added incentive for the parent to work at home with the child and also give feedback to the teacher. Construction paper was provided to the parent for this task and was collected by the teacher the following week so the pages could be laminated.

The fourth sheet further explains that open-ended questions are called divergent questions. Two more models of creative divergent questions are provided: "Just suppose?" and "What do you think?" questions. These two models

were explained by the teacher and modeled with the child. Construction paper was provided for the mother to think up her own divergent questions using the "Just suppose" and "What do you think" models. The question and the child's responses were to be printed on construction paper and turned in to the teacher to be laminated for the book.

The fifth sheet gives the parent two more models for asking divergent questions: "How many ways can...?" and "What would be better if...?" This gives the parent further practice in thinking about divergent questioning. Again the sheet was discussed, questions were asked the child by the teacher to model it, and the paper left for the parent to write down her own original questions and the child's responses for the book.

The sixth sheet asks the parent to use the different models of divergent questioning that they have practiced and to use them in a new situation. The parents were asked to think up a divergent question they could ask their child about the game or some topic on the regular home activity guide. For example, if the topic is soft and hard...they might say, "What if you were soft as a cotton ball? What would you do?" This final sheet was explained, examples of questions were given, and parents were asked to record the child's responses and return the sheet.

When all the 12 x 18 sheets were gathered they were laminated and put together as a book. When the testing

was completed the book was taken into the experimental home visit groups and read.

The six treatment sheets were given out in the home visit, but the entire hour was not taken up with the treatment. Educational games were played with parents and children, encompassing all areas of the child's development. Each treatment sheet was plugged into the last fifteen minutes of each experimental home visit as part of the natural process of the visit. Parents and children were not aware that anything different or special was taking place. The treatment sheet was given out as an extra sheet along with the home activity guide of educational games given to parents for them to follow through during the week. Since the program has many supplementary sheets that go along with the guide, the treatment sheets did not stand out. (Copies of all the treatment sheets may be found in the appendix.)

During the time of the treatment, the teaching style of the author was carefully monitored in all home visits. There was a conscious attempt by the author to use little or no divergent questioning techniques as a part of the lesson in both control and experimental groups except for those questions which were modeled for parents of the treatment group.

The experimental groups were not aware at any time during the study that they were receiving anything different

from the other home visit groups. This was easily accomplished since many kinds of hand-out sheets are left with mothers in the home and the individual home visit mothers do not have much contact with each other.

The control group received the regular home visit and the standard home activity guides. None were aware that anything special was taking place in other visits.

The author continued to give out each treatment until each family had received the six treatment sheets. The amount of time this took for each group varied because of sickness of the children or family members which prevented a visit to that home. Thanksgiving and Christmas vacation were also an interruption and delayed completion of the treatment for some groups.

When all the children in the experimental group had received all six treatment sheets, the testing was begun.

The Testing

The test administered to the thirty-four four year old children was E. Paul Torrance's test, "Thinking Creatively in Action and Movement."

Thus far, there have been no direct empirical validity studies of this test. However, there have been several pilot studies and doctoral dissertations that provide relevant validity data for the test. At the present time, however, arguments for the validity must rely heavily upon the

observation of the author and rationale presented in the testing manual.³

Preliminary norms presented in the test manual were derived from the performances of 1,806 children ranging from 3 to 8 years, distributed as follows:

3 year olds = 77

4 year olds = 877

5 year olds = 504

6 year olds = 155

7 year olds = 117

8 year olds = 710

The 1,806 children participating in the compilation of these norms came from several different states: Georgia, Idaho, North Carolina, Missouri, Indiana, Pennsylvania, Ohio, Guam, Oklahoma, Florida. Whites and blacks were equally represented.

The test is designed for use with children ranging from 3 to 8 years. The tasks try to sample some of the more important kinds of creative thinking abilities within a reasonable length of time, usually twenty minutes, and with equipment available in most schools and day care centers. (A white styrofoam cup and a trash can.) There are scores for fluency, originality, imagination, and a total score.

The test consists of four activities. Each activity asks a divergent question of the child who must figure

out how to answer the question verbally or by showing the examiner motorically.

The fluency score is simply the number of different, relevant, adequate responses given in the first, third and fourth activities. To be scorable a response should be a reasonable alternative for the problem as given. However pretend or just imagine responses are acceptable.

The Imagination score is based on the tasks which ask the child to imagine, empathize, fantasize and pretend he is an animal, a tree, a rabbit, a fish and a snake. A point scale of 1 to 5 is listed for each task...depending on the child's degree of involvement. For example, the first task says "Can you move like a tree in the wind? Imagine you are a tree and the wind is blowing you very hard. Show how you would move."

1	2	3	4	5
No movement		Adequate		Excellent like thing

Suggestions for scoring are provided and the degree of elaboration and involvement on the part of the child determines the score.

The originality score is based on three activities:

Activity 1 "How many ways can you move?"

Activity 2 "How many ways can you place a juice cup in a waste basket?"

Activity 3 "What else might this juice cup be?"

The scoring of originality is based primarily upon the statistical infrequency of the response in the normative sample of 500 children. Responses are provided as guides to help in assigning points of 0 - 3 to responses, 0 being common responses and 3 being the most original.

The first five refusals of each child were not accepted by the examiner. For example, in activity 1 -- "How many ways can you move across the room?" -- the child may walk and run, then "I can't think of any more." The examiner would ignore that response and say "Think about it some more. You already told me two really neat ways you can move." Some of the children's best responses came after they said they couldn't think of any more.

The only materials required for the test were a styrofoam cup and trash can. The examiner carried many cups because, as part of the test, "What else can you do with a paper cup?" , "tear it" and "crush it" is an acceptable response.

The author administered the test individually to each child in his or her home. The mother was sometimes present in both the control and the experimental group, but cautioned to say only "Tell me another idea" or "Think about it some more."

The other children in the home at the time were working in another room with their mothers. The kitchen was the room in which most children were tested.

It took the month of February to test all the children because of sickness on the part of the children and other family problems which made it impossible for the author to make a home visit to a particular child.

Each test took from 15 to 30 minutes to give, depending on the quantity of answers or responses the child made.

The tests were scored by the coordinator of the Parent-Child Early Education Program, who had no knowledge of which tests were control or experimental. They were hand scored in a total group so that she could bring the same mental set to the scoring process. The data was then converted into standard scores.

The standard scores are found using a conversion table provided in the norms manual. In computing the standard scores the mean is 100 and the standard deviation is 20. Conversion tables are provided for only 3, 4, 5, and 6 year olds.

Factors Difficult to Control

This author is aware that this study has many limitations. Because of the nature of the Parent-Child Early Education Program it was difficult to control or equalize numerous variables.

There were few subjects in the total study which makes it difficult to generalize the results to a greater population. Since the subjects were volunteers to the

program this also makes it difficult to generalize results.

Also, the author could not control the variable of mothers following through with the questioning techniques on the treatment sheets. The state of the economy affected this variable as more and more of the mothers accepted part-time jobs and had less time for family.

Illness was another variable difficult to control and it limited access to the child and mother to provide training in the treatment. Sometimes two to three weeks lapsed before the next treatment sheet could be given out.

The author had limited control over the home environment of each child, although experiences were provided in the home visit and training was given to the parents in the home visit in the regular home activity guides as to ways they could enrich their child's environment. The author could only suggest to the family ways to enrich that individual child's environment through the home activity guides. Again the author had no control over the follow up by the parent.

Data Analysis

The experimental design used was a post test only design.

R x O

R O

The symbol R represents the process of randomly assigning subjects to the two groups. The symbol X is used

to represent the treatment. The symbol 0 represents the observation of the subjects on the outcome measure or test.

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1. Paul Hargrave, B. A. (1987). Creativity, Learning, and Teaching of V. - Skills (Ed. 1987), p. 10.

2. T. Gifford, Intelligence, Creativity and The Educational Implications (New York, Guilford Press, 1987), p. 10.

3. Paul Hargrave, B. A. (1987). Learning Creatively in Art and Science (University of Toronto, Nov. 1987) PPT: Section 7, p. 10.

Footnotes

¹E. Paul Torrance, R. E. Myers, Creative Learning and Teaching (N.Y.: Dodd Mead Co., 1970), p. 80.

²J. P. Guilford, Intelligence, Creativity and Their Educational Implications (San Diego, Calif.: Robert R. Knapp, 1968), p. 16.

³E. Paul Torrance, Norms Manual: Thinking Creatively in Action and Movement, (University of Georgia, May, 1980) Fifth Revision, p. 15-20.

CHAPTER IV

RESULTS

The results do not support the hypothesis, namely, that four year old children whose mothers have had training in divergent question asking skills will attain higher scores on E. Paul Torrance's test, "Thinking Creatively in Action and Movement," than will four year olds whose mothers have not.

The standard scores and means of the experimental and control groups are presented in Table 2. There is very little differences between mean scores on the subtests for both experimental and control group. (Table 2, page 65.)

Analyzing the differences among the appropriate means using a single tailed t-test revealed no differences between any two means.

Table 3

Means and t-test
Comparing Experimental - Control Group

	\bar{X}		df	t
	Exp.	Cont.		
Fluency	124	118	32	0.62
Originality	108	107	32	0.15
Imagination	109	110	32	0.16
Composite	114	112	32	0.28

Table 2

Standard Scores

Child	Experimental				Control			
	F	O	I	C	F	O	I	C
1	111	97	90	99	171	131	120	143
2	182	125	129	145	95	89	100	97
3	120	102	116	113	127	100	120	117
4	108	115	116	113	105	88	125	106
5	103	96	113	104	92	92	91	92
6	131	90	123	115	81	79	74	78
7	153	162	119	145	157	145	119	140
8	127	108	126	120	100	97	100	99
9	150	124	119	131	120	105	94	106
10	148	125	120	133	125	106	126	119
11	81	80	94	85	120	112	97	110
12	148	133	123	135	101	90	117	103
13	103	101	68	91	79	79	74	77
14	69	75	60	68	136	129	119	128
15	100	89	103	97	125	121	123	123
16	149	105	109	121	146	124	129	133
17	128	102	117	116	132	125	123	127
\bar{X}	124	108	109	114	118	107	110	112

F - fluency score

O - originality scores

I - imagination scores

C - Composite scores

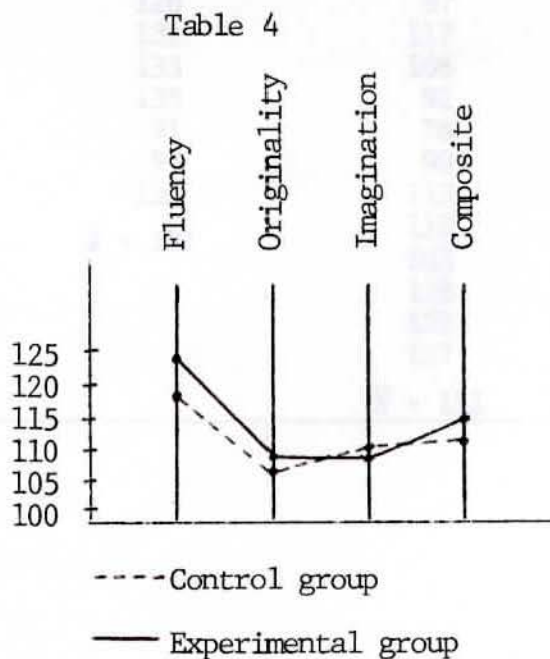
\bar{X} - mean scores

Since the data did not substantiate the hypothesis, that the experimental group would perform significantly better than the control group, the data to discover if there were any other relationships that were of value for future research.

The author realizes that this further exploration of the data is ad hoc.

In Table 4 the standard scores for the experimental and control groups were graphed using the subscores of fluency frequency, originality, imagination and the composite score. The experimental group means though not found to be statistically significant were slightly higher than the control means, especially in the area of frequency of responses.

The control group did slightly better than the experimental group in one area only, that of imagination.



The data was examined to see if there was any difference in the effect the treatment had based on the sex of the child. This investigation also showed there was no significantly different effect on the boys or girls because of the treatment, although the means for the girls in the experimental group were higher than the control groups means for girls. This data is found in Table 5.

Table 5

Summary of Mean Scores of Boys and Girls
on Thinking Creatively in Action and Movement

Experimental		Control	
Boys Composite Score	Girls Composite Score	Boys Composite Score	Girls Composite Score
99	145	143	140
145	120	97	106
113	131	117	77
113	133	106	133
104	135	92	$\bar{X} = 114$
85	91	78	
68	97	99	
$\bar{X} = 105$	121	119	
	$\bar{X} = 121$	110	
103			
128			
123			
127			
		$\bar{X} = 111$	

An analysis of variance test was calculated and the results are found in Table 6.

Table 6

Analysis of Variance of Composite Scores
as a Function of Group and Gender

Source	df	M. S	F.
Group	1	1201	2.25
Sex	1	64	< 1
Group X Gender	1	2563	4.80
Error	30		

CHAPTER V

DISCUSSION AND CONCLUSION

Because the hypothesis, four year old children whose parents have had training in divergent question asking skills will attain higher scores on E. Paul Torrance's test, "Thinking Creatively in Action and Movement," than will four year olds whose parents have not, was not proven, some of the factors which are thought to have contributed to this must be examined.

It was stated earlier that mothers follow up with the treatment sheets would be difficult to control. As the study proceeded, it was difficult to communicate to mothers the need to follow through with the treatment sheets and hand them back to the author. The author had no way of knowing because of this whether the mother did not do any practicing of the question asking skill or whether she simply lost the treatment sheet and did not hand it back.

Based on this author's nine years of experience with home visits, it was a reasonable assumption that mothers would complete the sheets and hand them back. This observation was based on the use of the home activity guides which is basically asking for convergent thinking production and manipulation of familiar materials. Most of the mothers

felt more comfortable with the convergent guide and would do activities on that sheet while neglecting the divergent questioning sheets.

In the future in seeking to control for variables it might be helpful to assess mothers who are more or less creative and to further study how they interact with their children. Mothers who are more divergent would seem to be more comfortable asking divergent questions, but that is supposition and it remains for future research to examine to see if it could be a correct supposition.

Because of the responses of the parents to the treatment sheets, the author concluded that there was at times confusion as to how the mother could make up her own questions using the model. Mothers who were self-confident in their skills of mothering, by the observations of this author in home visits, had no problem using the sheets. The mothers who were hesitant did not seem to feel comfortable using the treatment sheets and following through with them.

The kinds of behaviors a child evidenced in home visits and in school on Saturday also appeared to be a factor in how they responded to the creativity test, "Thinking Creatively in Action and Movement." The very shy children, although they may have answered the questions creatively on a one to one basis with the mothers on the treatment sheets, seemed to freeze when asked to give a verbal or a motoric response in the testing situation. This author has observed

the same frozen behavior when the motor test is given as part of a testing battery with four year olds. The child seemed to feel too insecure to get up and move. The chair seems to offer security.

The quality of the home environment appeared to be another factor in determining creativity, not necessarily the total socio-economic picture, but the rich interests and wide variety of experiences provided to the child. Although Bettye Caldwell looked at the home environment in terms of intellectual development, research must further assess the elements in a home that make it a creative one.

The factor of history was also a problem. As this author dealt with young children in the home, a variety of childhood sicknesses increased the length of time between treatment and the child was not as regularly reinforced as the treatment was planned to be.

The author feels the idea of trying to develop creativity in young children by training their parents in divergent questioning techniques is still a valid one.

To accomplish this many areas of research should be attempted and changes must be made to control for the parent follow up, mothers' own creativity, home environment factors, factors of mothers' confidence and the confidence of the child.

The factor of mother and child confidence is one which Torrance touches on in his research and one which Starkweather

addresses in her study when she mentions the willingness to take a risk. More research is needed in structuring a treatment approach that is more reinforcing to both the mother and child so that they may develop some self-confidence. The development of self-confidence and the development of the skills of divergent questioning also need to be practiced, over a longer period of time, with more intensive training. Instead of part of a total package of educational activities such as found in the total home visit, future researchers might address the problem by using the entire hour of a home visit as a training session in questioning techniques and also using many more manipulative experiences as part of the treatment.

The data suggested that in the area of flexibility the experimental group mean scores were a little higher than the control group. With a longer, more intensive treatment future research may find this an area where scores will further polarize.

Further, the intensity and extension of the treatment over time could make an even greater impact on girls than boys. Because the mean for the girls in the control group was lower than the mean for the experimental group girls, this may be an area to look at further.

Because the subjects in this study were from this author's class, it is difficult to generalize to a larger group. However, a bigger sample may be obtained in the

future if the treatment were implemented by all the teachers in the Parent-Child Early Education Program thereby reaching 700 children and their mothers.

It may be that creativity is not dependent upon any specific treatment like asking divergent questions, but rather upon mental stimulation and the enrichment of the child's total environment. Since that is the goal of the entire Parent-Child Early Education Program, control subjects received equal stimulation as did the experimental group.

Future research might also direct itself to determining how much the home environment is a factor in the creativity of a young child and to control for home environment so that the effects of a creative treatment could be more easily addressed.

Part 1

Do you know that you can teach your child
 most important skills in the world? It's called learning.
 A great deal of what we learn in school and
 at home through learning. Young children learn by exploring
 and playing. They learn what they need to know by
 trying things out. Another way to learn is by reading
 books. It is the best way to learn.

- Ask your child what they know
- Ask him how he learned
- Ask him how he feels
- Ask him to show you what he knows
- Ask him to explain his thinking

APPENDICES

These are the questions you should ask your child
 and check them as he goes along to see how well he is doing.

Sheet 1

Do you know that you can teach your child one of the most important skills in his life? It's called listening!

A great deal of what we learn in life in school and out is through listening. Young children learn by something called modeling which means they watch what we do, not what we say to do. Another way to teach your child to be a good listener is to be one yourself.

How? When you child asks you a question...

- give him your full attention
- look into his eyes
- get down to his level or pick him up to your own level.
- take time to hear his question without interrupting him.
- try to re-state the question in your own words so he knows you are listening.

Write down one question you child asked you this week and check above as to how you responded to your child.

Sheet 2

Did you know that one of the most frequent ways we communicate with our children is by asking questions? Did you know that we usually wait only 1 second for an answer, then we talk some more or ask another question? One second is not much time to think about an answer. Researchers who studied teacher's questioning skills found that when teachers waited 3 seconds after asking a question, children gave more thoughtful answers, they used more complex sentences, they weren't afraid to answer and they became more confident, thinking in a more creative way. All through a child's school years we want them to use more than one word answers and to be able to think for themselves. Waiting after asking a question is a step in the right direction.

This week when you ask your child a question wait 3 seconds, give him your full attention before you talk again. Write down some of the questions you asked and the time you waited.

Sheet 3

It's important to listen attentively to your child and wait 3 seconds after you ask a question to help him develop good listening and thinking skills, but the kinds of questions you ask him are important too. If you ask questions like, "What color is that?" The only answer is red. Most of the time a child doesn't have to think about the answer. He either knows it or he doesn't, mainly through remembering or what someone has told him. Questions that have no one right answer are the ones that develop problem solving and creative thinking skills.

Questions like "What if you were very tiny, as big as a penny, what would you do?"

There is no one right answer. The child must use his imagination and think for himself. The simple, fun, what if questions of childhood can grow into the what if questions of adulthood, like "what if there were no more oil?"

Ask what if questions that you think of and write them down including what your child says, we'll turn them into a book.

Sheet 4

Open-ended questions that have no one right answer are called divergent questions. These are the questions that require us to really think about an answer rather than just tell back something we have memorized, such as: "What color is this?"

It is difficult to think of divergent questions to ask. Here are models of two kinds of divergent questions:

- a) Just suppose you were a giant. What would happen? How would you feel?

Just suppose you had no hands. What would you do?

Just suppose you were shaped like a square. How would you move?

- b) What do you think when you see a rainbow?

What do you think when a tiny bug crawls on your finger?

What do you think when you're all alone?

Write down the "Just suppose" questions or the "What do you think" questions you asked your child and the answers your child gave.

YOU MAY USE ONE OF THE MODELS I HAVE PROVIDED AND THEN MAKE UP THE REST OF THE QUESTIONS ON YOUR OWN.

Place each question and answer, one to a page, on the large 12" x 18" paper provided. Each sheet will be a page in a book we are creating.

Sheet 5

There are other models or ways of asking divergent questions. Here are two more for you to try:

How many ways can you move those shapes to turn them into different pictures?

How many different ways can you wash yourself with a washcloth?

As you child demonstrates each way, praise him and say, "now show me another way." If he says, "I can't," tell him to think about it and wait a few more minutes. The procedure will ehlp your child learn to think in more detail and depth and not be satisfied with a surface answer.

"What would be better if . . ." is another model of a divergent question.

What would be better if it were bigger?

What do you have in your toy box that would be better if it were very tiny?

What would be better in your room if it were made of chocolate candy?

Using each of the two models, ask your child a question you have made up yourself and write it down on the large 12" x 18" paper along with your child's response. This will add more pages to the child's book.

Sheet 6

All the models of divergent questions require your child to think for him or herself. This week, using the Home Activity Guide, select any activity and using one of the divergent question models, ask your child a question that you have made up.

For example: if the activity guide is on numbers and it asked the children to count, you might say:

How many ways can you move and count to five at the same time?

How many ways can you group these pennies together into piles?

What if every time you said a number it grew on your table?

Just suppose there were no more numbers in the world. What would happen?

Make up one divergent question to ask your child this week using your Home Activity Guide.

Write down your question and your child's response on the 12" x 18" paper.

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