

THE RELATIONSHIP OF PERCEIVED PARENTAL OPINION OF CREATIVE
ABILITY AND LEARNER'S CREATIVE PROBLEM SOLVING ABILITY

by

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A Thesis Submitted to the Faculty of the
SCHOOL OF HOME ECONOMICS
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
WITH A MAJOR IN HOME ECONOMICS EDUCATION
In the Graduate College
THE UNIVERSITY OF ARIZONA

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ACKNOWLEDGMENTS

The researcher is deeply indebted to several people for the help and support they offered.

Special appreciation is extended to Dr. Amy Jean Knorr, thesis director, who offered her time, suggestions, and encouragement beyond the requirements of professional responsibility.

Appreciation is also extended to Dr. David Marx, who helped in analysis and interpretation of the data, to Dr. Glen Nicholson, who served on the thesis committee and who helped in planning and presenting the statistical analysis, and to Dr. Doris Manning, who served on the thesis committee and who offered much help in designing the research. Two fellow home economics teachers, Mrs. Nora Bellman and Mrs. Judy Wingert, deserve a special thanks for their help in field testing three of the measurement instruments.

Warm recognition is due my parents and husband. A very special thanks is extended to my husband Jeff for providing continuing encouragement and assistance during the writing of the thesis and to my parents for their example of scholarship and for providing an environment in childhood that encouraged creativity and learning.

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ABSTRACT

The purpose of this research was to determine whether or not a relationship exists between subjects' perceptions of parents' opinions of their creative abilities and (1) subjects' self-opinions of creative abilities, (2) subjects' creative abilities, and (3) subjects' gains in creative abilities.

The sample was composed of 89 seventh and eighth grade students enrolled in the researcher's home economics classes. At the beginning of the nine-week study, three instruments were administered to measure creative thinking ability, self-opinion of creative ability, and perceived parental opinion of creative ability. Six weekly one-hour lessons in creative thinking were taught by the researcher. Following the lessons, a posttest of creative thinking ability was given.

Results of the research indicated a strong positive relationship between perceived parental opinion and self-opinion of creative ability. A significant association was also found between perceived parental opinion and scores on the pretest of creative thinking ability. The relationship between perceived parental opinion and creativity posttest scores and the relationship between perceived parental

opinion and gains in creativity were found to be of no significance and in some cases in a negative direction.

CHAPTER 1

INTRODUCTION

Providing an education that equips students with skills and knowledge to cope with a rapidly changing world is a challenge facing educators today. No longer is it sufficient to teach students facts and principles about the world as it exists. By the time students are ready to use this static kind of knowledge, the world may have changed so dramatically that their education has become obsolete. Rather, education today must be aimed at equipping students with knowledge and skills that can be used to cope with increasingly rapid change and the complex problems that accompany change. Education in traditional methods of problem solving may be insufficient to cope with such complex problems. Creative solutions will be needed. Perhaps by training students in creative thinking, educators can help provide persons who can supply the creative solutions to the problems of a dynamic world.

Even though worldwide problems must be met by entire nations, the same problems demand action by individual families. Families as well as nations must deal with shortages of energy, over-population, changing roles of men and women, changing values, pollution of the environment,

and changing economic structures. Parents still retain the obligation to prepare children for adulthood even though the traditional family structure that supports this obligation is weakened. Families' needs for heat for homes, for transportation, and for preparing and storing food must be met regardless of worldwide fuel shortages. Whereas governments employ experts to provide answers to national and international problems, most families must provide their own solutions. The ability to think creatively in solving worldwide problems is as important to individuals and families as to governments and nations.

In another sense, expression of creative ability is important to individuals not only to solve problems but also as a requisite to mental health. Maslow (1954) contends that creativity is a major trait of self-actualizing people. The need to be self-actualizing or to be all one is capable of being requires that one's creative ability find a mode of expression. Maslow further argues that the fulfillment of psychological needs is as important to mental health as the fulfillment of physiological needs is to physical health. The person whose creative abilities are thwarted may never satisfy the ultimate need for self-actualization.

Despite the urgent needs of society, families, and individuals for creativity, much potential creativity goes unexpressed due to lack of encouragement and support. By its very nature, creative behavior may tend to threaten

those in a position to provide support for creative behavior, while at the same time demanding encouragement for its development.

Creativity implies the production of something new, original, and unusual. Most theorists now espouse the idea that originality means something that has never before existed in the mind of the thinker. Creative behavior involves divergent thinking as opposed to the convergent thinking needed for much of the achievement in school learning. Often the results of creative thinking are ideas or productions that are unconventional, unlike the accepted standards and even disturbing to others. The kind of mental energy needed to produce and share an unconventional, novel idea demands great support. Without the needed backing, some persons may be unwilling to expend that kind of mental energy.

To a child, the production of something that has never existed before in his world may be a disquieting, even frightening experience. More than ever, the child needs support for his creative behavior before he will feel free to explore it further. At the same time, unconventional behavior may cause anxiety in persons in positions of authority. The student who poses a searching question in class may threaten the authority of some teachers. Instead of receiving encouragement and help to find a solution, the student may be ridiculed or even punished for his divergent

thinking. The problem of recognizing and supporting creative behavior in children before it is suppressed by some educational practices, by a teacher or by a parent becomes an urgent challenge to educators who value creative thinking.

As a home economics teacher, the researcher was personally challenged to explore factors which provide support for creativity in home economics classes. The need to develop creativity in home economics students stems from two needs: the needs of families to cope creatively in a rapidly changing society and the need for students to support creative behavior in their own children. It was this latter area of parental influence on creativity that became the focus of this study.

It was the researcher's experience that children learn in pre-school and early school years of their parents' expectations and opinions of their creative abilities. Early in life, parents comment on a child's ability to draw and color, on imagination in dramatic play activities, on curiosity and question asking, and on independence of actions. From comments, a child learns how highly the parent values these creative behaviors, the degree of creative behavior expected of the child, and the parents' estimate of the child's ability to exhibit creative behavior. Concern about the eventual consequence of this parental behavior served to stimulate ideas for the study.

This study was designed to answer several questions about the roles parental opinion and self-opinion play in providing support for creative behavior. Three basic questions were posed:

What relationship exists between self-opinion of creative ability and perceived parental opinion?

Do those who perceive a higher parental opinion of creativity demonstrate greater creativity than those who perceive a lower parental opinion?

Are those who perceive a higher parental opinion of creativity better able to profit from instruction in creative thinking than those who perceive a lower parental opinion?

CHAPTER 2

REVIEW OF LITERATURE

Since 1950 a large body of literature has accumulated about the nature and theory of creativity and the various factors that have an influence upon its development. The literature reviewed to provide a basis for this study was concentrated in the following areas: the nature and characteristics of creative thinking, patterns of development of creative thinking, selected factors influencing development of creative thinking, and research needs.

Nature and Characteristics of Creative Thinking

For hundreds of years, creative ability was viewed as a rare quality possessed by a very few unusual and often eccentric people. Creative ability was thought to be a divine gift or rare hereditary trait. As such, the ability to think and act creatively was thought to be unchangeable and nearly impossible to explain (Guilford 1967).

Since the 1950's, increased interest in understanding individual differences resulted in a concept of creative ability as a continuum. This new concept made it possible to study creative ability. Persons no longer needed to be described as creative or uncreative, but rather

as possessing a measurable degree of creative ability. Since creative ability was measurable, dimensions of creative ability could be identified and factors relating to high or low degrees of creativity could be analyzed. While the degree of creative ability was viewed as limited by heredity, the possibility of developing it to its full potential could be attempted (Guilford 1967).

Most modern theorists view creativity as a process in which a problem is sensed, hypotheses formulated and tested, and the results communicated. The degree to which the process is viewed as creative is dependent upon the production of something new. Although some scholars insist that creativity result in something that has never existed before, most accept as sufficient something that has never before existed in the mind of the creator (Gowan, Demos, and Torrance 1967). According to Torrance (1969), whether or not thinking is creative depends upon the extent to which the thinking represents these qualities: (1) novelty, (2) value to the thinker and his culture, (3) unconventionality in its divergence from accepted ideas, (4) truth, (5) generalizability, and (6) unexpected in light of the thinker's knowledge and background.

Another way of defining creative thinking is to describe characteristics of the thinking processes of creative persons. Guilford (1962, as cited by Hallman 1967) has defined six traits that are widely accepted by other

scholars as traits essential to creative thinking: sensitivity to problems, fluency, flexibility, redefinition, originality, and elaboration. Sensitivity to problems involves the ability to identify defects, needs, or gaps in knowledge, and to find a plan for a solution to the problem. Fluency is the ability to produce numerous ideas, whereas flexibility involves the ability to shift thinking to numerous categories of ideas. Closely related to flexibility is redefinition, or perceiving in a different way from the usual or intended way. The novelty and unusualness of ideas reflects its originality. Elaboration implies the ability to add detail or to embroider on a basic idea. These six characteristics form the basis of much of the research in which measurement of creativity is a part.

Creativity has gained acceptance as a measurable mental process, differing in important ways from other intellectual processes, and resulting in novelty and originality. Components of creative thinking have been described through identification of traits of creative personalities. The six traits described by Guilford have been widely used by other researchers.

Patterns of Development of Creative Thinking

Many modern theorists and researchers have suggested that creative ability is present in all children. Torrance (1969) stated that when left to their own methods, children

naturally choose to learn in creative ways rather than by authority. Further, he stated that children naturally use fantasy and imagination in singing, play, drawing, and speaking. Andrews (1930, as cited by Torrance 1969) concluded that creativity exists to some degree in all healthy children, but that large individual differences exist and that there are many types of creative imagination. Starkweather (1958, as cited by Torrance 1969) stressed the importance of freeing the young child to behave creatively and thereby preventing loss of creative talent.

The existence of large individual differences in creative ability noted by Andrews stimulated interest in studies to explain the differences. Researchers wanted to know if gains in creative ability over time could be attributed to developmental processes and what factors facilitated or inhibited the development of creativity.

Through a series of cross-sectional studies, Torrance attempted to establish growth curves of creative ability for children from elementary through high school ages. In general, the growth curves resulting from several studies were similar. There was a gradual increase in creative ability from first through third grades. At about the fourth grade, a sharp decline occurred. Recovery of the ability to produce great numbers of ideas (fluency) occurred during fifth and sixth grades. The ability to produce highly unusual ideas (originality), however, did not show

recovery after the fourth grade decline. Another less severe decline occurred in the seventh grade, followed by another period of development during the eighth grade. During the remaining school years, a leveling off or slight drop occurred (Torrance and Gupta 1964).

Other researchers also noted similar patterns in gain and decline of creative ability. In 1922, Simpson administered a test of creative imagination to 407 children in grades three through eight in Oyster Bay Public Schools in Long Island, New York. The test involved making drawings out of sets of four dots arranged in squares. Scores were computed by dividing the number of creative changes in drawings by the total number of drawings. The average score increased during third grade, dropped at the fourth grade and continued to increase until the end of the sixth grade. A drop in the average score occurred during seventh grade and again during eighth grade (Simpson 1922).

Wilt (1959) and Barkan (1960) both noted a distinct change in the creative qualities of art work of fourth graders. The spontaneity of early childhood disappeared and was replaced by a great concern for accuracy of details, reality, and a new awareness of social customs and attitudes. In drawings of people, costumes became very important and male and female roles were well defined. Wilt observed that this stage of realism in art work occurred simultaneously with the gang age in social development.

The findings of Torrance, Simpson, Wilt, and Barkan pointed to the existence of two important periods of discontinuity in the development of creativity. The occurrence of discontinuity in both fourth and seventh grade students posed questions about the universality of these slumps and about the causes.

Torrance (1967) has suggested that the noted slumps in creativity at fourth and seventh grade levels were not purely developmental phenomena but rather culturally caused. Using his tests of creative thinking, Torrance found that the growth curves of creative abilities assumed different shapes in different cultures. In Western Samoa, originality at a young age was lower than that of any cultures studied but showed continual growth from year to year. Children in Germany and Australia showed similar growth through the fourth grade and then changed dramatically. The United States Negro sample showed a growth curve with much more continuity in development than the United States as a whole (Torrance 1967).

These studies indicated that creative thinking was a learned behavior and that the degree to which the behavior was learned depended upon differing cultural emphases.

Results of the research have pointed to a general pattern for the development of creativity in this country. In the pattern were two periods in which development showed a decline. That periods of decline in development occurred

at different ages in other cultures indicated that development of creativity was culturally determined. Studies designed to determine what cultural influences inhibit or facilitate development have followed.

Selected Factors Influencing Development of Creativity

Although creative development has been studied in relation to numerous factors, the factors reviewed for this research were influences of schools and teachers, influences of self-concept, and influences of parents.

Influences of Schools and Teachers

In an attempt to discover what kind of school environment encourages the development of creative ability, Ogilvie (1974) studied the creative ability of ten and eleven-year-olds in five schools. The school structure of each of the schools was different, ranging from highly structured to highly unstructured. Ogilvie found a curvilinear relationship between the creativity of students and the informality of the classroom, with greatest creativity occurring in a classroom with a medium level of informality. Ogilvie explained the results by hypothesizing that two conditions must exist together to maximize creative ability: the ability to draw upon a large reservoir of elements in the environment and the freedom to produce novel, unconventional combinations of these elements.

A school atmosphere that satisfies both conditions stimulates the greatest creative thinking in students.

Factors affecting motivation in the classroom have been identified as important variables in creative development. Torrance concluded that teaching methods, materials, attitudes, and relationships with pupils can account for much of the difference in creative growth (Torrance 1967).

The importance of motivation for creative thinking provided in test situations was noted by Torrance (1974a, p. 16).

Still another factor that must be taken into consideration in assessing the reliability of measures of creative thinking is that of motivation. One would not measure the jumping potential of children of a particular school by photographing them as they pass by a particular spot and finding out how high they just happened to be jumping. One would do something to motivate them to jump by providing competition, a challenging jumping task or situation, or the like. This factor is quite critical in the measurement of any kind of performance that requires the use of expensive energy. The more expensive the energy required, the more important are motivational factors. Since creative thinking requires rather expensive energy, motivational factors are especially important in the measurement of the abilities involved in creative thinking.

In addition to the motivational environment in school, curriculum content has been shown to influence creative growth. In 1964, Torrance and Gupta concluded a rather extensive study to test a set of teaching materials designed to prevent the typical fourth grade slump in creative ability. They employed three different test sites

and a total of 531 students in the control group and 585 in the experimental group. The teaching materials were used throughout the school year as part of the curriculum in the randomly assigned experimental classrooms. The Abbreviated Form VII Minnesota Test of Creative Thinking, the Sounds and Images Test of Originality, and the Imaginative Stories Test were administered at the beginning and end of the school year. Results from all three test sites showed a greater number of significant gains on the several measures of creativity for students in the experimental classrooms than for students in the control classrooms (Torrance and Gupta 1964).

In a less extensive study, Callahan and Renzulli (1974) studied the effectiveness of a three volume creativity training program, New Directions in Creativity. Results of testing 63 sixth grade students indicated that the program was a valuable resource in the development of creative thinking abilities. In another test of the same materials, 77% of the teachers using the materials concluded that their pupils had improved their creative thinking abilities following twenty hours of instruction (Renzulli 1973).

In summary, researchers studying school influences on creative growth have found several factors to be important. A medium level of informality in school structure provided both the psychological freedom and the needed knowledge for creative thinking. Motivation in test

situations and in classroom learning, as influenced by teaching methods, teacher attitudes and relationships with pupils was shown to be an important factor in creative development. Experiments in which researchers attempted to teach creative thinking skills demonstrated that the curriculum content influenced creative thinking with as little as twenty hours of instruction.

Influences of Self-Concept

The relationship of self-concept and creativity has been the focus of a number of researchers. Sisk (1972) investigated this relationship in a study of 45 students from a gifted class who were identified by their teachers as being low creatives. In ten weekly three-hour sessions, graduate students trained in techniques to enhance self-concept worked with these 45 students. At the end of the ten weeks, the regular classroom teachers reported that the 45 low creatives had become more aware of their own creative strengths.

According to theory set forth by Combs and Snygg (1959), one's self-concept develops as a result of interactions between oneself and persons who are significant in one's life. They hypothesized that a person gets a sense of his own reality through what others say and do. Parents are very influential in forming a child's self-concept through their own perceptions of the child. If a parent's

perceptions of an adolescent differ from the adolescent's self-concept, the adolescent becomes aware of the difference and attempts to resolve it. In resolving the difference, the adolescent may raise or lower the level of aspiration or raise or lower the level of achievement (Combs and Snygg 1959).

One study assumed that teachers could affect self-concept and performance in a way similar to parents. Through raising a teacher's perception of a child's creative ability, Rosenthal, Baratz, and Hall (1974) attempted to raise actual creative performance. Within each classroom in a predominantly black inner-city school, approximately one-fifth of the students in each classroom were designated to their teachers as showing unusual potential for gains in creativity. Although no gains were made in creativity in the school as a whole, the students designated as creative in the fifth grade class did show significant gains in creativity after eight months.

On the other hand, Passi and Lalithamma (1973) concluded that self-concept and school achievement were not related. In a study of the tenth grade students in Baroda High School, Baroda, India, subjects were classified as over-, normal-, or under-achievers. No mean differences in self-concept were found among these groups.

No definitive study positively relating self-concept to creative ability has been done. Viewed together, the

studies of Sisk and Rosenthal et al. demonstrated the importance of self-concept and of a significant other's opinion on actual demonstration of creative ability. Passi and Lalithamma found contradictory results.

Influence of Parents

According to Combs and Snygg (1959), parents play an important role in developing self-concept in a child. Gecas, Calonico, and Thomas (1974) emphasized the importance of the parent's perception of a child on the child's self-concept. They explored two factors which have been found to affect development of self-concept. One factor involved the relationship of parent's self-concept to child's self-concept (modeling). The other factor involved the relationship of parent's perception of the child to the child's self-concept (mirroring). Based upon questionnaire data from 219 families with mother, father, and college age and high school age children, a child's self-concept was found to be more closely related to the parent's perception of the child (mirroring) than to the parent's self-concept (modeling).

Bledsoe and Wiggins (1973) further explored the idea of parent's perceptions and child's self-concept. Their study employed a sample of 50 male and 50 female ninth grade students and their parents. They studied perceptions of self and others using Gordon's How I See Myself Scale and

Offer's Self-Image Questionnaire. Results showed that parents perceive adolescents more favorably than adolescents perceive themselves and that parents perceive adolescents' self-perceptions more favorably than adolescents perceive themselves.

A concept that has not been explored is the child's perception of the parent's perception of the child. It is impossible for a child to actually possess the parent's perception. It is only possible for the child to perceive the parent's perception. Thus, if a child's self-concept is influenced by the parent's opinion of the child (Gecas et al. 1974), the child's self-concept may be influenced to an even greater degree by the child's perception of the parent's opinion. Such a relationship has not been tested. Further, the influence of the child's perception of the parent's opinion on the child's actual behavior, specifically the child's creative behavior has not been studied.

Research Needs

To date, research about creativity has centered on many of the factors which are thought to account for large differences in creative ability among individuals and on various methods for cultivating creativity. Much of the research has been conducted using pre-school and elementary school children. Although several researchers have identified the seventh grade as the age of the second occurrence

of a slump in creativity (Simpson 1922, Torrance and Gupta 1964), there has been much less emphasis on attempts to relieve it than on attempts to relieve the fourth grade slump. In the attempts to cultivate creativity in learners, most of the research has been in areas of science, art, language arts and performing arts with some work in social studies and mathematics. Almost nothing has been done in the area of home economics.

Sisk (1972) demonstrated that raising self-concept could be used as a means of raising creative ability, thus establishing a link between self-concept and creative ability. Rosenthal et al. (1974) linked a person's creative ability with a significant other's opinions of the person's creative ability. Gecas et al. (1974) found a relationship between self-concept and parent's perception of the child. The role of a parent in nurturing or discouraging creative ability could be established if a relationship could be found linking a child's creative ability to the child's perception of the parent's perception of the child's creative ability.

CHAPTER 3

PURPOSE AND SCOPE OF THE STUDY

The purpose of this study was to determine whether or not a relationship exists between the self-opinions of creative ability of junior high school students and their perceptions of parents' opinions of their creativeness. In addition, the relationship between a student's perceived parental opinion and the student's actual creative ability was investigated.

Hypotheses

The following hypotheses were tested:

1. There will be a significant positive relationship between students' perceived parental opinions and self-opinions of creative ability.
2. Students who perceive the parent to hold high opinions of their creative abilities will obtain higher scores on the pretest of creative thinking than students who perceive the parent to hold medium or low opinions.
3. Students who perceive the parent to hold high opinions of their creative abilities will obtain higher scores on the posttest of creative thinking

than students who perceive the parent to hold medium or low opinions.

4. Students who perceive the parent to hold high opinions of their creative abilities will make greater improvements in tests of creative thinking than students who perceive the parent to hold medium or low opinions.

Research Setting

The study was conducted in a junior high school in Tucson, Arizona using three seventh grade and two eighth grade classes in home economics taught by the researcher. The study covered a nine week period during which each class met four days each week. All classes were studying clothing construction. The research design involved pre- and post-tests of creative thinking and a series of six lessons in creative thinking designed to stimulate and foster creative behavior in the clothing construction classes. Tests to measure students' self-opinions of creative ability and students' perceptions of parents' opinions of their creative abilities were also administered.

Definition of Terms

Throughout the study, the following definitions of terms were used.

1. Creative Problem Solving--the degree to which results of problem solving exhibit fluency, flexibility, originality, and elaboration.
2. Creative Self-Opinion--the degree to which one believes oneself to exhibit qualities found in creative persons.
3. Creativity--the degree to which a thought or group of thoughts shows fluency, flexibility, originality, and elaboration.
4. Elaboration--the number of different ideas used in working out the details of an idea.
5. Flexibility--the number of different categories of response used in responding to a situation.
6. Fluency--the number of different relevant responses used in responding to a situation.
7. High Perceived Parental Opinions of Creative Ability--those scores of perceived parental opinion which are in the upper third of all scores.
8. Low Perceived Parental Opinions of Creative Ability--those scores of perceived parental opinion which are in the lower third of all scores.
9. Medium Perceived Parental Opinions of Creative Ability--those scores of perceived parental opinion which are in the middle third of all scores.

10. Originality--the number of statistically infrequent responses used in responding to a situation that show creative intellectual energy.
11. Parent--the person identified by the student as an adult with whom the student has had close contact for three or more years and whose opinion of the student the student values.
12. Perceived Parental Opinion--the degree to which a person perceives the parent as believing the person to exhibit qualities found in creative persons.

Assumptions and Limitations

In carrying out the research, several assumptions were made.

1. All children possess some degree of creative thinking ability and have the inherent motivation to use the ability when creative behavior is accepted.
2. All subjects will make honest and serious responses on tests and measurement instruments.
3. The emotional and psychological environment of the intact classes will not significantly affect performance on measurement instruments.
4. The researcher will be able to teach in such a manner as to enable students to gain in creative thinking ability.

Several factors in the setting and design of the research were recognized as placing limitations on generalizing from the findings.

1. Because the home economics classes were elective classes, students in these classes may have differed to some degree from the general population of the school in intelligence, gender, ethnic background, socioeconomic level, and motivation.
2. The sample included a high proportion of subjects of Hispanic background, and previous research has shown persons from this background to have lower self-concepts of abilities than the general population (Evans and Anderson 1973).
3. The teacher of creative thinking skills was the researcher.
4. The interactions of complex factors of personality, teacher expectations, communication style, and interpersonal relations in teacher and students may have been confounding variables in teaching creative thinking skills (Callahan and Renzulli 1974).

CHAPTER 4

PROCEDURES

The procedure used in conducting this investigation of junior high school students' creative abilities and perceived parental opinions are described in the following sections: the sample, measurement instruments, research design and data collection, and data analysis plan.

The Sample

The invited sample for this study consisted of all the students enrolled in the five clothing classes taught by the researcher in the final quarter of the 1975-76 school year. The school attended by the subjects was a two-year junior high school located on the far west side of Tucson, Arizona. This sample was selected basically as a matter of convenience.

The data-producing sample was obtained by eliminating subjects from the invited sample for specified reasons. Several students moved to another school during the study. Some students were absent from school on days when pre- and posttest data were obtained and were not able to be tested upon their return to school. One student was totally unable to express himself in writing and was unwilling to accept an alternative method of testing. Other students chose not

to participate in some or all of the testing. Finally, some students were absent for more than two of the six hours of instruction in creative problem solving and so were eliminated from the data-producing sample. Reasons for elimination from the invited sample and numbers eliminated are presented in Table 1.

Table 1. Numbers of subjects in invited and data-producing samples with reasons for elimination from invited sample.

	7th Grade	8th Grade	Total
Invited Sample	64	36	100
Reasons for Elimination:			
1. Moved to another school	3	1	4
2. Absent during testing	1	1	2
3. Unable to express self in writing	0	1	1
4. Unwilling to complete tests	1	5	6
5. Absent during more than two hours of instruction	1	0	1
Total Eliminated from Invited Sample	6	8	14
Data-producing Sample	58	28	86

For some subjects eliminated from the invited sample, only one piece of datum was missing. For some of the descriptive statistics as much data as available were used, including some from those students eliminated from the data-producing sample. Consequently, sample size ranged from 86 to 100 depending upon which piece of datum was missing.

Subjects in the sample ranged in age from 11 to 15 years of age with the mean age of 12 years 11-1/2 months. Table 2 shows the distribution of ages in the sample.

Table 2. Ages of subjects, absolute and relative frequencies.

Age	Absolute Frequency	Relative Frequency
11	2	2.1%
12	30	30.9
13	39	40.2
14	22	22.7
15	4	4.1
Total	97	100.0

Although the home economics classes were elective, coeducational classes, numbers of males and females in these classes were not equal. The invited sample consisted of 88 females and 12 males. Of the 12 males, five were among

those eliminated from the invited sample. The data-producing sample consisted of 79 females and seven males.

The school in which the study was conducted was considered by school district officials to be one whose ethnic mixture very closely approximated that of the city as a whole. Table 3 shows the numbers and percentages of each major ethnic group represented in the school and in the invited sample. In general, the sample was composed primarily of nearly equal groups of Anglo-Saxon and Spanish surname subjects, with a smaller group of black subjects. Comparison of the invited sample with the whole school revealed that the ethnic mixture of the invited sample closely approximated the ethnic mixture of the school. The invited sample included a slightly higher percentage of black and a slightly lower percentage of Spanish surname subjects than the school.

Some bias in sample selection was inherent in the use of intact groups. A comparison of characteristics of the data-producing sample with those in the invited sample shows that further bias was present as indicated in Tables 4, 5, 6, and 7. Slightly lower percentages of male, black, eighth grade and older subjects were included in the data-producing sample than were in the invited sample.

Table 3. Numbers and percentages of major ethnic groups in school and in invited sample.

Ethnic Group	In School		In Invited Sample	
	Number	Percentage	Number	Percentage
Anglo	241	44.3%	44	44.4%
Spanish Surname	250	46.0	38	38.4
Black	46	8.4	16	16.2
American Indian	4	0.7	1	1.0
Other	3	0.6	0	0.0
Total	544	100.0	99	100.0

Table 4. Comparison of characteristics of students in invited and data-producing samples by gender.

Gender	Invited Sample		Data-Producing Sample	
	Number	Percentage	Number	Percentage
Male	12	12%	7	8%
Female	88	88	79	92

Table 5. Comparison of characteristics of students in invited and data-producing samples by ethnic group.

Ethnic Group	Invited Sample		Data-Producing Sample	
	Number	Percentage	Number	Percentage
Anglo	44	44%	39	45%
Spanish Surname	38	38	34	40
Black	16	16	12	14
American Indian	1	1	1	1
Unknown	1	1	0	0

Table 6. Comparison of characteristics of students in invited and data-producing samples by age.

Age	Invited Sample		Data-Producing Sample	
	Number	Percentage	Number	Percentage
11	2	2%	2	2%
12	30	30	28	33
13	39	39	34	40
14	22	22	19	22
15	4	4	3	3
Unknown	3	3	0	0
Mean Age	13.27		12.96	

Table 7. Comparison of characteristics of students in invited and data-producing samples by grade.

Grade	Invited Sample		Data-Producing Sample	
	Number	Percentage	Number	Percentage
7	64	64%	58	67%
8	36	36	28	33

Measurement Instruments

Measurement devices used in this study consisted of tests to measure creative thinking ability and tests to measure creative self-opinion and perceived parental opinion of creative ability. Five instruments were used in total, four adapted from instruments developed by Torrance and one developed by the investigator.

Tests to Measure Creative Thinking Ability

The Torrance Tests of Creative Thinking are among the most widely used and tested instruments to measure creative thinking. The numerous studies which have found the tests to exhibit acceptable test-retest and alternate-form reliability and construct, concurrent and predictive validity are cited in the Norms Technical Manual (Torrance 1974a). Therefore two adapted forms of the Torrance Tests of Creative Thinking were used as pre- and posttest measures of creative thinking ability. The Torrance tests are composed of several subtests emphasizing either figural or verbal ability. Each verbal subtest is scored for fluency, flexibility, and originality, whereas figural subtests add a scoring variable for elaboration. The Tests of Imagination used in this study were formulated directly from the Torrance subtests of product improvement, unusual uses, circles and squares, and the Ask-and-Guess Test (Appendices A and B). In all but the circles and squares subtests,

specific objects were changed so that the tasks were more closely related to home economics problems. As much as possible, instructions and wording remained unchanged.

Methods used to score the Tests of Imagination were modeled after scoring methods suggested in the TTCT Directions Manual and Scoring Guides (Torrance 1966, 1974b). In all verbal subtests, scores for fluency, flexibility, and originality were obtained. In the circles and squares subtests, an elaborations score was also obtained. Since all the verbal subtests had been changed slightly to relate more closely to home economics problems, new scoring guides were constructed. In order to construct these new scoring guides, the tests were field tested at another Tucson junior high school. As far as possible, categories of responses established by Torrance (1966, 1974b) were used. Statistical infrequency of each response was estimated from field testing. Since the new scoring guides were based upon a relatively small number of field tests compared with the number of tests used to establish norms for the TTCT, some scoring reliability was sacrificed.

As all tests were scored by the researcher, inter-scoring reliability could not be computed. Instead, score-rescore reliability was computed using a one-month interval between scorings. Score-rescore reliability coefficients were .92, .70, .95, and .98 for fluency, flexibility, originality, and elaboration respectively. Considering the

difficulty inherent in establishing new scoring guides and the degree of scorer judgment required, score-rescore reliability coefficients for fluency, originality, and elaboration were considered very satisfactory. The coefficient for flexibility was considered acceptable.

Tests to Measure Creative Self-Opinion and Perceived Parental Opinion

Adaptations of the What Kind of Person Are You? Test were used to measure self-opinion and perceived parental opinion of creative ability. The What Kind of Person Are You? Test was constructed by Torrance from 66 characteristics selected from the literature as differentiating creative from less creative persons. The characteristics were rated by a panel of ten advanced research students studying the creative personality. Characteristics were then paired in a forced choice format. In each pair, the characteristic which received the higher rating by panelists was judged to be the correct answer. The test was designed to provide an index of an individual's disposition to behave in creative ways (Torrance and Khatena 1970).

Test-retest reliability coefficients obtained using college students with time intervals from same day to one week ranged from .97 to .71 (Torrance and Khatena 1970). No reliability data were available for junior high age students. Because some of the characteristics used in the test were identified by words not common to junior high students,

explanatory notes were added to some characteristics for this study. Further, the test was given in oral and written form simultaneously to help assure greater reliability.

Several tests of validity have yielded moderate validity coefficients. Among these was one which compared results on the What Kind of Person Are You? Test with the various scales on the Runner Studies of Attitude Patterns. When 101 college students were divided into high, moderate, and low groups on the basis of scores on the What Kind of Person Are You? Test, significant F-ratios were found on the Experimental, Rules and Planfulness scales. Results indicated that personality traits differentiated by high scores on the What Kind of Person Are You? Test were also differentiated by high scores on the Experimental scale and low scores on the Rules and Planfulness or need for structure scales (Torrance and Khatena 1970).

Various measures of concurrent validity have been computed for the What Kind of Person Are You? Test. Correlation coefficients using scores on the What Kind of Person Are You? Test and scores on Sounds and Images Forms I and II, Onomatopoeia and Images Forms I and II, Imaginative Stories Test, self-ratings and Provocative Questions Test were .75, .26, .48, .37, .73, .40, and .60, respectively. All measures of concurrent validity were obtained using adult subjects (Torrance and Khatena 1970). No measures of validity using a junior high age group were

available. The existence of norms for such a group, however, indicated that Torrance and Khatena believed the test to be appropriate for that age group.

For this study, slightly different forms of the What Kind of Person Are You? Test were used to measure self-opinion of creative ability and perceived parental opinion of creative ability. To measure self-opinion, the students were asked to select the one phrase or term in each of 50 pairs that most nearly described themselves (Appendix C). The pairs of phrases were arranged vertically on the page. In the test of perceived parental opinion, called the What Kind of Person Does Your Parent Think You Are? Test (Appendix D), each student was asked to select the term or phrase in each pair that the parent would choose to describe the student. The order of pairs was changed and pairs were arranged horizontally on the page.

One other instrument, the Parent Opinion Test, designed specifically for this study by the researcher, was used to gain further information to help explain results, although not to test hypotheses (Appendix E). This test was written to ascertain the kind of support students believed they would receive from their parents in response to creative and uncreative behaviors.

In the process of developing multiple choice type questions for the Parent Opinion Test, it became apparent to the researcher that the parent response to behavior

could not be estimated by the student until the student had selected the kind of behavior most typical of himself. Moreover, asking a student to indicate how a parent would respond to a creative behavior would be ambiguous if the student seldom behaved in a creative way. Responses to such questions would be based upon speculation, not on experience, and would probably prove to be unreliable.

As a result, the model of parent-child interaction shown in Figure 1 was used to formulate questions in which a student indicated own response to a situation and the student's belief about what the parent's reaction to the student's response would be. If the student were to select a behavior indicating creativity and a parent reaction indicating encouragement of creativity, the answer would be a Situation I response. On the other hand, if the student were to select a behavior indicating a lack of creativity and a parent reaction indicating encouragement for lack of creativity, the answer would be a Situation II response. Situation III responses would indicate creative student behavior met by parental discouragement of creativity. Situation IV responses would indicate uncreative student behavior and a parental response discouraging the lack of creativity. For each item in the 20-item test, a problem was presented along with one response for each of the four situations.

		Child's Behavior	
		Creative	Uncreative
Parent's Response	Encouraging	Situation I	Situation II
	Discouraging	Situation III	Situation IV

Figure 1. Parent-Child Interaction

Items for the Parent Opinion Test were written to include various aspects of creative behavior. From several sources, a list of the most frequently named characteristics of creative persons was compiled. For each characteristic on the list, one or two test items were written. Every attempt was made to write test items in which all responses appeared to be positive responses, in which any sex bias was avoided and in which situations were drawn from actual or very possible experiences of junior high age students.

Because the resulting 20-item test involved complex choices and much reading, some field testing was done using

two different formats. In the original format, the four situation choices were simply lettered A, B, C, and D. In the alternate format, students selected two responses for each problem: one response indicated student behavior and a separate response indicated parental reaction to student behavior. Administering half the test in the original format and the other half in the alternate format showed that both formats yielded similar results. The original format was selected for ease of scoring and for its slightly greater ability to differentiate Situation I and Situation II responses. In order to eliminate reading ability as a factor influencing validity, the written test was accompanied by an audio tape allowing a 20 second interval for selecting and marking the responses.

Although no measures for reliability or validity of the Parent Opinion Test were computed before use, some evidence of concurrent validity resulted. Correlation coefficients of scores on the What Kind of Person Are You? Test and number of Situation I responses were .42 for the eighth grade subjects in the sample, significant at the .025 level, and .03 for the seventh grade subjects. Negative correlation coefficients of scores on the What Kind of Person Are You? Test and numbers of Situation II responses resulted. Correlation coefficients were $-.18$ and $-.41$ for the seventh and eighth grade subjects respectively. These correlations were significant at .10 and .025 levels

respectively. Similarly, when numbers of responses in Situations I and III were added together, the total correlated with scores on the What Kind of Person Are You? Test at .09 and .52 for seventh and eighth graders respectively, with significance at .005 level for eighth graders. For eighth grade subjects, whether or not students selected creative behaviors on the Parent Opinion Test was somewhat indicative of scores on the test measuring self-opinion of creative ability. There was no such indication for the seventh grade subjects.

Research Design and Data Collection

The research was conducted utilizing a pretest, posttest design with six groups. All students enrolled in the seventh and eighth grade home economics classes in the final nine-week quarter of 1976 participated initially as the invited sample. Subjects first completed Form A of the Test of Imagination, the What Kind of Person Are You? Test, and the What Kind of Person Does Your Parent Think You Are? Test. Subjects then participated in approximately six hours of instruction in creative problem solving, taught in one-hour sessions throughout the quarter. Approximately midway through the instruction period, students took the Parent Opinion Test developed by the investigator. Following the instruction, subjects completed Form B of the Test of Imagination. Information describing the sample in terms

of age, sex, ethnic background, and grade was collected from student enrollment cards. The data producing sample was selected after eliminating students producing incomplete data as described on page 25.

Form A of the Test of Imagination was administered separately to each of the five home economics classes on the second day of the nine-week quarter. Because the school in which the research was conducted had a rotating schedule with one class dropped each day, all administrations of the test were not done on the same day. Before each administration began, the classes were told that several tests and activities would be included in the course of study for the quarter in order to help the researcher test some ideas about how students learn. Each class was told that the tests would have no influence on grades and that tests would not even be scored until after the quarter was over.

During the administration of the test, the researcher attempted to create an atmosphere conducive to creative thinking. In the instructions given each class, students were told that there were no right or wrong answers and that they were to give their most imaginative, inventive, and clever ideas. The various parts of the test were timed allowing eight minutes for Task 1, Product Improvement, five minutes for Task 2, Unusual Uses, ten minutes for Task 3, Squares, and five minutes each for Tasks 4, 5, and 6, the three sections of the Ask-and-Guess Test. During the three

sections of the Ask-and-Guess Test, a colored transparency was projected onto a screen at the front of the room to serve as stimulus for the tasks. During the test, students who completed tasks before time was called were encouraged to continue thinking about the task. Those students choosing not to complete part or all of the test remained in the same room and read, drew on their papers, or sat quietly. All students who were absent from school on the day the Test of Imagination was administered were called from another class two days later and the test was administered a second time. No other test sessions were attempted.

The following week, the What Kind of Person Are You? Test was administered. The test was presented to each student in written form. In addition instructions for the test were read aloud. Following the oral reading of the instructions, each item was read aloud and time allowed to circle a response. Questions about the meanings of words on the test were answered orally as they arose. In response to student statements that neither term nor phrase was self-descriptive, students were instructed to select the term or phrase that was most nearly self-descriptive.

After another week, the What Kind of Person Does Your Parent Think You Are? Test was given. Before taking the actual test, each student was asked to identify the person each regarded as parent. On a cover paper to the test (Appendix F), it was explained that the word parent

could have different meanings for different people. Students were asked to think of some important adults in their lives whom they had known very well for at least three years and whose opinion they valued. It was suggested that this person would be one's mother or father in most cases, but that for some, it would be a grandparent, step-parent, or someone else. Each student then wrote on the cover sheet the person whom they regarded as the parent.

Administration of the What Kind of Person Does Your Parent Think You Are? Test followed the same procedure as the What Kind of Person Are You? Test. In the oral reading of the test, before each pair of terms or phrases, the researcher inserted the question "Would your parent describe you as . . .?" Students absent during either the What Kind of Person Are You? Test or the What Kind of Person Does Your Parent Think You Are? Test were administered the test during their regular class periods upon their returns.

During the sixth week of the nine-week quarter the Parent Opinion Test was administered. The cover sheet on which the students had indicated who the word parent meant to them were handed back to each student and reviewed orally. Complete instructions with an example were given orally before the test began. Any questions about how to choose an appropriate response were answered. The written test was then administered orally on tape, allowing a 20 second interval for selecting and marking the desired

response. Those absent during this test were not given another opportunity to take the test.

Two days before the end of the nine-week quarter, Form B of the Test of Imagination was administered to each class in the same manner as Form A. Identical instructions, time limits and encouragements were used. Again, those absent for the test were called from other classes the following day for a second opportunity to take the test.

On all data gathering instruments, students were identified by a number assigned at the beginning of the quarter. Before each instrument was administered, students were informed of their rights to choose not to answer any or all test items. These two provisions assured students' rights to anonymity as required by the Human Subjects Committee of The University of Arizona.

Following the administration of the What Kind of Person Does Your Parent Think You Are? Test, instruction in creative thinking began. Six lessons were taught in six weekly one-hour class periods (Appendix G). Each lesson was designed to emphasize one specific aspect of creative thinking. Lessons were concentrated on fluency, flexibility, originality, sensitivity to problems, elaboration, and redefinition. Because all home economics classes were studying clothing construction during the nine-week quarter, subject matter for all lessons was related to using skills,

equipment, and supplies commonly used in clothing construction classes.

During the lessons, attempts were made to create a playful, game-like atmosphere in which students would feel free to be creative. In each lesson, a warm-up activity was planned to get students thinking along creative lines. In addition, since many students find a lack of structure very disorienting, a suggested method of proceeding with the problem was presented. Finally, some method of reinforcing or encouraging creative behavior was incorporated in each lesson. In all classes, lessons were presented in the same order with approximately the same time allotments.

In an attempt to magnify the results of the lessons in creative thinking, creative behavior of all sorts was encouraged throughout the nine-week quarter. Following most lessons in creativity, suggestions on how students might continue the activity at home were given. Extra credit was given for those who did continue the activity outside of class. Suggestions that students could elaborate on their regular assigned projects and receive extra credit were used to further stimulate creative thinking. Finally, students having original ideas for projects were allowed to deviate widely from the regular course of study.

Data-Analysis Plan

The data for this study were analyzed in several ways to test the four hypotheses and to help explain the results obtained. In all tests, the level of significance was set at .05.

The first hypothesis, concerning the relationship between self-opinion and perceived parental opinion of creative ability, simply required the computation of the Pearson product-moment correlation coefficient using scores on the What Kind of Person Are You? Test for measures of self-opinion and on the What Kind of Person Does Your Parent Think You Are? Test for measures of perceived parental opinion. Correlation coefficients were computed for the seventh and eighth grade samples separately as well as for the total sample.

In order to test the hypotheses that dealt with measures of creative abilities of students, it was necessary to arrive at total scores from the multitude of sub-scores obtained for each subject on the Tests of Imagination. On each of the six tasks in the Tests of Imagination, a score was obtained for fluency, flexibility, and originality. An additional score for elaboration was obtained for Task 3, Circles and Squares. From these 19 scores, total scores were derived for each student for fluency, flexibility, originality, and elaboration. A composite score of these four factors was also computed for each student. In order

to be able to add the four unlike factors without giving undue weight to any one of them, scores on the four factors were first converted to T-scores and then added to obtain a composite score. The T-scores were also used in computing gain for each of the four factors and for the composite gain.

For testing hypotheses 2, 3, and 4, dealing with the relationship between perceived parental opinion and students' creative abilities and gains in creative ability the two-way analysis of variance technique was used. Six subgroups were formed by dividing the sample into three nearly equal groups of high, medium, and low perceived parental opinion and then sub-dividing these groups by grade. The two-way analysis of variance was especially appropriate because it allowed for possible interaction between grade in school and perceived parental opinion. Such an interaction was considered likely at the junior high age during which students normally show rapid growth of independence from parents. Two-way analyses of variance were done using total scores for each of the factors, fluency, flexibility, originality, and elaboration separately and also using the composite scores. For Hypothesis 2, concerning relationship between perceived parental opinion and creative thinking on the pretest, scores from the pretest, Form A of the Test of Imagination were used. For Hypothesis 3, concerning relationship between perceived parental opinion and creative

thinking on the posttest, scores from the posttest, Form B were used. For Hypothesis 4, dealing with the relationship between perceived parental opinion and gains in creative thinking, gain scores were used.

In addition, scores from the Test of Imagination were correlated with perceived parental opinion scores and with self-opinion scores. Each of the four factors and the composite scores were correlated with perceived parental opinion and self-opinion scores on the pretest and posttest. Gain scores for each factor and composite gain were also correlated with perceived parental opinion and self-opinion scores. Comparing correlations obtained with perceived parental opinion with those obtained with self-opinion would give some evidence of which variable was the stronger in influencing creative behavior.

Data obtained from the Parent Opinion Test were not used to test hypotheses, but rather as a means to better understand the kind of interaction between student behavior and parental reaction to that behavior. Scoring the Parent Opinion Test resulted in tallies of the number of responses in each of the four situations illustrated in Figure 1. The first analysis of these data was done by correlating scores for each situation with scores for perceived parental opinion and self-opinion of creativity. A second analysis resulted from summing all combinations of two situations, resulting in a total of six different combinations. The

adding of scores in two situations made it possible to examine student behavior, perceived parental reaction, and perceived parental preferences separately. Using these combinations, further correlations with perceived parental opinion and self-opinion were computed.

Results from the analyses of data are presented in the following chapter. These findings are discussed and conclusions and implications for further research are presented in succeeding chapters.

CHAPTER 5

FINDINGS

The findings of this investigation are presented in order for each of the four hypotheses tested. Additional data concerning students' self-opinions of creativity and from the Parent Opinion Test developed by the researcher are included for the stimulation they may provide for ideas for further research.

Self-Opinion and Perceived Parental Opinion of Creative Ability

In testing Hypothesis 1, predicting a significant positive relationship between self-opinion and perceived parental opinion of creative ability, the Pearson product moment correlation coefficient was computed. Scores of perceived parental opinion as measured on the What Kind of Person Does Your Parent Think You Are? Test and scores of self-opinion as measured on the What Kind of Person Are You? Test were used. Correlations of .62, .66, and .63 were obtained for the seventh grade, eighth grade, and total samples, respectively. The data are presented in Table 8. All correlations were statistically significant, supporting the hypothesis.

Table 8. Correlations for perceived parental opinion and self-opinion.

Sample	N	r
Seventh grade	59	.62*
Eighth grade	30	.66*
Total	89	.63*

*p < .005.

Perceived Parental Opinion and Student's
Scores on Pretest of Creativity

Several findings indicated support for the hypothesis predicting higher pretest scores of creativity for students with high perceived parental opinion of creativity than for those with medium or low perceived parental opinion.

Pearson correlation coefficients were computed between each factor on the pretest of creativity, fluency, flexibility, originality and elaboration, the pretest composite score and perceived parental opinion, and self-opinion. Significant correlations were found between perceived parental opinion and fluency, flexibility, originality, and composite scores. The correlation between perceived parental opinion and elaboration approached but did not reach significance. No correlations with

self-opinion reached significance. The correlation coefficients are presented in Table 9.

Table 9. Correlations for self-opinion and for perceived parental opinion and for composite and factor scores on pretest of creativity (N = 89).

Pretest Scores	Perceived Parental Opinion	Self-Opinion
Composite	.31**	.12
Fluency	.29**	.11
Flexibility	.30**	.11
Originality	.31**	.11
Elaboration	.18*	.12

*p < .10.

**p < .005.

Multiple regression analyses resulted in positive coefficients of regression for perceived parental opinion. These analyses were significant for the total and seventh grade samples but not for the eighth grade sample. Results are presented in Table 10.

In order to analyze the data further, students were divided into three nearly equal groups based upon scores of perceived parental opinion. Group 1 was composed of the students scoring in the lower third of all perceived

Table 10. Multiple regression analysis for perceived parental opinion.

Sample	Coefficient of Regression, β	N	Standard Error of β	F
7th grade	2.06	59	.68	9.14**
8th grade	.17	30	1.37	.15
Total	1.62	89	.62	6.80*

* $p < .01$.

** $p < .005$.

parental opinion scores. Group 2 included the middle third and Group 3 the upper third.

A two-way analysis of variance was done to determine the relative influence of grade, group, and interaction of grade and group on composite pretest scores. Results of the analysis of variance indicated that grouping by perceived parental opinion made a significant difference in composite pretest scores but that grade and interaction effects were not significant. Results of the analysis of variance are presented in Table 11.

Inspection of the differences between means of the subgroups (Table 12) indicated that the differences were in the direction predicted. Analysis of the differences by the test of least significant difference indicated that the

Table 11. Two-way analysis of variance of differences in composite creativity pretest scores (N = 92).

Source of Variation	Sums of Squares	df	Mean Square	F
Main effects				
Grade	1839.40	1	1830.40	1.66
Group	9291.47	2	4645.74	4.19*
Interaction (Grade x Group)	2915.28	2	1457.64	1.31
Residual	95417.76	86	1109.51	
Total	109463.90	91	1202.90	

*p < .05.

Table 12. Differences between means of subgroups on pretest of creativity.

	Mean Difference
High PPO Group - Low PPO Group	25.2*
High PPO Group - Medium PPO Group	7.7
Medium PPO Group - Low PPO Group	17.5*

*p < .05.

differences between high and low perceived parental opinion groups and between medium and low perceived parental opinion groups were significant. The difference between high and medium perceived parental opinion groups was not significant. The results of the analysis are presented in Table 12.

A multimariate analysis of variance was done to test the relative influence of grade, group, and interaction effects upon each factor in the pretest. Results indicated that there were no significant differences attributable to grade or interaction effects but that scores on flexibility and originality were significantly influenced by perceived parental opinion group. Results of the analysis by group are presented in Table 13.

Table 13. Multivariate analysis of variance of differences in four factors in pretest of creativity attributed to effect of perceived parental opinion group (N = 89).

Factor	F
Fluency	2.39
Flexibility	3.39*
Originality	4.08*
Elaboration	.98

*p < .05.

Several multivariate regression analyses using perceived parental opinion tested for the degree of association between perceived parental opinion and each factor in the pretest and the contribution of each factor in accounting for the association. For analyses using the total and seventh grade samples, significant values of F were found for fluency, flexibility, and originality but not for elaboration when analyzed separately. The value of F when factors were analyzed as a group was not significant. For the eighth grade sample, no significant values of F resulted. Results of the multivariate regression analyses are presented in Tables 14 and 15 for total and seventh grade samples.

Table 14. Multivariate regression analysis using perceived parental opinion and factors in the pretest of creativity, total sample (N = 89).

Factor	F
Fluency	6.16*
Flexibility	6.75**
Originality	7.35**
Elaboration	1.78

*p < .05.

**p < .01.

Table 15. Multivariate regression analysis using perceived parental opinion and factors in the pretest of creativity, seventh grade sample (N = 59).

Factor	F
Fluency	8.35*
Flexibility	8.61*
Originality	9.20*
Elaboration	2.51

*p < .01.

Inspection of Tables 14 and 15 reveals that all variables indicating significant contribution to the association between perceived parental opinion and pretest scores were scores composed mainly of the verbal tasks of the test. The elaboration score, on the other hand, was based entirely upon the single figural task. Correlation coefficients between fluency, flexibility, originality, and elaboration indicated that elaboration scores were not as closely correlated to verbal scores as verbal scores were to each other. Correlations are compared in Tables 16 and 17.

Results summarized in Tables 9 through 17 provided a basis for accepting Hypothesis 2 for the total and seventh grade samples but not for the eighth grade sample. Students with high scores of perceived parental opinion did tend to

Table 16. Correlations for four factors on pretest of creativity, total sample (N = 89).

Pretest Factors	Correlation Coefficients			
	Fluency	Flexibility	Originality	Elaboration
Fluency	1.00			
Flexibility	.83	1.00		
Originality	.86	.80	1.00	
Elaboration	.48	.63	.50	1.00

Table 17. Correlations for four factors on pretest of creativity, seventh grade sample (N = 59).

Pretest Factors	Correlation Coefficients			
	Fluency	Flexibility	Originality	Elaboration
Fluency	1.00			
Flexibility	.83	1.00		
Originality	.83	.79	1.00	
Elaboration	.42	.57	.46	1.00

score higher on the pretest of creative ability. More specifically, higher scores of perceived parental opinion indicated higher scores for the factors of fluency, flexibility, and originality but not for elaboration.

Perceived Parental Opinion and Student's Scores on Posttest of Creativity

Analyses of data for Hypothesis 3 were similar to those used for Hypothesis 2 except that posttest scores were used. Results indicated limited support for the hypothesis which predicted higher posttest scores for students with high perceived parental opinions than for those with medium or low perceived parental opinion.

Pearson correlation coefficients were computed between each factor in the posttest and the composite posttest score and perceived parental opinion and self-opinion. None of the correlations approached significance.

Multiple regression analyses for total, seventh grade, and eighth grade samples yielded significant findings for the seventh grade sample only. Results of this analysis are presented in Table 18.

A two-way analysis of variance using composite posttest scores was done to test the relative influence of grade, perceived parental opinion group and interaction effect. Only the interaction effect reached significance. Results are presented in Table 19.

Table 18. Multiple regression analysis for perceived parental opinion, seventh grade sample (N = 59).

Sample	Coefficient of Regression, β	Standard Error of β	F
7th grade	1.56	.66	5.51*

*p < .05.

Table 19. Two-way analysis of variance of differences in composite creativity posttest scores (N = 89).

Source of Variation	Sums of Squares	df	Mean Square	F
Main effects				
Grade	689.01	1	689.01	.62
Group	1691.35	2	845.68	.76
Interaction (Grade x Group)	8713.53	2	4356.77	3.89*
Residual	93017.23	83	1120.69	
Total	104111.13	88	1183.08	

*p < .05.

In order to understand the nature of the interaction effect, the means of the six cells and the differences between all combinations of the six cells were compared. Comparison indicated that grouping by perceived parental opinion accounted for differences in posttest scores for the seventh grade sample in the direction hypothesized. For the eighth grade sample, grouping by perceived parental opinion resulted in differences in scores in a nearly opposite direction. A test of the least significant difference determined that the two highest scoring subgroups (seventh grade high perceived parental opinion group and eighth grade low perceived parental opinion group) differed significantly from the two lowest scoring subgroups (seventh grade low perceived parental opinion group and eighth grade medium perceived parental opinion group). Cell means and results of the analysis of differences are presented in Table 20.

Table 20. Comparison of means of composite creativity posttest.

Grade	Perceived Parental Opinion Group		
	Low	Medium	High
7th	190.7	203.8	214.5
8th	217.5	186.6	192.8

Similarly a multivariate analysis of variance using the separate scores for each of the four factors on the posttest indicated no significant difference by grade or perceived parental opinion group, but for two factors significant differences were accounted for by the interaction of grade and group. These factors were fluency and originality. For another factor, flexibility, significance was approached. Table 21 presents the findings.

Table 21. Multivariate analysis of variance of differences in four factors in posttest of creativity attributed to interaction effect (N = 89).

Factor	F
Fluency	4.91**
Flexibility	2.85
Originality	4.23*
Elaboration	.66

*p < .05.

**p < .01.

Multivariate regression analyses with perceived parental opinion showed no significant association between factors on the posttest of creativity and perceived parental opinion for the total and eighth grade samples. For the seventh grade sample, however, significant contributions

were made by fluency, flexibility, and originality scores. Examination of Table 22 demonstrates the difference in contribution made by those scores based on verbal tasks and the score for elaboration for which figural tasks are required.

Table 22. Multivariate regression analysis using perceived parental opinion and four factors in posttest of creativity, seventh grade sample (N = 59).

Factor	F
Fluency	5.21*
Flexibility	4.75*
Originality	5.12*
Elaboration	1.94

*p < .05.

Comparison of correlations between each combination of the four factors showed that verbal factors were much more highly correlated with each other than with the figural factor. Table 23 presents the comparison of correlation coefficients.

In summary, the ability to predict posttest scores of creative thinking from perceived parental opinion was limited in several ways. The influence of perceived parental opinion on posttest scores was supported for the

Table 23. Correlations for four factors in posttest of creativity, seventh grade sample (N = 59).

Posttest Factors	Correlation Coefficients			
	Fluency	Flexibility	Originality	Elaboration
Fluency	1.00			
Flexibility	.81	1.00		
Originality	.87	.84	1.00	
Elaboration	.41	.52	.44	1.00

seventh grade sample only. In fact, for the eighth grade sample, posttest scores and perceived parental opinion interacted in a curvilinear relationship. Lowest scores on the posttest were associated with eighth graders having medium perceived parental opinion. Eighth graders having low perceived parental opinion scored highest of all groups on the posttest. In addition, the elaboration factor of the posttest was not associated with perceived parental opinion for any portion of the sample. Hypothesis 3 was accepted for the seventh grade portion of the sample only, and with the exclusion of the elaboration factor.

Perceived Parental Opinion and Student's
Gains in Creative Thinking

The hypothesis which predicted greater gains for students with high perceived parental opinion than for

students with medium and low perceived parental opinion was not supported by the findings. Instead, the results indicated a nearly opposite trend. Although not highly significant, some analyses indicated that students with low perceived parental opinions made greater gains than those of medium and high perceived parental opinions.

Pearson correlation coefficients between gain in each factor and composite gain and self-opinion and perceived parental opinion were significant in one case but approached significance in three others. All coefficients were negative. Correlation coefficients are presented in Table 24 for comparison.

Table 24. Correlations for self-opinion and for perceived parental opinion and for composite and factor gains in creativity (N = 89).

Gain Scores	Perceived Parental Opinion	Self-Opinion
Composite	-.20*	-.14*
Fluency	-.17	-.11
Flexibility	-.20*	-.18*
Originality	-.21**	-.11
Elaboration	-.07	-.08

*p < .10.

**p < .05.

Multiple regression analyses for total, seventh, and eighth grade samples yielded no significant findings. In the total and eighth grade samples in which the coefficient of regression β approached significance, the value of β was negative ($\beta = -1.12$, significant at .065 level; $\beta = -2.66$, significant at .09 level, respectively).

Two-way analysis of variance of the differences in composite gain showed no significant findings for any portion of the sample. The multivariate analysis of variance yielded only one significant finding. Gain in flexibility was found to be related to grade ($F = 5.80$, significant at .01 level) but not to group or interaction effect. Examination of the mean gain in flexibility for each grade (1.66 for seventh grade and -3.27 for eighth) showed only a slight gain for seventh grade and a decline for eighth grade.

Multivariate regression analysis, testing the contribution of gain in each factor, showed no significant association between gain and perceived parental opinion.

In summary, results of most analyses showed no significant findings relating high perceived parental opinion to high gain in creativity. Some tests indicated that the opposite relationship was more nearly true. On the basis of these findings, Hypothesis 4 was rejected.

Findings from Parent Opinion Test

In scoring the Parent Opinion Test, tallies were made of the number of responses in each of these situations: Situation I, Creative Behavior Encouraged by Parent; Situation II, Uncreative Behavior Encouraged by Parent; Situation III, Creative Behavior Discouraged by Parent; and Situation IV, Uncreative Behavior Discouraged by Parent. For each student, a configuration of scores resulted. Analyses were done to determine if any general configuration was correlated significantly with either self-opinion or perceived parental opinion.

Correlation coefficients were computed using self-opinion and each situation and using perceived parental opinion and each situation. All correlations were computed for the total sample and for each grade.

Several correlations were found to be significant. Self-opinion correlated significantly with Situation I, Creative Behavior Encouraged by Parent, for the eighth grade sample. Correlations of self-opinion and Situation II, Uncreative Behavior Encouraged by Parent, were significant and negative for eighth grade and total samples but only approached significance for the seventh grade sample. Perceived parental opinion and Situation III, Creative Behavior Discouraged by Parent, correlated significantly for the eighth grade sample. Correlations are presented in Table 25.

Table 25. Correlations of perceived parental opinion and of self-opinion with Situations I, II, III, and IV.

Situation	Grade Level	Perceived Parental Opinion	Self-Opinion
Situation I	7th	-.15	.03
Creative Behavior	8th	.01	.42*
Encouraged by Parent	7th and 8th	-.11	.12
Situation II	7th	.03	-.18
Uncreative Behavior	8th	-.21	-.41*
Encouraged by Parent	7th and 8th	-.04	-.22*
Situation III	7th	.04	.06
Creative Behavior	8th	.33*	.10
Discouraged by Parent	7th and 8th	.11	.04
Situation IV	7th	.05	.05
Uncreative Behavior	8th	-.21	-.07
Discouraged by Parent	7th and 8th	-.08	.04

*p < .05.

Further analysis was done using all combinations of two situations. Taken in pairs, the situation combinations were conceived to indicate the kind of environment for creativity perceived by the student. Combining numbers of responses in Situations I and II, Creative Behavior Encouraged by Parent and Uncreative Behavior Encouraged by Parent, indicated the child's perception of general approval by the parent independent of the creativeness of the child's behavior. Conversely, combining Situations III and IV, Creative Behavior Discouraged by Parent and Uncreative Behavior Discouraged by Parent, signified a child's perception of general disapproval. Numbers of responses in Situations I and III, Creative Behavior Encouraged by Parent and Creative Behavior Discouraged by Parent pointed to the child's disposition to choose creative behavior regardless of the kind of parental response. Combining responses in Situations II and IV revealed the child's tendency to select uncreative behavior regardless of parental response. Combining numbers of responses in Situations I and IV and in Situations II and III indicated selective parental responses. Situations I and IV, Creative Behavior Encouraged by Parent and Uncreative Behavior Discouraged by Parent, signified a pattern of parental preference for creative behavior in the child. Situations II and III, Uncreative Behavior Encouraged by Parent and Creative Behavior Discouraged by Parent, indicated a child's

perception of parent's preference for uncreative behavior. Combinations and the environment for creativity associated with each are presented in Table 26.

Table 26. Conceptual environments for creativity indicated by combinations of child's preference and perceptions of parent's reaction to creative behavior.

Combinations of Situations	Environment for Creativity
I & II	Perceived general parental approval
I & III	Child's preference for creative behavior
I & IV	Perceived parental preference for creative behavior
II & III	Perceived parental preference for uncreative behavior
II & IV	Child's preference for uncreative behavior
III & IV	Perceived general parental disapproval

Inspection revealed that Combination I & II was numerically and conceptually opposite to Combination III & IV. Further analysis was not done on Combination III & IV since the result would be just opposite that done on Combination I & II. Similarly Combinations II & III and II & IV were excluded from further analysis.

Correlation coefficients were computed using self-opinion and perceived parental opinion and each remaining

combination. In all cases, correlations were done for total sample and for each grade separately. Two significant correlations resulted and are presented in Table 27.

Table 27. Correlations of perceived parental opinion and of self-opinion with environments for creativity.

Environment for Creativity	Grade Level	Perceived Parental Opinion	Self-Opinion
Perceived General Parental Approval	7th	.01	.14
	8th	-.14	-.02
	7th and 8th	-.03	-.06
Child's Preference for Creative Behavior	7th	.03	.09
	8th	-.48*	.52**
	7th and 8th	-.16	.12
Perceived Parental Preference for Creative Behavior	7th	-.07	.09
	8th	-.03	.33
	7th and 8th	-.05	.18

*p < .01.

**p < .005.

Results in Tables 25 and 27 indicated several important associations for the eighth grade sample. Self-opinion was positively associated with the student's disposition to select creative behaviors and to reject uncreative behaviors. Perceived parental opinion was associated with creative behavior discouraged by the parent. Perceived parental opinion was negatively associated with the child's preference for creative behavior.

Summary of Findings

The analyses of the data indicated support for the acceptance of some of the hypotheses. A positive relationship was established between perceived parental opinion and self-opinion of creative ability. Further, a positive relationship between perceived parental opinion and scores on the pretest of creativity was established. The relationship between perceived parental opinion and creativity posttest scores and the relationship between perceived parental opinion and gains in creativity were found to be of no significance and in some cases in opposite direction to the relationship hypothesized.

CHAPTER 6

DISCUSSION OF THE RESULTS

The purpose of this study was to test the ability of the concept of perceived parental opinion of creativity to influence self-opinion, creative thinking, and learning to increase creative thinking. The results of the several analyses indicated that perceived parental opinion was closely associated with self-opinion and some aspects of creative thinking but not with learning to increase creative thinking. Results will be discussed in relation to perceived parental opinion and self-opinion, creative thinking, and learning to increase creative thinking.

Perceived Parental Opinion and Self-Opinion

The results supported the acceptance of the first hypothesis for the total sample and for the seventh and eighth grades individually. Perceived parental opinion was highly associated with self-opinion.

The finding of a strong relationship between self-opinion and perceived parental opinion could be interpreted as a demonstration of the reliability of the test. Essentially the same test was used to measure both variables. The changes made in the What Kind of Person Are You? Test were changes only in instructions and format. This

interpretation seems unwarranted, however, when the results of testing the other hypotheses are considered.

In testing for a relationship between pretest scores of creativity and perceived parental and self-opinions, it was found that only perceived parental opinion correlated significantly with pretest scores. That self-opinion and perceived parental opinion yielded different correlations with pretest scores of creativity suggested that the variables themselves were measures of different opinions.

One factor the Parent Opinion Test was designed to measure was the disposition of a student to choose creative behaviors. Results of analyzing the Parent Opinion Test data indicated that only self-opinion was correlated significantly and positively with numbers of responses in Situation I, Creative Behavior Encouraged by Parent, and significantly and negatively with numbers of responses in Situation II, Uncreative Behavior Encouraged by Parent. Similarly, only self-opinion correlated significantly and positively with Child's Preference for Creative Behavior (combination of Situations I and III). These significant correlations demonstrated that the Parent Opinion Test was in part another measure of self-opinion of creativity. If the perceived parental opinion test were measuring the same variable as the self-opinion test, similar correlations using perceived parental opinion would have resulted. Because self-opinion and perceived parental opinion were

correlated with differing variables, it was concluded that perceived parental opinion and self-opinion scores were indeed different variables which are closely associated with each other.

Whether or not there is a cause and effect relationship between perceived parental opinion and self-opinion of creativity has not been determined. In light of some theories (Combs and Snygg 1959) about the influence of the parent upon self-concept formation, it seems very possible that a cause and effect relationship may exist.

Perceived Parental Opinion and Creative Thinking

Results of Hypotheses 2 and 3 indicated that perceived parental opinion was associated with demonstrations of creative thinking in varying degrees. A change in the relationship may have occurred between the pretest and posttest.

In several analyses, a relationship between perceived parental opinion and creative thinking as measured on the pretest was noted. The multivariate regression analysis and multivariate analysis of variance both indicated that the relationship was significant for all factors except elaboration. Multiple regression and multivariate regression analysis further restricted the relationship by the fact that the findings were not significant for the eighth grade sample considered by itself. The two-way

analysis of variance and the multivariate analysis of variance, however, both showed no significant difference by grade. Whether or not the relationship between perceived parental opinion and creative thinking pretest scores is significant for the eighth grade sample is questionable. There does appear to be a significant relationship for the total and seventh grade samples.

Creative thinking as measured on the posttest appeared not to be associated with perceived parental opinion except for the seventh grade on the fluency, flexibility, and originality factors. Since the same variables were measured by both pretest and posttest, the change in the degree of association with perceived parental opinions probably related to a change which occurred between administrations of the two tests of creative thinking.

One explanation for the decrease in the degree of association between perceived parental opinion and creative thinking may be found in the sample. On Table 1, it was noted that six students were eliminated from the invited sample because they were unwilling to complete the tests. Five of the six students were eighth graders. During the posttest, the researcher noticed a severe lack of motivation in the eighth grade classes probably due in part to the nearness of the posttest date to the end of the school year. The five eighth graders who were unwilling to complete the test may have been an indication of other eighth graders

whose motivation was high enough to complete the test but not high enough to perform well. Torrance (1974a) noted the extreme importance of high motivation in the test of creativity. The seventh grade sample exhibited a more sustained level of motivation. The fact that an association between creative thinking and perceived parental opinion remained for the seventh grade sample, but declined for the eighth grade sample, may be attributed to a decline in motivation for the eighth graders.

Another explanation may be hypothesized about the influence of the instruction in creative thinking. Since one important occurrence between administrations of pre- and posttests was the six-hour unit of instruction, a decline in association between perceived parental opinion and creative thinking may be attributed to the instruction. The results indicated perceived parental opinion declined in influence on creative thinking. Perhaps, as more experiences in creative thinking were brought into the class setting, perceived teacher opinion or perceived peer opinion became more important than perceived parental opinion. The importance of teacher perceptions of a student's creative ability on the student's actual creative behavior was noted by Rosenthal et al. (1974). Study of perceived teacher and peer opinions was beyond the scope of this research.

Rejection of parental opinion may be another explanation for the decline in the relationship between perceived parental opinion and creative thinking. Findings from the Parent Opinion Test indicated that for the eighth grade sample Child's Preference for Creative Behavior, combination of Situations I and III, was positively correlated with self-opinion but negatively correlated with perceived parental opinion. Both correlations were significant ($p < .01$). Perceived parental opinion was also significantly ($p < .05$) correlated with Situation III (creative behavior discouraged by parent). Perhaps the eighth grade sample rejected parental opinion as influencing their own behavior. Combs and Snygg (1959) noted that when discrepancies between self-opinion and parent's perceptions occurred, the difference was resolved by raising or lowering level of aspiration or level of achievement. As students experienced success or failure in creative behavior in class, self-opinions may have changed. Posttest scores may have reflected behavior based upon changed self-opinions or changed levels of achievement.

The researcher has accepted both the first and third explanations operating simultaneously. The second explanation seems possible but was unsupported by data.

Perceived Parental Opinion and Learning to
Increase Creative Thinking

The fourth hypothesis predicting a positive relationship between perceived parental opinion and gains made in creative thinking test scores was rejected. Although few findings reached significance, many findings indicated a trend toward a negative relationship.

In order to understand the findings, the second and third explanations above may be presented again. The second explanation suggested the possibility that perceived teacher or peer opinions may be operating. No data exist to support this explanation. In the third explanation, rejection of parental opinion was suggested. This explanation is supported by some findings from the Parent Opinion Test. The researcher has accepted this explanation.

CHAPTER 7

CONCLUSIONS AND IMPLICATIONS

The findings of this study indicated that for this sample perceived parental opinion was an important variable influencing self-opinion and creative thinking. In some cases, perceived parental opinion appeared to be a more important variable than self-opinion in influencing creative thinking. On the other hand, perceived parental opinion proved to be a poor indicator of the gains students made in creative thinking.

The hypotheses for this research were based upon the theory that self-opinion is influenced by perceived opinions of other persons important in a child's life. Although the parent is certainly an important person in the life of most children, during adolescence many other persons may rise to equal or greater importance. The influence of persons other than the parent in creative self-concept formation in adolescents needs exploration.

As experiences in creative behavior occur in the classroom, the persons available to give immediate feedback about creative ability are the teacher and other students. A study in which self-opinion and perceived parent, teacher, and peer opinion were measured repeatedly at intervals

throughout the study would yield some information about how influences upon creative behavior change over time. Such a study would need to span a greater time than did this study to allow for repeated measures spaced far enough apart so that students are not constantly taking tests.

Some information about the importance of creative self-opinion on creative thinking resulted from this research. It appeared that over the period of nine weeks, creative self-opinion increased in significance as an indicator of creative thinking. The direction of the influence, however, was negative at the end of the research period. Since creative self-opinion was not the main focal point of this research, further analyses with creative self-opinion were not done. Future research about the importance of creative self-opinion on creative thinking and about the relative strengths of creative self-opinion and perceived opinions of others could provide new understanding about conditions that foster creative behavior.

Another factor that needs examination is the role age plays in the importance of perceived parental opinion. At a younger age, perceived parental opinion may be highly important while older subjects may be influenced minimally by it. A longitudinal study beginning at age seven and continuing to age 15 would demonstrate changes that might occur in early adolescence and that might occur during the fourth and seventh grade slumps in creativity.

The results of this study have serious implications for parents and teachers. If parents value creativity and wish to develop it in their children, encouragement of a nature that fosters a positive self-concept should be provided. Not only does the parent need to perceive the child as creative, he also needs to be sure that the child perceives the parent's opinion as positive. Teachers must realize that perceived parental opinion is an important factor influencing self-concept and creative behavior. In attempts to increase creativity, some parent education may be necessary. As another option to increasing creativity, teachers may need to engage other means of influencing self-concept.

As more and more research data on the factors influencing creativity become available, teachers and parents will know better how to foster it in their students and children. In addition, teachers and parents will need to develop new skills to foster creativity and to improve their own creative abilities. Perhaps this last requirement is not so difficult to achieve. "One of the best ways to cultivate our own creativity is to help children cultivate theirs" (Gowan et al. 1967, p. viii).

APPENDIX A

TEST OF IMAGINATION FORM A

The test you will be taking in the next 40 minutes is called a test of imagination. It is a test of your ability to think creatively. This ability to think creatively is more important in school success and in everyday living than people used to think. We hope you will enjoy this test. It will not influence your grade. There are no right or wrong answers. It is important, however, that you give your most imaginative, inventive, and clever ideas. You will be given several tasks and timed on each. Once time has been called on one task, do not go back to that page again. Use your time well and work as rapidly as you can with comfort.

If you do not wish to answer any question, please feel free to leave it blank.

Task 1

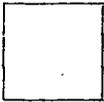
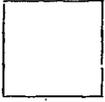
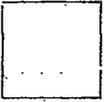
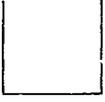
Now, think of an ordinary pair of jeans. On this sheet of paper, list the most interesting, clever, and unusual ways you can think of for changing a pair of jeans to make them more fun to wear. You will have eight minutes to write down as many ideas as you can.

Task 2

On this page, list the most unusual, interesting, and clever ideas you can think of for using a ball of yarn. The yarn can be any color, kind, or size. You can use as many colors or kinds of yarn as you like and as much as you like. You will have five minutes to write down as many ideas as you can think of.

Task 3

In the next ten minutes, you are going to see how many drawings you can make using a square as the main part. Use just a few lines to make each sketch. You may place lines inside or outside the square or both inside and outside. If you don't think we will know that object you have drawn, label it.

The remainder of the test is called the Ask-and-Guess Test. This part will tell us something about how well you can use your curiosity about the world and how well you can guess at possible causes and consequences of events. You will be shown a picture and asked to use your imagination to answer questions about the picture.

Task 4

On this sheet of paper, write down all the questions you can think of about the things you see in the picture. Ask questions about any and all parts of the picture and about what you see happening in the picture. Ask only questions which cannot be answered just by looking at the picture. Work as rapidly as you can for the next five minutes.



Task 5

On this page, list as many possible things as you can think of which might have caused or led up to the action shown in this picture. You will have five minutes to write down as many possible causes as you can.

Task 6

On this page, list as many possible consequences as you can of what might happen next in the picture. Think of both immediate and future consequences. What is going to follow the action shown in the picture? Work as hard as you can for the next five minutes.

APPENDIX B

TEST OF IMAGINATION FORM B

The test you will be taking in the next 40 minutes is called a test of imagination. It is a test of your ability to think creatively. This ability to think creatively is more important in school success and in everyday living than people used to think. We hope you will enjoy this test. It will not influence your grade. There are no right or wrong answers. It is important, however, that you give your most imaginative, inventive, and clever ideas. You will be given several tasks and timed on each. Once time has been called on one task, do not go back to that page again. Use your time well and work as rapidly as you can with comfort.

If you do not wish to answer any question, please feel free to leave it blank.

Task 1

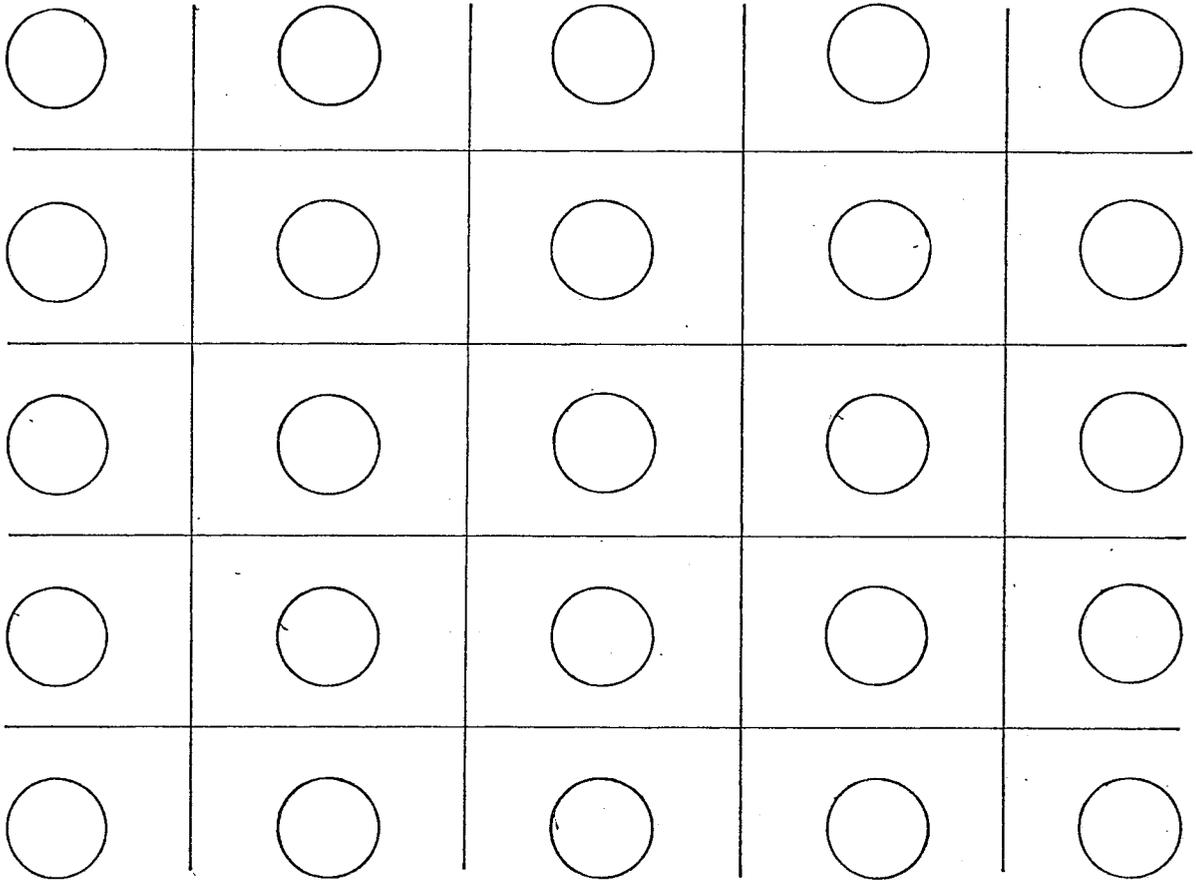
Now, think of an ordinary T-shirt. On this sheet of paper, list the most interesting, clever, and unusual ways you can think of for changing a T-shirt to make it more fun to wear. You will have eight minutes to write down as many ideas as you can.

Task 2

On this page, list the most unusual, interesting, and clever ideas you can think of for using a piece of fabric. The fabric can be any color, kind, or size of fabric and you can use as many colors, kinds, and pieces of fabric as you like. You will have five minutes to write down as many ideas as you can think of.

Task 3

In the next ten minutes, you are going to see how many drawings you can make using a circle as the main part. Use just a few lines to make each sketch. You may place lines inside or outside the circle or both inside and outside. If you don't think we will know what object you have drawn, label it.



The remainder of the test is called the Ask-and-Guess Test. This part will tell us something about how well you can use your curiosity about the world and how well you can guess at possible causes and consequences of events. You will be shown a picture and asked to use your imagination to answer questions about the picture.

Task 4

On this sheet of paper, write down all the questions you can think of about the things you see in the picture. Ask questions about any and all parts of the picture and about what you see happening in the picture. Ask only questions which cannot be answered just by looking at the picture. Work as rapidly as you can for the next five minutes.



Task 5

On this page, list as many possible things as you can think of which might have caused or led up to the action shown in this picture. You will have five minutes to write down as many possible causes as you can.

Task 6

On this page, list as many possible consequences as you can of what might happen next in the picture. Think of both immediate and future consequences. What is going to follow the action shown in the picture. Work as hard as you can for the next five minutes.

APPENDIX C

WHAT KIND OF PERSON ARE YOU? TEST^a

Below is a list of characteristics frequently used in talking about people. Indicate by circling either a or b the one term of each pair that best describes you. Remember, even if neither term describes you exactly, select the one term of each pair which is nearest to being a description of yourself. Please feel free to leave blank any test item you would prefer not to answer.

1. a. Likes to work alone
b. Prefers to work in a group
2. a. Industrious (hard working)
b. Neat and orderly
3. a. Socially well-adjusted
b. Occasionally regresses and is playful and childlike
4. a. Persistent (keeps trying)
b. Does work on time
5. a. Popular, well-liked
b. Truthful, even when it gets you into trouble
6. a. Considerate of others
b. Courageous in convictions (standing up for beliefs)
7. a. Conforming (going along with others)
b. Nonconforming (not going along with others)
8. a. Sophisticated (worldly, artificial)
b. Unsophisticated (simple, natural)
9. a. Sense of humor
b. Talkative
10. a. Visionary (idealistic, dreamer)
b. Versatile (many-sided)

^aDeveloped by E. Paul Torrance, University of Minnesota, 1963 (in Torrance and Khatena 1970).

11. a. Adventurous
b. Does work on time
12. a. Becomes absorbed in tasks
b. Courteous
13. a. Curious
b. Energetic
14. a. Attempts difficult tasks
b. Desires to excel (wants to do well)
15. a. Disturbs existing organization and procedures (rocks the boat)
b. Accepts the judgments of authorities
16. a. A good guesser
b. Remembers well
17. a. Quiet
b. Obedient
18. a. Independent in judgment
b. Considerate of others
19. a. Critical of others
b. Courteous
20. a. Feels strong emotions
b. Reserved (quiet)
21. a. Emotionally sensitive (touchy about feelings)
b. Socially well-adjusted (gets along well with others)
22. a. Imaginative
b. Critical
23. a. Receptive to ideas of others (open to ideas of others)
b. Negativistic (unwilling to think of the good)
24. a. Fault-finding
b. Popular, well liked
25. a. Determination (not giving up)
b. Obedient
26. a. Intuitive (understanding without reasoning)
b. Thorough (complete)

27. a. Never bored
b. Refined (not gross or crude)
28. a. Haughty (conceited)
b. Courteous
29. a. Cautious (careful)
b. Willing to take risks
30. a. Affectionate (loving)
b. Courteous
31. a. Always asking questions
b. Quiet
32. a. Competitive (trying to win)
b. Conforming
33. a. Energetic
b. Neat and orderly
34. a. Remembers well
b. Talkative
35. a. Self-assertive (declaring one's rights over others)
b. Reserved
36. a. Sense of beauty
b. Socially well-adjusted
37. a. Self-confident (sure of oneself)
b. Timid (shy, bashful)
38. a. Versatile (many-sided)
b. Popular, well-liked
39. a. Self-sufficient (not needing other people)
b. Curious
40. a. Thorough (complete)
b. Does work on time
41. a. Eccentric (unusual)
b. Socially well-adjusted
42. a. Self-confident (sure of oneself)
b. Spirited in disagreement (lively in arguments)
43. a. Spirited in disagreement (lively in arguments)
b. Talkative

- 44. a. Prefers complex tasks
b. Does work on time
- 45. a. A good guesser
b. Receptive to ideas of others (open)
- 46. a. Curious
b. Self-confident (sure of oneself)
- 47. a. A self-starter (begins on one's own)
b. Obedient
- 48. a. Intuitive (understands without reasoning)
b. Remembers well
- 49. a. Unwilling to accept things on mere say-so
b. Obedient
- 50. a. Altruistic (working for good of others)
b. Courteous

APPENDIX D

WHAT KIND OF PERSON DOES YOUR PARENT THINK YOU ARE? TEST^a

Below is a list of characteristics frequently used to describe people. How would your parent describe you? Indicate by circling either a or b the one term of each pair that your parent would use to describe you. Remember, even if neither term is exactly as your parent would describe you, select the one term of each pair which your parent would choose as nearest to describing you. Please feel free to leave blank any test item you would prefer not to answer.

- | | |
|--|--|
| 1. a. Obedient | b. Quiet |
| 2. a. Fault-finding | b. Popular, well-liked |
| 3. a. Prefers to work in a group | b. Likes to work alone |
| 4. a. Attempts difficult tasks | b. Desires to excel (wants to do well) |
| 5. a. Socially well-adjusted (gets along well with others) | b. Emotionally sensitive (touchy about feelings) |
| 6. a. Remembers well | b. Talkative |
| 7. a. Neat and orderly | b. Energetic |
| 8. a. Independent in judgment | b. Considerate of others |
| 9. a. Conforming (going along with others) | b. Competitive (trying to win) |
| 10. a. Prefers complex tasks | b. Does work on time |
| 11. a. Thorough (complete) | b. Intuitive (understanding without reasoning) |

^aDeveloped by E. Paul Torrance, University of Minnesota, 1963 (in Torrance and Khatena 1970).

- | | |
|---|--|
| 12. a. Sophisticated (worldly, artificial) | b. Unsophisticated (simple, natural) |
| 13. a. Remembers well | b. A good guesser |
| 14. a. Curious | b. Energetic |
| 15. a. Courteous | b. Haughty (conceited) |
| 16. a. Adventurous | b. Does work on time |
| 17. a. Courteous | b. Becomes absorbed in tasks |
| 18. a. Sense of humor | b. Talkative |
| 19. a. Refined (not gross or crude) | b. Never bored |
| 20. a. A self-starter (begins on one's own) | b. Obedient |
| 21. a. Courteous | b. Altruistic (working for good of others) |
| 22. a. Industrious (hard working) | b. Neat and orderly |
| 23. a. Does work on time | b. Persistent (keeps trying) |
| 24. a. Receptive to ideas of others (open to ideas of others) | b. Negativistic (unwilling to think of the good) |
| 25. a. Spirited in disagreement (lively in arguments) | b. Self-confident (sure of oneself) |
| 26. a. Always asking questions | b. Quiet |
| 27. a. Courageous in convictions (standing up for beliefs) | b. Considerate of others |
| 28. a. Critical of others | b. Courteous |
| 29. a. Obedient | b. Determination (not giving up) |

- | | |
|--|---|
| 30. a. Socially well-adjusted | b. Occasionally regresses and is playful and childlike |
| 31. a. Versatile (many-sided) | b. Visionary (idealistic, dreamer) |
| 32. a. Affectionate (loving) | b. Courteous |
| 33. a. Remembers well | b. Intuitive (understands without reasoning) |
| 34. a. Feels strong emotions | b. Reserved (quiet) |
| 35. a. Nonconforming (not going along with others) | b. Conforming (going along with others) |
| 36. a. Popular, well-liked | b. Truthful, even when it gets you into trouble |
| 37. a. Accepts the judgments of authorities | b. Disturbs existing organization and procedures (rocks the boat) |
| 38. a. Thorough (complete) | b. Does work on time |
| 39. a. Socially well-adjusted | b. Eccentric (unusual) |
| 40. a. Self-confident (sure of oneself) | b. Timid (shy, bashful) |
| 41. a. Talkative | b. Spirited in disagreement (lively in arguments) |
| 42. a. Imaginative | b. Critical |
| 43. a. Self-confident (sure of oneself) | b. Curious |
| 44. a. A good guesser | b. Receptive to ideas of others (open to ideas of others) |
| 45. a. Cautious (careful) | b. Willing to take risks |
| 46. a. Popular, well-liked | b. Versatile (many-sided) |

47. a. Self-sufficient (not
needing other people) b. Curious
48. a. Socially well-adjusted b. Sense of beauty
49. a. Unwilling to accept
things on mere say-so b. Obedient
50. a. Reserved b. Self-assertive
(declaring one's rights
over others)

APPENDIX E

PARENT OPINION TEST

Read each situation carefully. Then circle the letter to indicate the response that is most likely to occur. You will first need to decide in the first part of the answer what your own reaction will be. Then decide from the second part of the answer what your parent's reaction will be. The most important part of the answer is the response of your parent.

Please feel free to leave blank any questions you would rather not answer.

1. You have found a clock that isn't working properly.
 - A. You suggest that you could take it apart and see what's wrong. Your parent thinks that is a good idea and offers to help.
 - B. You suggest that you could take it apart and see what's wrong, but your parent thinks you ought to just throw it away.
 - C. You suggest that you throw the clock away and buy a new one. Your parent thinks that is the best choice.
 - D. You suggest that you throw the clock away and buy a new one, but your parent thinks you ought to at least try to fix it.

2. You have learned about a contest for writing the silliest story about men from outer space.
 - A. You don't believe you could write a very silly story and neither does your parent.
 - B. You don't believe you could write a very silly story, but your parent thinks you could and suggests that you give it a try.
 - C. You decide to enter the contest and your parent thinks you have a good chance of winning.
 - D. You decide to enter the contest, but your parent thinks you don't have a chance of winning.

3. In an emergency, you are asked to take care of five children. You learn that there are no toys for the children.
 - A. You say "no" and your parent agrees that you wouldn't be able to entertain them with no toys.
 - B. You say "no," but your parent says that you could have found ways to entertain the children.
 - C. You accept the job, but your parent thinks you'll have a lot of trouble entertaining five children with no toys.
 - D. You accept the job and your parent agrees that you will be able to think of many ideas to entertain the children.

4. You are out shopping for some new clothes. You have found two outfits you really like that cost the same. One outfit is quite unusual, the other very much like clothes your friends wear.
 - A. You select the unusual outfit, but your parent thinks you should be concerned about what others will think.
 - B. You select the unusual outfit and your parent praises you for being willing to be different.
 - C. You select the clothes like your friends wear, and your parent thinks you made the best choice.
 - D. You select the clothes like your friends wear but your parent thinks you are afraid to be different.

5. You are given a math problem to work on at home.
 - A. You are bored with the old way of solving the problem and try to work out a new way to solve it. Your parent thinks you are wasting your time, if you already know one way to solve it.
 - B. You are bored with the old way of solving the problem and try to work out a new way to solve it. Your parent praises your work.
 - C. You know one way to solve the problem and you use it. Your parent praises your work.
 - D. You know one way to solve the problem and you use it, but your parent encourages you to find new ways to solve it also.

6. You are planning to sew a shirt with pockets, but you aren't sure you like the pockets on the pattern drawing.
 - A. You think you ought to leave the pockets the way they are in the pattern, but your parent thinks you could come up with better pockets on your own.
 - B. You think you ought to leave the pockets the way they are in the pattern, and your parent thinks your decision is a good one.
 - C. You experiment with different pocket shapes and your parent praises your new ideas.
 - D. You experiment with different pocket shapes, but your parent thinks your ideas won't look as good as the pattern drawing.

7. You have just finished a drawing, but it looks just as nice upside down, right side up, or on its side.
 - A. You suggest that if you put a title at the bottom, people will know which way it should be. Your parent agrees.
 - B. You suggest that if you put a title at the bottom, people will know which side goes down, but your parent suggests that it might be more fun to make people wonder.
 - C. You decide against adding a title at the bottom. Your parent says it would be better to add a title.
 - D. You decide against adding a title at the bottom. Your parent agrees that it's fun to make people wonder.

8. You have just bought a new sewing machine.
 - A. You decide you will play around with the machine rather than reading the instruction booklet. Your parent insists you read the instructions first.
 - B. You decide you will play around with the machine rather than reading the instructions. Your parent agrees this will be a fun way to learn about the machine.
 - C. You decide to read the instruction booklet to learn about what the machine can do. Your parent agrees this is the best way.
 - D. You decide to read the instruction booklet to learn about what the machine can do. Your parent suggests that trying the machine out might be a more fun way to learn.

9. There is an art class being offered at a nearby park.
- A. You decide not to take the art class because you are not very talented. Your parent agrees.
 - B. You decide not to take the art class because you are not very talented. Your parent says you are more talented than you think.
 - C. You decide to take the art class because you are pretty talented, but your parent thinks you are not very talented.
 - D. You decide to take the art class because you are pretty talented. Your parent agrees that you are talented.
10. You are going to decorate a birthday cake for a member of your family.
- A. You decide to make up your own design for the cake and your parent thinks your own idea is a good one.
 - B. You decide to make up your own design, but your parent thinks you would do better to copy a design from a book.
 - C. You decide to copy a design you saw in a book, but your parent thinks you could make up a better design on your own.
 - D. You decide to copy a design you saw in a book and your parent thinks that is a good idea.
11. You hear on TV that if you take vitamin A pills every day, you will not have an acne or pimple problem.
- A. You go to the store to buy some vitamin A pills, but your parent thinks you are too quick to believe what you hear on TV.
 - B. You go to the store to buy some vitamin A pills and your parent thinks that is certainly a good idea.
 - C. You suggest that you will call your doctor to see if the story is true. Your parent suggests you also read about vitamin A.
 - D. You suggest that you will call your doctor to see if the story is true. Your parent thinks if it was allowed to be on TV, it must be true.
12. Someone has asked you to write a song about the beautiful voice of a bullfrog.
- A. You tell the person you don't like spending your time on ridiculous things. Your parent agrees with your decision.

- B. You tell the person you don't like spending your time on ridiculous things, but your parent thinks such a song might be fun to write.
 - C. You agree to write the silly song just because it sounds like fun, but your parent thinks it's a waste of your time.
 - D. You agree to write the silly song just because it sounds like fun. Your parent agrees with your decision.
13. You have been asked to buy a list of supplies for a group camping trip.
- A. You accept the job and your parent thinks you'll be a good judge when it comes to shopping.
 - B. You accept the job, but your parent suggests that you will need help knowing the best buys.
 - C. You ask someone else to buy the supplies, but your parent thinks you could have done a good job.
 - D. You ask someone else to buy the supplies and your parent agrees that you might not know the best buys.
14. You and your friends are at your house practicing a skit to be presented to a social studies class. Each person has a script that tells what each character says.
- A. You do your part but add extra lines and actions to it. Your parent later says your additions made the part better.
 - B. You do your part but add extra lines and actions to it. Your parent later says that the part was better without your additions.
 - C. You do your part just as the script is written. Your parent later suggests that you could improve the part by changing some lines.
 - D. You do your part just as the script is written. Your parent later praises your acting.
15. You have just bought your new set of the game Monopoly. After reading the rules, you play a game with your family.
- A. You play exactly as the rules say. Your parent thinks this is the best way.
 - B. You play exactly as the rules say. Your parent suggests that you might be able to think up some new rules to make it more fun.
 - C. You suggest that a new rule be added to make hotel owners pay property tax. Your parent thinks the new rule is a good idea.

- D. You suggest that a new rule be added to make hotel owners pay property tax. Your parent says that the old rules are better.
16. You and your friends are having an argument about whether telling someone the real truth is right or wrong when the truth will hurt the person's feeling.
- A. You agree with both sides of the argument. Your parent disagrees and tells you that only one side can be correct.
- B. You agree with both sides of the argument. Your parent agrees with you that there is no true answer.
- C. You decide to ask your parent. Your parent says there is no true answer and asks you why both sides of the argument can be true.
- D. You decide to ask your parent. Your parent tells you the correct answer.
17. When you were younger, you liked to color with crayons.
- A. You liked blank paper better than coloring books. Your parent agreed that your own drawings were better than those in coloring books.
- B. You liked blank paper better than coloring books, but your parent thought you colored better in a coloring book.
- C. You liked coloring books better than blank paper but your parent thought your own drawings were better than those in coloring books.
- D. You liked coloring books better than blank paper for coloring. Your parent agreed you colored better in a coloring book.
18. A teacher suggests that you might think about becoming a fashion designer.
- A. You think you would be able to design some very unusual fashions but your parent thinks you are not capable of very unusual ideas.
- B. You think you would be able to design some very unusual fashions and your parent agrees.
- C. You think you probably would not be able to design anything very unusual. Your parent agrees.
- D. You think you probably would not be able to design anything very unusual, but your parent thinks you could produce lots of unusual ideas.

19. You are busy working on one of your hobbies. It's time for one of your favorite TV shows. You must choose between the TV show and the hobby.
- A. You put away your hobby and watch the TV show, but your parent wishes you were more interested in your hobbies.
 - B. You put away your hobby and watch the TV show. Your parent agrees with your choice.
 - C. You continue working on the hobby. Your parent is pleased that you are so interested in your hobby.
 - D. You continue working on your hobby, but your parent wishes you would not get so involved in it.
20. You are planning to cook the entire dinner for your family and you want everything to be ready at the same time.
- A. You decide on one hot dish so that you don't have to think of too many things. Your parent thinks this is a good decision.
 - B. You decide on one hot dish so that you don't have to think of too many things, but your parent thinks you could prepare at least two hot dishes.
 - C. You decide on three hot dishes and a salad because you enjoy working on several things at once. Your parent doesn't think you can do it all alone.
 - D. You decide on three hot dishes and a salad because you enjoy working on several things at once. Your parent thinks this is a good decision.

Scoring Key for Parent Opinion Test

Test Item	Situations			
	I	II	III	IV
1	A	C	B	D
2	C	A	D	B
3	D	A	C	B
4	B	C	A	D
5	B	C	A	D
6	C	B	D	A
7	D	A	C	B
8	B	C	A	D
9	D	A	C	B
10	A	D	B	C
11	C	B	D	A
12	D	A	C	B
13	A	D	B	C
14	A	D	B	C
15	C	A	D	B
16	B	D	A	C
17	A	D	B	C
18	B	C	A	D
19	C	B	D	A
20	D	A	C	B

APPENDIX F

IDENTIFICATION OF PARENT

The test you are about to take is a little different from one you have ever taken before. There are no right or wrong answers. The test will not be graded.

All answers refer to a parent. The word parent may mean something different to different people. You will need to decide who "parent" will mean to you.

Think for a moment about some important adults in your life. Some have known you all your life, some for only a year or less. Some are persons whom you admire and respect, some are not. Some have had a lot to do with the person you have become.

Your job now is to identify one adult that you have known very well for at least three years and with whom you have had a very close personal relationship. This person needs to be one who has had a lot to do with the kind of person you have become and one whose opinion you think is important. For most of you, this person will be your mother or father. For others, this person may be a grandparent, a step-parent, or even an aunt, an uncle, or good friend. Most likely this person is an adult with whom you live most of the time. After deciding who this person is, write a sentence explaining who this person is and what your relationship is to the person. (If you have any questions at this point, ask for help before going on.)

From now on, we will call this person "your parent" even though the person may not be your mother or father.

Please feel free to leave blank any questions you prefer not to answer. You have the right to choose not to answer any questions at all.

APPENDIX G

LESSONS IN CREATIVE THINKING

Lesson 1

Objective: Each student will produce at least seven different looking rows of stitches using a sewing machine, fabric, thread, and any other textile products.

Creativity Factor Emphasized: Fluency.

Generalization: Changes in thread tension, stitch length, stitch width, stitch type, stitch direction, and materials can be used to produce an endless variety of stitches.

Warm-up Activity: Students are guided through a series of changes in machine settings to produce different looking stitches.

Instructions for Activity: (Given orally by teacher)
As you can see the rows of stitches you have just made look different. To make these differences we changed the stitch width and stitch length. What are all the parts on the sewing machine which can be changed? (Probable student responses: needle position, stitch type, upper thread tension, presser foot, backstitch lever, color of thread.) In addition, you can change the material on which you stitch, the thread you use, and where on the material you stitch.

Today, I would like you to explore your sewing machines. I would like you to see how many different looking rows of stitching you can make. You may change any of the parts of your sewing machine to make these different looking stitches, or you can change fabric or thread. You will probably think of many other possibilities also.

As you work, make a whole row of each kind of stitch you can think of. Don't be afraid if your ideas look like those of others. You're trying to find as many ways as possible to make stitches look different.

In order to get new ideas every few minutes, we'll all need to share ideas. Every 15 minutes, I'll call time.

At that time choose the one row of stitching that is your best and most different stitch and put it on the edge of the table. We'll all get up and walk around the table looking at everyone else's stitches. Then sit down and try out more ideas.

Reinforcement and Evaluation: At the end of class, each student will select one best row of stitches, cut it out and mount it on a class chart with the student's name. Charts will be displayed the following day to all classes.

Lesson 2

Objectives: (1) Students can predict some problems a physically handicapped person may encounter in using an electric sewing machine. (2) Students can suggest changes in the sewing machine or operation procedures to alleviate problems.

Creativity Factor Emphasized: Sensitivity to problems.

Generalization: The ability to solve problems creatively depends upon the ability to identify defects and needs.

Warm-up Activity: Listen to tape recording of "Eyes at Their Fingertips," the story about Louis Braille (Torrance and Gupta 1964, pp. 182-190).

Instructions for Activity: (Given orally by teacher) You have just heard the story of how one young boy invented a way of printing books that enabled thousands of blind persons to read. Louis Braille made it possible to read by touch. His idea came about because he personally experienced the great difficulties of a blind person.

Using a sewing machine is another task that a blind person might want to do. Can you think of what problems a blind person would have in using a sewing machine?
(Probable student responses: threading the needle, stitching straight, adjusting dials.) How could you find out exactly what problems a blind person would have in sewing?
(Probable student responses: use a blindfold, close eyes.)

Other physically handicapped persons might also have difficulty in sewing. What kinds of physical handicaps would present problems for a person who wanted to sew?
(Probable student responses: wheelchair victim, person with broken arm, paralyzed person, cerebral palsy victim.)

I believe that many physically handicapped persons can and do sew, but they probably have to make some changes. Sewing could probably be made easier if physically handicapped persons could buy specially built sewing machines designed just for them.

Today I would like you to become inventors of sewing machines for handicapped persons. You will need to do four things. (1) Decide on a handicap that makes sewing difficult but not impossible. (2) Figure out what problems a person with that handicap would have. Make a list. (3) Invent changes in a sewing machine that would make sewing less of a problem for that person. (4) Share your ideas.

This is a difficult task, so you'll really have to use your imaginations. Please write down your ideas and decisions for each step. When you decide on some changes, try them out, if possible. Half way through the class, we'll all stop and share ideas so far.

You may work alone or in groups of two or three.

Reinforcement and Evaluation: Half way through class and at the end, groups will orally share best idea.

Lesson 3

Objective: Students are able to produce increasing numbers and categories of ideas when prompted to think in different ways.

Creativity Factors Emphasized: Flexibility primarily and fluency secondarily.

Generalization: By using standard key thought processes, a person can increase the number of categories of ideas produced.

Warm-up Activity: One student will construct a simple cloth rectangle with opening and will turn it right side out. Teacher asks, "The simple sewing project that _____ has made has many uses. What are some uses for it? Can anyone think of any more?"

Instructions for Activity: (Orally by teacher) Sometimes our minds get stuck in a rut. Today we're going to use some techniques to get our minds out of those ruts.

So far we have named only _____ uses for the sewing project that _____ made. If we could learn to think of this project in different ways, we could think of many more ideas. Let's try with the use of a few key words.

The first key word is magnify. This means "to make larger." If you could make this rectangle as much larger as you wanted, can you think of any more uses? (Repeat this procedure with the following key words: Minify (to make smaller), addition (to add something else to it), change shape, division (to use only part of it), multiplication (to use many of them together), change quality of material (change to metal, paper, stone, . . .).)

How many ideas did we get from using key words?

Now let's try another example. Let's think of uses of a tin can. How many things can a tin can be used for? (Repeat process with same key words above and combination, motion, change of position, and rearrangement.)

As you can see, if we can keep these key words in mind, it might be possible to always think of uses for some things people commonly think are useless.

Let's try out this idea. Can you name some useless things? Let's concentrate on _____. How many uses for this object can we think of. Using the key words and writing down all your ideas, think of as many uses as possible. You may work in small groups of 4 or 5. You will have 5 minutes.

Repeat with other ideas.

Reinforcement and Evaluation: Following each trial, have each group share its best idea.

Lesson 4

Objective: Students construct useful toys from common household materials.

Creativity Factor Emphasized: Redefinition.

Generalization: The ability to use objects for purposes other than the intended purposes can result in creative and productive uses of resources.

Warm-up Activity: Use "What Do They Have In Common?," Unit 9 in Invitations to Thinking and Doing (Myers and Torrance

1964). Go over each triplet orally, asking two or three students to explain a common element.

Instructions for Activity: (Orally by teacher) You have just been stretching your minds finding out what three unrelated words have in common.

Now, I am going to challenge you to stretch your minds in another direction. Can anyone imagine what these three objects have in common? (Styrofoam cup, spool of thread and string) (Students will probably name physical properties.) Most of your answers are ones that describe what these three objects are like. For the rest of the class, we're going to be stretching our imaginations to find ways in which objects have common uses.

Today we're going to imagine that you are taking care of some young children and that you don't have too many toys available. You'll have to use your imagination to think of ways to entertain the children. This is how we'll operate. I'll name a few objects, maybe three. They will be objects which you'll find in these boxes. Your job will be to think of a way to make a toy or game out of the objects named. You must use all the objects named, not just one or two. If I say "tin can," you may use as many tin cans as you like and at least one of the other objects named. You'll have a time limit of five minutes to come up with the most workable and unusual idea you can. You may work in pairs, if you like.

The first set of objects is styrofoam cup, string, and spool of thread.

(Repeat using more complex groupings. Suggested articles are styrofoam cup, string, spool of thread, milk carton, tin can, glue bottle, popsicle stick, fabric scraps.)

Reinforcement and Evaluation: After each round, allow any or all individuals or groups to share ideas.

Lesson 5

Objective: Students design details to complete a simple design and use the plan and sewing machine to produce decorative fabric patches.

Creativity Factor Emphasized: Elaboration.

Generalization: One simple idea can become an endless variety of ideas when the details are added.

Warm-up Activity: Post a sign "Alphabet Patch Manufacturing Company" prominently in room. Pass out three small sheets of scratch paper and one small sheet of gift wrapping paper.

(Orally by teacher) On the first sheet of paper, write the first letter of your name. Write it large. Now ask your neighbor if he or she likes what you wrote. Let's try again. On the second sheet of paper, write your initial again but try to do it in an interesting way. Ask your neighbor's opinion again. Ask your neighbor for suggestions. Let's try again. This time add some extra lines around the initial or make your initial look like something else. For this last time, take a piece of gift wrapping paper. Try to find a place in the paper that looks good with your initial. Then write your initial. With your pencil, draw in all the parts of the design on the gift wrapping paper that you like with your initial. (Share results.)

Instructions for Activity: (Orally by teacher) You have probably been wondering just what this sign means. Today you have been hired by the Alphabet Patch Manufacturing Company as fashion designers. One of the latest fashion accessories for boys and girls is the patch--patches of peace signs, patches about bicycling, patches showing sports symbols. This company thinks it can sell millions of patches that are designed to display a person's initials. Your job then is to design one or more patches using either your first or last initial.

First, make several drawings on paper. The designs should fit on a four inch square of felt. When you have a design you like, you may use tracing paper and a tracing wheel to transfer the design to a piece of felt. Then using a different color of thread and a short zig-zag stitch, you may stitch the design onto the felt.

Reinforcement and Evaluation: Students may sew patches onto own clothing. Comments from other students will provide evaluation.

Lesson 6

Objective: Students design an original pattern for construction of a stuffed animal.

Creativity Factor Emphasized: Originality.

Generalization: When students combine their ideas about many known animals and their experiences using stuffed animal

patterns, the students may be able to produce new and unusual stuffed animal patterns.

Warm-up Activity: Ask students, "What is your favorite animal?" Record answers on the board.

Instructions for Activity: (Orally by teacher) Suppose you wanted to make a stuffed animal in honor of your favorite animal. We don't have patterns for birds, cats, horses, and many others. We don't need to let that stop us. We can design our own patterns.

My favorite animal is an owl. Let's see if we can design a pattern for an owl here on the board. As we do it, we'll write down steps.

1. Start with a simple shape--square, circle, triangle, oval.
2. List the features that make your animal different from all other animals.
3. Draw these features onto the basic shape. You may change the basic shape if you decide another would be better.
4. Add $5/8$ inch seam allowances to the basic shape.
5. Trace each feature that will be cut out of a different color of fabric.
6. Place the pattern on two pieces of fabric, cut it out, and stitch it together. Glue or stitch on the other fabric features.

Now it's your turn. There are some animal books here to help you with step 2. Let's see how many unusual new patterns you can make.

Reinforcement and Evaluation: Students may use patterns to make and stuff own animal.

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